017 Final Exam

ARITHMETIC PART: 10 QUESTIONS

Select randomly one question from each category.

1. Addition, subtraction up to 3 integers.

Evaluate. Otherwise, write "undefined": $-3+5$

Compute. Otherwise, write "undefined": $-7-1$

Evaluate. Otherwise, write "undefined": $3-10$

Compute. Otherwise, write "undefined": $-3-(-2)+(-11)$

Compute. Otherwise, write "undefined": $4-(-100)-100$

Evaluate. Otherwise, write "undefined": $-2+5-9$

Compute. Otherwise, write "undefined": $-5-4$

Evaluate. Otherwise, write "undefined": $2-(-9)$

Compute. Otherwise, write "undefined": $-10-(+3)$

Compute. Otherwise, write "undefined": $-8+(-100)-100$

Compute. Otherwise, write "undefined": $-14-(-50)+1$

Compute. Otherwise, write "undefined": $40-(-40)+20$

Compute. Otherwise, write "undefined": $40+(-70)-(-30)$

Evaluate. Otherwise, write "undefined": $12-5-9$

Evaluate. Otherwise, write "undefined": $-20+5+15$

Evaluate. Otherwise, write "undefined": $-2-5-9$

2. Multiplication, or division of integers (using both: ÷ and fraction bar as a division sign) - up to 3 integers.

Evaluate. Otherwise, write “undefined”: $(-1)(-4)$

Compute. Otherwise, write “undefined”: $-2\times(-1)\times(-1)$

Evaluate. Otherwise, write “undefined”: $\frac{-10}{2}$

Compute. Otherwise, write “undefined”: $-10\div 2$

Evaluate. Otherwise, write “undefined”: $\frac{-48}{-8}$

Compute. Otherwise, write “undefined”: $-3\div(-3)$

Evaluate. Otherwise, write “undefined”: $2(-3)(7)$

Compute. Otherwise, write “undefined”: $-6(-1)(-2)$

Evaluate. Otherwise, write “undefined”: $4(-10)(-100)$

Compute. Otherwise, write “undefined”: $-5(-1)(8)$

Evaluate. Otherwise, write “undefined”: $-6(-8)$

Compute. Otherwise, write “undefined”: $\frac{-9}{0}$

Evaluate. Otherwise, write “undefined”: $0\div 10$

Compute. Otherwise, write “undefined”: $-10\div 0$

Compute. Otherwise, write “undefined”: $\frac{0}{5}$

3. Order of operations, integers only, two operations (only integers as an answer, no exponents).

Compute. Otherwise, write “undefined”: $7+2\times 3$

Compute. Otherwise, write “undefined”: $4-(7-8)$

Evaluate. Otherwise, write “undefined”: $\frac{5-10}{5}$

Evaluate. Otherwise, write “undefined”: $-1-1(-1)$

Compute. Otherwise, write "undefined": $-4-4(-4)$

Evaluate. Otherwise, write "undefined": $(-6-1)(2-9)$

Compute. Otherwise, write "undefined": $4\div(-12+12)$

Evaluate. Otherwise, write "undefined": $2-(-1-3)$

Compute. Otherwise, write "undefined": $2\div(4-5)\times(-3)$

Evaluate. Otherwise, write "undefined": $[-3+(-7)](-2)$

Compute. Otherwise, write "undefined": $4\div(-1+3-2)$

Evaluate. Otherwise, write "undefined": $-4-(-7)+(-2)$

Compute. Otherwise, write "undefined": $-8(-2)-8$

Evaluate. Otherwise, write "undefined": $\dfrac{-3-7}{-4+4}$

Compute. Otherwise, write "undefined": $-2-3\cdot(-2)$

Evaluate. Otherwise, write "undefined": $-12\div3-2$

Compute. Otherwise, write "undefined": $8-(-9+2)$

Evaluate. Otherwise, write "undefined": $4-(2+5)$

Compute. Otherwise, write "undefined": $-12\div(3-2)$

Evaluate. Otherwise, write "undefined": $-5\times3-4$

Evaluate. Otherwise, write "undefined": $4\div(-2+2)$

Compute. Otherwise, write "undefined": $\dfrac{-12}{-6-(-6)}$

Evaluate. Otherwise, write "undefined": $(-5+5)\div10$

4. Addition and subtraction of fractions or of fractions and integers (positive and negative).

Compute: $-\frac{2}{3}+\frac{4}{5}$

Compute: $\frac{3}{5}-\left(-\frac{5}{6}\right)$

Evaluate: $2+\frac{3}{4}$

Evaluate: $1-\frac{4}{3}$

Evaluate: $\frac{2}{3}+\left(-\frac{3}{7}\right)$

Evaluate: $-\frac{5}{4}-\frac{3}{5}$

Evaluate: $-\frac{4}{9}+\frac{-5}{12}$

Evaluate: $\frac{-3}{14}-\frac{9}{2}$

Evaluate: $-(-1)-\frac{3}{8}$

Evaluate: $-\left(-\frac{5}{6}\right)-3$

Evaluate: $-\frac{7}{23}+2$

Compute: $-\left(-\frac{4}{7}\right)+\left(-\frac{2}{9}\right)$

Compute: $-\frac{3}{4}-\frac{10}{9}$

Compute: $\frac{7}{18}-\left(\frac{-4}{9}\right)$

Compute: $-1-\left(-\frac{5}{7}\right)$

Compute: $-\frac{3}{14}+\frac{5}{7}$

Compute: $-\frac{2}{3}-\frac{3}{11}$

Compute: $-\frac{2}{9}-\frac{3}{7}$

Compute: $\frac{2}{3}-6$

Compute: $-\frac{4}{9}+\frac{-5}{12}$

5. Multiplication of fractions and of fractions and integers (positive and negative).

Compute: $\frac{3}{5}\times(-10)=$

Evaluate: $-\frac{345}{5}\times\frac{1}{2}\times\frac{10}{345}=$

Compute: $12\left(\frac{-2}{15}\right)$

Evaluate: $\frac{-8}{9}\times(-18)$

Compute: $\frac{11}{7}\times\frac{4}{3}\times\frac{1}{11}$

Evaluate: $-\frac{5}{2}\times\frac{4}{6}\times\left(-\frac{4}{35}\right)$

Compute: $-\frac{5}{12}\times\left(-\frac{3}{10}\right)\times\left(-\frac{4}{8}\right)$

Evaluate: $\left(-\frac{24}{7}\right)\left(\frac{-1}{6}\right)\left(\frac{4}{32}\right)$

Compute: $\frac{7}{321}\times(-2)\times\left(\frac{321}{6}\right)$

Evaluate: $12\left(-\frac{2}{15}\right)$

Compute: $100\times\frac{23}{27}$

Evaluate: $\left(-\frac{24}{3}\right)\left(-\frac{19}{8}\right)$

Compute: $\frac{7}{2}\times\left(-\frac{4}{21}\right)$

Evaluate: $\left(-\frac{10}{11}\right)\left(-\frac{22}{5}\right)$

Compute: $\frac{9}{7}\times\frac{4}{3}$

Evaluate: $\left(-\frac{5}{4}\right)\left(\frac{6}{10}\right)$

Compute: $-\frac{5}{2}\times\frac{8}{15}$

Evaluate: $\frac{-8}{7}\times\frac{10}{9}$

Compute: $\frac{7}{3}\times\left(-\frac{2}{3}\right)$

Evaluate: $\left(\frac{-5}{4}\right)\left(\frac{9}{2}\right)$

6. Division (using both ÷ and fraction bar) of fractions and of fractions and integers (positive and negative).

Evaluate. Otherwise, write "undefined": $\dfrac{\frac{3}{4}}{\frac{1}{2}}$

Compute. Otherwise, write "undefined": $-\frac{3}{5}\div\frac{2}{7}$

Evaluate. Otherwise, write “undefined”: $\dfrac{\frac{3}{4}}{2}$

Compute. Otherwise, write “undefined”: $-4 \div \frac{2}{7}$

Evaluate. Otherwise, write “undefined”: $-\frac{9}{7} \div \frac{8}{14}$

Compute. Otherwise, write “undefined”: $\frac{2}{5} \div \frac{5}{3}$

Evaluate. Otherwise, write “undefined”: $\frac{16}{9} \div (-8)$

Compute. Otherwise, write “undefined”: $-20 \div \left(\frac{-2}{5}\right)$

Evaluate. Otherwise, write “undefined”: $\dfrac{\frac{2}{15}}{-6}$

Compute. Otherwise, write “undefined”: $\dfrac{-\frac{4}{11}}{10}$

Evaluate. Otherwise, write “undefined”: $\dfrac{-\frac{8}{9}}{\frac{5}{6}}$

Compute. Otherwise, write “undefined”: $\dfrac{-9}{-\frac{12}{13}}$

Evaluate. Otherwise, write “undefined”: $\dfrac{\frac{-3}{10}}{\frac{1}{5}}$

Compute. Otherwise, write “undefined”: $\dfrac{2}{\frac{1}{5}}$

Evaluate. Otherwise, write "undefined": $\dfrac{-\frac{14}{3}}{\frac{7}{9}}$

Compute. Otherwise, write "undefined": $\dfrac{-\frac{2}{21}}{-\frac{1}{14}}$

Evaluate. Otherwise, write "undefined": $-1 \div \left(\frac{-2}{5}\right)$

Compute. Otherwise, write "undefined": $\frac{5}{3} \div \left(-\frac{2}{3}\right)$

Evaluate. Otherwise, write "undefined": $\left(-\frac{15}{4}\right) \div \left(\frac{10}{6}\right)$

Compute. Otherwise, write "undefined": $\left(-\frac{9}{13}\right) \div (-3)$

7. "Zero category"(number/0; 0/number; addition of opposite numbers; multiplication by 0). "Ten category": Multiplication and division of decimals and integers by powers of ten.

Compute. Otherwise, write "undefined": $234 \times 1000 =$

Evaluate. Otherwise, write "undefined": $0.13 \div 10 =$

Compute. Otherwise, write "undefined": $0.2 \times 100 =$

Evaluate. Otherwise, write "undefined": 0×237

Compute. Otherwise, write "undefined": $0 \div 23$

Compute. Otherwise, write "undefined": $-2667 + 2667$

Evaluate. Otherwise, write "undefined": $\dfrac{-17}{0}$

Evaluate. Otherwise, write "undefined": $0.2 \div 10$

Evaluate. Otherwise, write "undefined": $3.21 \div 100$

Evaluate. Otherwise, write "undefined": $6 \div 100$

Evaluate. Otherwise, write "undefined": $112 \div 10$

Evaluate. Otherwise, write "undefined": $\frac{4.5}{100}$

Evaluate. Otherwise, write "undefined": 0.234×100

Compute. Otherwise, write "undefined": 7.2×1000

Compute. Otherwise, write "undefined": $\frac{0}{100}$

Compute. Otherwise, write "undefined": $0 \div 0$

Compute. Otherwise, write "undefined": 10×1000

Compute. Otherwise, write "undefined": 10×67.5

Compute. Otherwise, write "undefined": $-98-(-98)$

Compute. Otherwise, write "undefined": 100×0.3

8. Addition, subtraction, multiplication and division of decimals (and integers).

Evaluate. Otherwise, write "undefined": $0.1-2.1=$

Compute. Otherwise, write "undefined": $0.1+0.999=$

Compute. Otherwise, write "undefined": $-3 \times 0.02=$

Compute. Otherwise, write "undefined": $0.1 \times 0.01=$

Evaluate. Otherwise, write "undefined": $0.33 \div (-0.011)=$

Evaluate. Otherwise, write "undefined": $\frac{2}{-0.2}=$

Compute. Otherwise, write "undefined": $\frac{1.2}{-0.018}$

Compute. Otherwise, write "undefined": $\frac{-49}{0.21}$

Compute. Otherwise, write "undefined": $-0.5 \div (-0.0001)$

Evaluate. Otherwise, write "undefined": $3.2 - (-1.4)$

Evaluate. Otherwise, write "undefined": $-0.8 - (-0.04)$

Compute. Otherwise, write "undefined": $-0.9 - 0.2 - 0.4$

Compute. Otherwise, write "undefined": $7.22 + (-0.002)$

Compute. Otherwise, write "undefined": $-(-0.8) + (-0.2)$

Compute. Otherwise, write "undefined": $0.71 - (-5.1) - 3.4$

Compute. Otherwise, write "undefined": $-3.5 \times (-2)$

Compute. Otherwise, write "undefined": -79.3×0.001

Compute. Otherwise, write "undefined": $4 \times (-0.005)$

Compute. Otherwise, write "undefined": $-0.2 \times (-0.3) \times (-0.4)$

Compute. Otherwise, write "undefined": $2 \times (-0.2) \times 0.03$

9. Exponential notation (fractions, integers, decimals)

Evaluate. Otherwise, write "undefined": -1^6

Compute. Otherwise, write "undefined": $(0.1)^3$

Evaluate. Otherwise, write "undefined": $-\left(-\frac{2}{3}\right)^2$

Evaluate. Otherwise, write "undefined": $(0.9)^2$

Evaluate. Otherwise, write "undefined": $(-0.4)^3$

Evaluate. Otherwise, write "undefined": $-(1.1)^2$

Evaluate. Otherwise, write "undefined": $-(-0.01)^4$

Evaluate. Otherwise, write "undefined": $(-0.06)^2$

Evaluate. Otherwise, write "undefined": $(-0.1)^7$

Evaluate. Otherwise, write "undefined": -2^4

Evaluate. Otherwise, write "undefined": $(-1)^{14}$

Evaluate. Otherwise, write "undefined": $-(-7)^2$

Evaluate. Otherwise, write "undefined": $(-1)^{25}$

Evaluate. Otherwise, write "undefined": $-(-3)^3$

Evaluate. Otherwise, write "undefined": $\left(-\frac{9}{8}\right)^2$

Evaluate. Otherwise, write "undefined": $-\left(\frac{1}{2}\right)^4$

Evaluate. Otherwise, write "undefined": $\frac{4^3}{9}$

Evaluate. Otherwise, write "undefined": $-\left(\frac{-2}{3}\right)^3$

Evaluate. Otherwise, write "undefined": $\frac{-5^2}{6}$

Evaluate. If not possible, write "undefined": $\left(-\frac{1}{2}\right)^4$

10. Addition, subtraction, multiplication and division including mixed number representations. Order of operations (up to 3 operations).

Compute. Otherwise, write "undefined": $2\frac{1}{3}-1\frac{5}{6}$

Compute. Otherwise, write "undefined": $2\frac{3}{5}+5\frac{2}{7}$

Compute. Otherwise, write "undefined": $-2\frac{1}{3}\times 1\frac{6}{7}$

Evaluate. Otherwise, write "undefined": $1\frac{2}{3}\div(-1\frac{1}{9})$

Evaluate. Otherwise, write "undefined": $-2\times\frac{1}{2}-2^2$

Evaluate. Otherwise, write "undefined": $(2-3)(-\frac{1}{3}-\frac{2}{3})$

Evaluate. Otherwise, write "undefined": $\frac{3}{5}\div\left(\frac{1}{2}-\frac{3}{5}\right)$

Evaluate. Otherwise, write "undefined": $\frac{3}{20}-\frac{4}{17}\times\frac{17}{5}$

Evaluate. Otherwise, write "undefined": $\frac{-2}{5}\times 8-\frac{2}{3}$

Evaluate. Otherwise, write "undefined": $-\frac{5}{6}\div\frac{3}{4}\div 2$

Evaluate. Otherwise, write "undefined": $\left(-\frac{2}{7}\times\frac{14}{5}\right)^2$

Evaluate. Otherwise, write "undefined": $\frac{-0.2}{-0.01}-20.1$

Evaluate. Otherwise, write "undefined": $(-0.7-0.3)(-0.02)$

Evaluate. Otherwise, write "undefined": $(-0.2)(-5)+(-0.2)(0.3)$

Evaluate. Otherwise, write "undefined": $0.9\div 1.8\times 10$

Evaluate. Otherwise, write "undefined": $-4.2-(3.9-4.6)$

Evaluate. Otherwise, write "undefined": $-2-1\frac{3}{7}$

Evaluate. Otherwise, write "undefined": $-5\frac{1}{3}\times(-2)$

Evaluate. Otherwise, write "undefined": $-2\div 2\frac{3}{9}$

Evaluate. Otherwise, write "undefined": $\frac{1}{3}-4\frac{3}{5}$

Theme I:
UNDERSTANDING THE PRINCIPLE "EQUALS CAN BE SUBSTITUTED FOR EQUALS"; PROPER USE OF PARENTHESES ("adjacent" operation signs must be separated by parentheses; the exponent pertains only to the closest symbol unless parentheses indicate otherwise)

1. Rewriting the expression by replacing the variable(s) with its (their) value(s)

Let $A=-1$ *and* $B=-1$ Rewrite the expression $-(A+3B)$ by substituting values of the variables. **Do not evaluate the resulting expression.**

Let $A=0.1$ *and* $B=-0.2$ Rewrite the expression $2A+B$ by substituting values of the variables. **Do not evaluate the resulting expression.**

Let $A=\frac{2}{7}$ *and* $B=-\frac{1}{6}$ Rewrite the expression $2AB$ by substituting values of the variables. **Do not evaluate the resulting expression.**

Let $A=\frac{1}{3}$ *and* $B=-\frac{2}{3}$ Rewrite the expression A^2+B^2 by substituting values of the variables. **Do not evaluate the resulting expression.**

Let $x=0.1$ *and* $y=-0.2$ Rewrite the expression $2x\div y$ by substituting values of the variables. **Do not evaluate the resulting expression.**

Rewrite the expression $A-B^2$ by substituting values of the variables: $A=4$ *and* $B=\frac{5}{9}$. **Do not evaluate the resulting expression.**

Rewrite the expression $bn-1$ by substituting values of the variables: $b=\frac{1}{3}$ *and* $n=-3$. **Do not evaluate the resulting expression.**

Let $m=-0.3$ *and* $n=0.6$. Rewrite the expression $n\div 0.2+m$ by substituting values of the variables. **Do not evaluate the resulting expression.**

Rewrite the expression $8m-10n$ by substituting values of the variables when $m=-\frac{1}{8}$ *and* $n=\frac{4}{5}$. **Do not evaluate the resulting expression.**

Let $m = -\frac{1}{8}$ *and* $n = \frac{4}{5}$. Rewrite the expression $8m^2 + n$ by substituting values of the variables. **Do not evaluate the resulting expression.**

Rewrite the expression $2m - 3n$ by substituting values of the variables when $m = -2$ *and* $n = 5$. **Do not evaluate the resulting expression.**

Let $x = -100$. Rewrite the expression $3x$ replacing the variable with its value. **Do not evaluate the resulting expression.**

Let $x = -100$. Rewrite the expression $3 - x$ replacing the variable with its value. **Do not evaluate the resulting expression.**

Let $x = -1$. Rewrite the expression $x - 2$ replacing the variable with its value. **Do not evaluate the resulting expression.**

Let $x = \frac{7}{9}$. Rewrite the expression x^7 replacing the variable with its value. **Do not evaluate the resulting expression.**

Let $x = -1$. Rewrite the expression $\frac{x}{700}$ replacing the variable with its value. **Do not evaluate the resulting expression.**

Let $x = -2$. Rewrite the expression $-4x$ replacing the variable with its value. **Do not evaluate the resulting expression.**..

Let $x = 7$. Rewrite the expression x^x replacing the variable with its value. **Do not evaluate the resulting expression.**

Rewrite the expression $-A$ replacing the variable with its value if $A = -2$. **Do not evaluate the resulting expression.**

Substitute $x = -6$ in the expression: $x - 8$. **Do not evaluate the resulting expression.**

Substitute $x = -6$ in the expression: $-10 - x$. **Do not evaluate the resulting expression.**

Substitute $x = 5$ in the expression : $-10 - x$. **Do not evaluate the resulting expression.**

Substitute $x = -1$ in the expression : $3 \div x$. **Do not evaluate the resulting expression.**

Substitute $x = -1$ in the expression : $-2 + x - 6$. **Do not evaluate the resulting expression.**

Substitute $x = -1$ in the expression : $-50 \div x$. **Do not evaluate the resulting expression.**

Substitute $x = \frac{3}{7}$ in the expression : x^9. **Do not evaluate the resulting expression.**

Substitute $x = -12$ in the expression: x^2. **Do not evaluate the resulting expression.**

Let $x = 8$. Rewrite the expression replacing the variable with its value and evaluate: $(-x)^2$ **Do not evaluate the resulting expression.**

Let $x = 100$. Rewrite the expression replacing the variable with its value and evaluate: $-x^2$ **Do not evaluate the resulting expression.**

Substitute $x = -\frac{7}{3}$ in the expression: $\frac{5}{3} + x$. **Do not evaluate the resulting expression.**

Substitute $x = -\frac{2}{9}$ in the expression: $x + \frac{1}{5}$. **Do not evaluate the resulting expression.**

Substitute $x = -\frac{3}{5}$ in the expression: $\frac{3}{10} \div x$. **Do not evaluate the resulting expression.**

Substitute $x = -\frac{3}{5}$ in the following expression: x^4. **Do not evaluate the resulting expression.**

Substitute $x = \frac{2}{7}$ in the following expression: x^4. **Do not evaluate the resulting expression.**

Substitute $x = 0.2$ in the expression: $\frac{-x}{0.04}$. **Do not evaluate the resulting expression.**

Substitute $x = -0.6$ in the expression: $-x - 4.5$. **Do not evaluate the resulting expression.**

Rewrite the expression $A^2 + B^2$ by substituting value of variables when $A = \frac{1}{3}$ *and* $B = -\frac{2}{3}$. **Do not evaluate the resulting expression.**

2. <u>Substitution when the value of a part of the algebraic expression is given (rather than the value of the variables); Rewriting the original expression in an equivalent form is not required to make the needed substitution</u>

Rewrite the expression $-2A^5$ by substituting the numerical value of $A^5 = -3$. **Do not evaluate the resulting expression.**

Rewrite the algebraic expression $a + b + c - d$ as a numerical expression by substituting the following values $a + b = -2$ and $c - d = 3$. **Do not evaluate the resulting expression.**

Rewrite the expression $-x^5 + 1$ by substituting the numerical value of $x^5 = -3$. **Do not evaluate the resulting expression.**

Rewrite the expression $(yx^3)^5$ by substituting the numerical value of $yx^3 = \frac{2}{3}$. **Do not evaluate the resulting expression.**

Rewrite the expression $4ab$ by substituting the numerical value of $ab = -4$. **Do not evaluate the resulting expression.**

Rewrite the expression $\left(\frac{x-y}{2}\right)^2$ by substituting the numerical value of $x - y = 3$. **Do not evaluate the resulting expression.**

Rewrite the expression $3 - ax$ by substituting the numerical value of $ax = -0.7$. **Do not evaluate the resulting expression.**

Rewrite the expression $-abcd$ by substituting the numerical values of $ab = -6$ and $cd = -8$. **Do not evaluate the resulting expression.**

Rewrite the expression $2(x + y + 3)$ by substituting the numerical value of $x + y = -0.5$ **Do not evaluate the resulting expression.**

Rewrite the expression $\frac{x^2 + 1}{x^2}$ by substituting the numerical values of $x^2 = 3$ **Do not evaluate the resulting expression.**

Rewrite the expression $\frac{2}{5}a^2b$ by substituting the numerical value of $a^2b = -\frac{2}{9}$ **Do not evaluate the resulting expression.**

Rewrite the expression $2 \div AB$ by substituting the numerical value of $AB = -2.5$ **Do not evaluate the resulting expression.**

Rewrite the expression $-\frac{1}{m^2}$ by substituting the numerical value of $\frac{1}{m^2} = -4$ **Do not evaluate the resulting expression.**

Rewrite the expression $-\frac{1}{m^2}$ by substituting the numerical value of $m^2 = 2$ **Do not evaluate the resulting expression.**

Rewrite the expression $7x^2 - 3y + 2$ by substituting the numerical values of $x^2 = -2$ *and* $y = 4$ **Do not evaluate the resulting expression.**

Rewrite the expression $-m^2n^7$ by substituting the numerical values of $m^2 = 3$ *and* $n = -8$ **Do not evaluate the resulting expression.**

Rewrite the expression $(a - b)(c + d)^3$ by substituting the numerical values of $a - b = -1$ *and* $c + d = -4$ **Do not evaluate the resulting expression.**

Rewrite the expression $-(a-b)+2(c+d)$ by substituting the numerical values of $a-b=-1$ *and* $c+d=-4$
Do not evaluate the resulting expression.

3. Rewriting algebraic expression in terms of another variable (only a direct substitution needed; "relatively easy" simplification) or replacing up to 2 variables with an algebraic expression and solving the resulting "relatively easy" equation

Rewrite the expression $\frac{7}{3a}$ in terms of x given that $a=7x$. Simplify and write your answer without parentheses.

Let $a=3x-2$ *and* $b=2$. Find the value of x so that the following is true: $a=b$

Express A^3 in terms of x when $A=x^7$. Write your answer without parentheses. Simplify and write your answer without parentheses.

Rewrite the expression $\frac{3a}{2}$ in terms of x given that $a=2x$. Simplify and write your answer without parentheses.

Express $-2P$ in terms of m when $P=-m$. Simplify and write your answer without parentheses.

Express $-2P$ in terms of m when $P=m^2-m$ Simplify and write your answer without parentheses.

Express A^3 in terms of x when $A=2x$ Simplify and write your answer without parentheses.

Express A^3 in terms of x when $A=-x$ Simplify and write your answer without parentheses.

Rewrite the expression $\frac{a-1}{3x-1}$ in terms of x if it is given that $a=3x$ Simplify and write your answer without parentheses.

Express A^3 in terms of x when $A=-x^3$. Simplify and write your answer without parentheses.

Write the expression $-a+2b$ in terms of x if $a=5x$ *and* $b=-x$. Simplify and write your answer without parentheses.

Write the expression a^2+4a in terms of x if $a=x-2$. Simplify and write your answer without parentheses.

Express $\frac{x-y}{2}$ in terms of a and b if $x=a+b$ *and* $y=a-b$. Simplify and write your answer without parentheses.

Express $\frac{4}{x+y}$ in terms of x if $y = x$. Simplify and write your answer without parentheses.

Let $P = -x + 2, \quad Q = 4x - 1$. Express $P + Q$ in terms of x. Simplify and write your answer without parentheses.

Let $P = -x + 2, \quad Q = 4x - 1$. Express $P - Q$ in terms of x. Simplify and write your answer without parentheses.

Let $P = -x + 2, \quad Q = 4$. Express PQ in terms of x. Simplify and write your answer without parentheses.

Let $Q = 4x - 1$. Express Q^2 in terms of x. Simplify and write your answer without parentheses.

Let $A = -x + 2$ *and* $B = 4x$. Express $A + B$ in terms of x. Simplify and write your answer without parentheses.

Let $A = -x + 2$ *and* $B = 4x$. Express $-AB$ in terms of x. Simplify and write your answer without parentheses.

Express $A^2 - AB$ in terms of x if $A = x$ *and* $B = -x$. Simplify and write your answer without parentheses.

Let $P = -x^3$ *and* $R = 2x^2$. Write the expression PR in terms of x. Simplify and write your answer without parentheses.

Let $P = -x^3$ *and* $R = 2x^2$. Write the expression $\frac{P}{R}$ in terms of x. Simplify and write your answer without parentheses.

Rewrite the expression $a^2 - b^2$ in terms of x if $a = 5x$ *and* $b = 1$. Simplify and write your answer without parentheses.

Rewrite the expression $a^2 - b^2$ in terms of x if $a = x$ *and* $b = -x$. Simplify and write your answer without parentheses.

Rewrite the expression $a^2 - b^2$ in terms of a if $a = b$. Simplify and write your answer without parentheses.

Rewrite the expression $a^2 b$ in terms of x if $a = x^3$ *and* $b = x^4$ Simplify and write your answer without parentheses.

Rewrite the expression $a^2 b$ in terms of a if $a = b$. Simplify and write your answer without parentheses.

Let $C = -3x$ *and* $D = \frac{x}{2}$. Write the expression CD in terms of x. Simplify and write your answer without parentheses.

Let $C = -3x$ *and* $D = \frac{x}{2}$. Write the expression $C - D$ in terms of x. Simplify and write your answer without parentheses.

Rewrite the expression $a^2 - 2ab + b^2$ in terms of x if $a = 1$ *and* $b = x$. Simplify and write your answer without parentheses.

Rewrite the expression $a^2 - 2ab + b^2$ in terms of x if $a = 3x$ *and* $b = 2x$. Simplify and write your answer without parentheses.

Rewrite the expression $a^2 - 2ab + b^2$ in terms of x if $a = \frac{x}{2}$ *and* $b = -x$. Simplify and write your answer without parentheses.

Rewrite the expression $a^2 - 2ab + b^2$ in terms of x if $a = b = x$. Simplify and write your answer without parentheses.

Express $2x - y$ in terms of s, if $x = s^3$ *and* $y = 2s$. Simplify and write your answer without parentheses.

Express $x^2 y$ in terms of s, if $x = s^3$ *and* $y = 2s$. Simplify and write your answer without parentheses.

Express $2x + y^3$ in terms of s, if $x = s^3$ *and* $y = 2s$. Simplify and write your answer without parentheses.

Express $\frac{xy^2}{4}$ in terms of s, if $x = s^3$. Simplify and write your answer without parentheses.

Express ab in terms of x, if $a = \frac{5x}{126}$ *and* $b = \frac{126}{5}$. Simplify and write your answer without parentheses.

Let $a = 3x$ *and* $b = x + 2$. Find the value of x so that the following is true: $a = b$

Let $a = 3x$ *and* $b = x$. Find the value of x so that the following is true: $a = 2b$

Let $A = 2x, \quad B = -x$. Find the value of x so the following is true: $\frac{A}{2} = 1 - B$

Let $A = 2x - 1, \quad B = -x + 2$. Find the value of x, so the following is true: $A + B = 0$

Let $A = 2x, \quad B = -x$. Find the value of x, so the following is true: $A - 3B = 1$

Let $P = 3x, \quad Q = 3x + 6$. Find the value of x such that the following is true: $P = -Q$

Let $P = -7, \quad Q = 2x$. Find the value of x such that the following is true: $\frac{Q}{2} = -P$

Let $x = 3a, \quad y = -2a + 1$. Find the value of a, so the following is true: $x + y = 3$

Let $y = -2a + 1, \quad z = 2 + a$. Find the value of a, so the following is true: $y = z - 2$

4. Evaluating (or expressing in term of another variable) algebraic expressions when the value of a part of it is given (rather than the value of variables). No rewriting the original expression is needed to make the substitution.

If $A + B = -1$, evaluate: $-2(A + B)^5$

If $A^5 = -3$, evaluate: $-(2A^5)^2$

If $A^5 = -3$, evaluate: $-2 - 2A^5$

Evaluate the expression $\left(\frac{a}{b}\right)^2$ if $\frac{a}{b} = -3$

Evaluate the expression $-\frac{a}{b}$ if $\frac{a}{b} = -3$

Evaluate the expression $\frac{a+b}{c} - 2$ if $\frac{a+b}{c} = -2$

Evaluate the expression $-\left(\frac{a+b}{c}\right)^2$ if $\frac{a+b}{c} = -2$

Evaluate the expression $\left(-\frac{a+b}{c}\right)^2$ if $\frac{a+b}{c} = -2$

If $x + y = -2$, evaluate $(x + y)^2 - 4$

If $x + y = -2$, evaluate $\frac{x+y}{7} + \frac{1}{3}$

If $\frac{1}{A} = -\frac{2}{7}$, evaluate $-\frac{1}{A}$

Evaluate the expression $\frac{1}{GHJ}$ if $GHJ = -1$

Evaluate the expression $2 - \frac{a}{b} - 10$ if $\frac{a}{b} = 3$

Evaluate the expression $-\frac{xy}{z}$ if $\frac{xy}{z} = -\frac{1}{3}$

Evaluate the following expression $a + b + c - d$ if $a + b = -2$ *and* $c - d = 3$

Evaluate the following expression $(a+b)^2+c-d$ if $a+b=-2$ *and* $c-d=0$

Evaluate the following expression $\frac{a+b}{c-d}$ if $a+b=-9$ and $c-d=3$

Evaluate the expression $(x-z)x^2y$ if $x^2y=-0.2$ *and* $x-z=0.6$

Evaluate the expression $\frac{x-z}{x^2y}$ if $x^2y=-0.2$ *and* $x-z=0.6$

Evaluate the expression $-(x-z)+x^2y$ if $x^2y=-0.2$ *and* $x-z=0.6$

Evaluate the expression $-4xyzt$ if $xy=-1$ *and* $zt=-3$.

Evaluate the expression $-xy+zt$, if $xy=-1$ *and* $zt=-3$.

Evaluate the expression $\frac{xy-zt}{xy}$, if $xy=-1$ *and* $zt=-3$.

Evaluate the following expression $-y^4x^3z^6$ if $x^3y^4z^6=-\frac{2}{3}$.

Evaluate the following expression $\frac{1}{x^2+y^2}$ if $x^2+y^2=0.1$

Evaluate the following expression $y^2+x^2-0.3$ if $y^2+x^2=0.1$

Express $\frac{x}{z}-\frac{t}{z}$ in terms of y if $\frac{x}{z}=-y$ *and* $\frac{t}{z}=2y$. Simplify.

Express $\left(\frac{x}{z}\right)^2-\left(\frac{t}{z}\right)^2$ in terms of y if $\frac{x}{z}=3y$ *and* $\frac{t}{z}=-2$. Simplify.

5. <u>Evaluating (or expressing in term of another variable) algebraic expressions when the value of a part of it is given (rather than the value of variables). Rewriting the original expression in some equivalent form is required to make the needed substitution</u>

Evaluate the expression $\frac{a}{2}+\frac{b}{2}$ if $a+b=\frac{1}{3}$.

Evaluate the expression $x-y$ if $y-x=0.1$.

Rewrite the expression $7x+7y$ in terms of m if $x+y=m$.

Rewrite the expression $a-2b+3c+4d$ in terms of x if it is given that $a+3c=5x$ *and* $4d-2b=-x$. Simplify.

Evaluate the expression $10x-10y$ if $x-y=0.07$.

Rewrite the expression $-x-y$ in terms of m if $x+y=3m$.

Rewrite the expression $\frac{x}{7}+\frac{y}{7}$ in terms of m if $x+y=m$.

Rewrite the expression $\frac{1}{A^2}$ in terms of x if $\frac{1}{A}=x$.

Rewrite the expression $-c+b+2a$ in terms of x if $2a+b-c=x$.

Rewrite the expression $-2a-b+c$ in terms of x if $2a+b-c=x$.

Rewrite the expression $a-b-(3b-a)$ in terms of x if $2a-4b=x$.

Rewrite the expression $m(-2)n(-1)p$ in terms of s if $mnp=s$. Simplify.

Rewrite the expression $m^3(np)^3$ in terms of s if $mnp=s$.

Rewrite the expression $\frac{a^2a}{b^3}$ in terms of y if $\frac{a}{b}=y$.

Rewrite the expression $-\frac{x^2y^2}{z^2}$ in terms of m if $\frac{xy}{z}=\frac{m}{2}$.

Rewrite the expression $-zxty$ in terms of m if $xy=-m,\quad zt=-3m$. Simplify.

Rewrite the expression $z^6(-2)y^4(-3)x^3$ in terms of s if $x^3y^4z^6=s$. Simplify.

Rewrite the expression $\frac{1}{2}x^2+\frac{1}{2}y^2$ in terms of s if $x^2+y^2=-2s$. Simplify.

Write the expression $\left(6^a\right)^b$ in terms of m, if $ab=m$

Write the expression $\frac{a}{2}b$ in terms of m, if $ab=4m$

Write the expression $(-2b)(-\frac{1}{2}a)$ in terms of m, if $ab = m$

Write the expression a^3b^3 in terms of m, if $ab = m$

Evaluate the expression $3a(-4b)c$ if $ac = 0.2$ *and* $b = 0.1$.

Evaluate the expression $a - c - b$, if $a - b = -1$ *and* $c = 2$.

Evaluate the expression $\frac{a}{c} - \frac{b}{c}$, if $a - b = -1$ *and* $c = 2$.

Evaluate the expression $2c - (b - a)$, if $a - b = -1$ *and* $c = 2$.

Evaluate the expression $\frac{m^2}{n^2}$, if $\frac{m}{n} = 4$.

Evaluate the expression $\frac{n}{m}$, if $\frac{m}{n} = 4$.

If $x + y = -2$, evaluate $7x + 7y$

If $x + y = -2$, evaluate $\frac{x}{7} + \frac{y}{7}$

If $x + y = -2$, evaluate $-x - y$

Evaluate the expression $x^3(y^2z^3)^2$, if $x^3y^4z^6 = -\frac{2}{3}$.

Evaluate the expression $z^6(-2)y^4(-3)x^3$, if $x^3y^4z^6 = -\frac{2}{3}$.

Evaluate the expression $-\frac{x^3y^4}{3} \cdot z^6$, if $x^3y^4z^6 = -\frac{2}{3}$.

Evaluate the expression $2(a - d + c + b)$ if $a + b = -2$ *and* $c - d = 3$

Evaluate the expression $9(a + b)^2 - d + c$ if $a + b = -2$ *and* $c - d = 3$

Evaluate the expression, $-zxty$ if $xy = -1$ *and* $zt = -3$:

Evaluate the expression $\frac{1}{2}x^2 + \frac{1}{2}y^2$ if $x^2 + y^2 = 0.1$

Evaluate the expression $\frac{x^2}{0.2}+\frac{y^2}{0.2}$ if $x^2+y^2=0.1$

Evaluate the expression $G^3(HJ)^3$ if $GHJ=-1$

Evaluate the expression $G(-2)H(-1)J$ if $GHJ=-1$

If $\frac{1}{A}=-\frac{2}{7}$, evaluate $\frac{1}{A^2}$

If $\frac{1}{A}=-\frac{2}{7}$, evaluate $\frac{1}{-A}$

Simplify the expression $4x-(z+4x)$ and then evaluate when $z=-3$:

Theme II:
WRITING PHRASES AS ALGEBRAIC EXPRESSIONS; PROPER USE OF PARENTHESES (required by the order of operations as well as the adopted conventions like "adjacent" operation signs must be separated by parentheses; the exponent pertains only to the closest symbol unless parentheses indicate otherwise)

6. Writing phrases (involving only one operation) as algebraic expressions.

Write a direct translation of the phrase "The product of a *and* $-b$" as an algebraic expression. **Do not simplify.**

Write a direct translation of the phrase "The sum of $-a$ *and* $-b$" as an algebraic expression. **Do not simplify.**

Write a direct translation of the phrase "$-x$ raised to m-th power " as an algebraic expression. **Do not simplify.**

Write a direct translation of the phrase "$-x$ squared" as an algebraic expression. **Do not simplify.**

Write a direct translation of the phrase "The product of $-a$ and $-b$" as an algebraic expression. **Do not simplify.**

Write a direct translation of the phrase "$-n$ divided by $-m$" as an algebraic expression. **Do not simplify.**

Write a direct translation of the phrase: "$\frac{b}{a}$ raised to the tenth power" as an algebraic expression. **Do not simplify.**

Write a direct translation of the phrase: "*MN* raised to the sixth power" as an algebraic expression. **Do not simplify.**

Write a direct translation of the phrase: " $3x$ cubed" as an algebraic expression. **Do not simplify.**

Write a direct translation of the phrase "The sum of x, p and y" as an algebraic expression.

Write a direct translation of the following phrase as an algebraic expression: The opposite of C

Use any letter to represent a number and write the following statement as an algebraic expression:
"Double a number"

Use any letter to represent a number and write the following statement as an algebraic expression:
"Two thirds of a number"

Use any letter to represent a number and write the following statement as an algebraic expression:
"A number increased by 3"

Write a direct translation of the phrase "−A subtracted from m " as an algebraic expression. **Do not simplify.**

Write a direct translation of the phrase "−B subtracted from $-m$ " as an algebraic expression. **Do not simplify.**

Let m represent mass, and c speed of light. Use m and c to write the following phrase as an algebraic expression: the product of mass and the square of speed of light.

Use the letter x to represent a number and write the following phrase as an algebraic expression:
"One fourth of a number".

John is 5 years older than Tom. If John is x years old, how old is Tom? Give your answer in the form of an algebraic expression.

Write the following phrase as an algebraic expression: "The expression $a+b$ subtracted from c".

Use the letter x to represent a number and write the following phrase as algebraic expression:
One-eighth of a number

Use the letter x to represent a number and write the following phrase as an algebraic expression:
A number multiplied by -3

Use the letter x to represent a number and write the following phrase as an algebraic expression:
A number subtracted from -3

Use the letter x to represent a number and write the following phrase as an algebraic expression:
The product of AB and a number.

Let a be a variable representing the length of the side of a square. Use a to write the following statement as an algebraic expression:
Four times the side of a square.

Let a be a variable representing the length of the side of a square. Use a to write the following statement as an algebraic expression:
The side of a square raised to the second power.

Let a be a variable representing the length of the side of a square. Use a to write the following statement as an algebraic expression:

The side of a square doubled.

John has x dollars in his bank account. How much money will John have in the bank, after he withdraws $100? Give your answer in the form of an algebraic expression.

John's salary is x dollars. He got a new job and his salary doubled. How much does John earn in his new job? Give your answer in the form of an algebraic expression.

If a family has x children, and each of those children has 3 children of his own, how many grandchildren are there? Give your answer in the form of an algebraic expression.

Let t be a variable representing temperature on a given day. Use the variable to write the following statement as an algebraic expression: The temperature on the given day increased by 5 degrees.

7. Writing phrases as algebraic expressions (involving 2 operations).

Use the letter x to represent a number and write the following as a single algebraic expression:

Seven more than one third of a number

Use the letter x to represent a number and write the following as a single algebraic expression:

A quantity decreased by 9, and then multiplied by A

Use the letter x to represent a number and write the following as a single algebraic expression:

The product of a number and 2, then raised to the tenth power.

Use the letter x to represent a number and write the following as a single algebraic expression:

The sum of 3 and a number, then the result multiplied by 5.

Use the letter x to represent a number and write the following as a single algebraic expression:

A number cubed, and then decreased by y

Write a direct translation of the following phrase as an algebraic expression.

Multiply 3 by x, and then add y.

Write a direct translation of the following phrase as a single algebraic expression.

Multiply the sum of a and b by 4.

Write a direct translation of the following phrase as a single algebraic expression. **Do not simplify**.

The opposite of x, then raise it to the sixth power.

Write a direct translation of the following phrase as a single algebraic expression. **Do not simplify**.

Subtract 3 from y, and then multiply it by z.

Write a direct translation of the following phrase as a single algebraic expression.

Raise x to the third power, and then multiply by 9.

Write a direct translation of the following phrase as a single algebraic expression. **Do not simplify**.

Multiply x by 9, and then raise the result to the third power.

Write a direct translation of the following phrase as a single algebraic expression.

The difference of a and b, then divided by c

Write a direct translation of the following phrase as a single algebraic expression.

Divide 3 by y, and then add x

Write a direct translation of the following phrase as a single algebraic expression.

Raise $-x$ to the third power, raise y to the seventh power, and then add them together

Let C be a variable representing the temperature in Celsius. Write the following phrase as a single algebraic expression:

Nine fifths of the Celsius temperature plus 32.

Let m represents mass, and c speed of light. Use m and c to write the following phrase as a single algebraic expression:

The product of mass and the square of speed of light.

Use the letter X to represent a number and write the following as a single algebraic expression:

A number decreased by 7, and then the result is doubled.

Use the letter Y to represent a number and write the following as a single algebraic expression:

The opposite of a number, then raised to one hundred and twenty first power

Use the letter C to represent a number and write the following as a single algebraic expression:

A number, first divided by 2, and then raised to the third power.

Use the letter s to represent a number and write the following as a single algebraic expression:

Multiply a number by 9, and then subtract it from c.

Use the letter m to represent a number and write the following as a single algebraic expression:

The difference between a number and 4, then multiplied by y.

Use the letter x to represent a number and write the following as a single algebraic expression:

Take one fourth of a number, and then subtract 5.

8. Writing phrases as algebraic expressions and then simplifying them by either

a) using the laws of exponents

b) removing parentheses and collecting like terms.

Subtract $3x-2$ from $-4x+2$ and simplify your answer.

Find the product of $-x^5$ and x^2 and simplify your answer.

Find the product of $a+2$ and $a-1$ and simplify your answer.

Find the quotient of b^3 and b, then raised to the second power. Then simplify your answer.

Add $-3x-2$ and $4x+2$ and then raise the result to the second power. Then simplify your answer.

Subtract $-x^2+3x-2$ from $4x^2-4x$ and simplify your answer.

Multiply $3x-2$ and $-4x+2$ and simplify your answer.

Find the product of $2x^2-3x-2$ and $4x$ and simplify your answer.

Find the product of $4a-1$ and $\frac{3}{2}-6a$ and simplify your answer.

Find the product of 4, $2x^2-y$ and $3y-x^2$ and then simplify your answer.

Find the sum of $-mnk$, $4nmk$, and $-3mn$ and then simplify your answer.

Find the sum of $3x$ and 2 which is then raised to the second power. Then simplify your answer.

Find the difference of $2a$ and b which is then raised to the second power. Then simplify your answer.

Find the product of $2x^4$ and $-4x+1$ and simplify your answer.

Find the opposite of $-\frac{x^2}{3}+5x-2$

Find the product of $-3x$ and x^2 which is then raised to the third power.

Write as an algebraic expression using parentheses where appropriate, then remove the parentheses and simplify: The quotient of a^{12} and a^2, then raised to the second power. Then simplify your answer.

Find $-a^3$ raised to seventh power which is then multiplied by a. Then simplify your answer.

Find xy^7 raised to the fifth power. Then simplify your answer.

Find $3ab^3$ squared which is then multiplied by b. Then simplify your answer.

Subtract $-\frac{2}{3}xy+y$ from $3yx-y$. Then simplify your answer.

Find the sum of $3x^4-1$ and twice the expression $-4x^4+2$. Then simplify your answer.

Theme III:

RECOGNIZING AND CREATING EQUIVALENT EXPRESSIONS BY APPLYING

a) the order of terms of an expression can be changed

b) the order of factors of an expression can be changed

c) $\frac{b}{a} \pm \frac{c}{a} = \frac{b \pm c}{a}$ *d)* $\frac{ab}{c} = a \cdot \frac{b}{c} = ab \cdot \frac{1}{c}$ *e)* $-\frac{a}{b} = \frac{-a}{b} = \frac{a}{-b}$

f) performing numerical operations

9. Recognizing and creating equivalent expressions using the following

a) the order of terms of an expression can be changed

b) the order of factors of an expression can be changed

c) $\frac{b}{a} \pm \frac{c}{a} = \frac{b \pm c}{a}$ **d)** $\frac{ab}{c} = a \cdot \frac{b}{c} = ab \cdot \frac{1}{c}$ **e)** $-\frac{a}{b} = \frac{-a}{b} = \frac{a}{-b}$

(no inserting additional parentheses needed)

Circle all expressions that are equal to $-6x-5y-4z$:

$(-6x)(-5y)(-4z)$ $\quad -5y-4z-6x$ $\quad -5y-6x-4z$

Rewrite the expression $3mnk$ in two equivalent forms by multiplying its factors in a different order.

Rewrite $\frac{7}{11}ab$ in its equivalent form as a single fraction.

Rewrite $\frac{a}{xy} + \frac{2b}{xy}$ in its equivalent form as a single fraction.

Fill in the blanks to make a true statement: $\frac{3x}{y} = x \cdot$ _____

Circle all expressions that are equal to $2x-5y+4z$:

$2x+4z-5y$ $\quad -5y+4z+2x$ $\quad -5y+2x+4z$

Rewrite the expression $yx(a+b)$ in two equivalent forms by multiplying its factors in a different order.

Rewrite $(x+2) \cdot \frac{6}{11}$ in its equivalent form as a single fraction.

Rewrite $2\frac{x}{y}$ in its equivalent form as a single fraction.

Rewrite $\frac{1}{3}(a^2+1)$ in its equivalent form as a single fraction.

Rewrite $\frac{a}{x-2}+\frac{2b}{x-2}$ in its equivalent form as a single fraction.

Fill in the blank to make a true statement: $\frac{3x}{y}=x\cdot$_____

Fill in the blank to make a true statement: $\frac{3x}{y}=\frac{1}{y}\cdot$____

Fill in the blank to make a true statement: $\frac{b+2}{y}=\frac{b}{y}+$_____

Circle all expressions that are equivalent to $\frac{2-b}{c}$:

$\frac{b-2}{c}$ $\quad$ $\frac{2}{c}-\frac{b}{c}$ $\quad$ $\frac{-b+2}{c}$

Circle all expressions that are equivalent to $\frac{2b}{c}$:

$\frac{1}{c}\cdot 2b$ $\quad$ $\frac{2}{c}\cdot b$ $\quad$ $\frac{b}{2c}$

Circle all expressions that are equivalent to $-m$:

$\frac{m}{-1}$ $\quad$ $-\frac{m}{1}$ $\quad$ $m(-1)$

Circle all expressions that are equivalent to $m-n$:

$-n+m$ $\quad$ $m(-n)$ $\quad$ $-nm$

Circle all expressions that are equivalent to $mk-n$:

$-n-mk$ $\quad$ $-n+km$ $\quad$ $km-n$

Circle all expressions that are equivalent to $\frac{2xy}{9}$:

$\frac{2}{9}xy$ $\quad$ $2\cdot\frac{xy}{9}$ $\quad$ $2xy\cdot\frac{1}{9}$

Circle all expressions that are equivalent to $\frac{2xy}{9}$

$\frac{1}{9}xy\cdot 2$ $\quad$ $\frac{xy}{9}\cdot 2$ $\quad$ $\frac{2x}{9}\cdot y$

Circle all expressions that are equivalent to $-a-c+b+d$.

$-a+b-c+d$ $\quad$ $-a+b-c-d$ $\quad$ $d+b-c-a$

Circle all expressions that are equivalent to $-\frac{a}{b}$.

$\frac{-a}{b}$ $-a\cdot\frac{1}{b}$ $-b\cdot\frac{1}{a}$

Circle all expressions that are equivalent to $-\frac{a}{b}$.

$-\frac{2a}{2b}$ $\frac{a}{-b}$ $\frac{-a}{-b}$

Circle all expressions that are equivalent to $-abc$

$b(-a)c$ $\frac{cba}{-1}$ $a-bc$

Circle all expressions that are equivalent to $-abc$

$-\frac{bca}{1}$ $ab-c$ $ab(-c)$

Circle all expressions that are equivalent to $\frac{5x}{6}$.

$5\cdot\frac{x}{6}$ $\frac{5}{6}x$ $\frac{1}{6}\cdot 5x$

Circle all expressions that are equivalent to $\frac{5x}{6}$.

$x\cdot\frac{5}{6}$ $\frac{5}{6x}$ $\frac{10x}{12}$

Circle all expressions that are equivalent to $x\div 2$.

$\frac{x}{2}$ $2x$ $2\div x$

Circle all expressions that are equivalent to $3+8a$.

$11a$ $8a+3$ $3+a\cdot 8$

Circle all expressions that are equivalent to $\frac{m}{3}-\frac{n}{3}$.

$\frac{n}{3}-\frac{m}{3}$ $\frac{m-n}{3}$ $\frac{1}{3}\cdot m-\frac{1}{3}n$

By placing the minus sign differently, write the following expression in two additional equivalent ways.

$-\frac{2a}{b}$

By placing the minus sign differently, write the following expression in two additional equivalent ways.

$$\frac{2ac}{-2d}$$

Rewrite $\frac{m}{4}-\frac{7n}{4}$ in its equivalent form as a single fraction.

Rewrite $\frac{7m}{t}-\frac{n^2}{t}$ in its equivalent form as a single fraction.

Rewrite $\frac{5m}{4c-2}-\frac{2n^2}{4c-2}$ in its equivalent form as of a single fraction.

Rewrite $\frac{m}{s-1}-\frac{3}{s-1}-\frac{t}{s-1}$ in its equivalent form as of a single fraction.

Write $\frac{2}{3}x+\frac{4}{3}y$ in its equivalent form as a single fraction.

Write $\frac{2}{3}x-\frac{1}{3}y$ in its equivalent form as a single fraction.

Write $2x\cdot\frac{1}{3}-7\cdot\frac{y}{3}$ in its equivalent form as a single fraction.

Write $\frac{3}{t}x-\frac{1}{t}y$ in its equivalent form as a single fraction.

Write $-2\frac{x}{t}+3\frac{y}{t}$ in its equivalent form as a single fraction.

Write $-\frac{1}{k+t}-2\frac{n}{k+t}$ in its equivalent form as a single fraction.

Circle all of the following expressions that are equivalent to $-ab(c-d)$:

$-ab(d-c)$ $\quad -(c-d)ab$ $\quad ab(c-d)(-1)$

Circle all of the following expressions that are equivalent to $\frac{ad-b}{6}$:

$\frac{b-ad}{6}$ $\quad \frac{1}{6}(ad-b)$ $\quad \frac{da}{6}-b$

Replace Ω with expression such that the resulting statement is true. $\frac{2x-7y}{ab}=-\frac{7y}{ab}+\Omega$

Replace Δ with expression such that the resulting statement is true: $\frac{m+n}{v}=\Delta\cdot(m+n)$

Replace Δ with expression such that the resulting statement is true: $2(a-2b)(3+d)=(3+d)\Delta$

Replace Δ with expression such that the resulting statement is true: $da-b=-b+\Delta d$

Replace Ψ with expression such that the resulting statement is true: $\frac{m}{2}-\Psi=\frac{m-n}{2}$

Replace Δ with expression such that the resulting statement is true: $\frac{-a}{b}=\frac{a}{\Delta}$

10. Recognizing and creating equivalent expressions using the following

a) $\frac{b}{a}\pm\frac{c}{a}=\frac{b\pm c}{a}$ **b)** $\frac{ab}{c}=a\cdot\frac{b}{c}=ab\cdot\frac{1}{c}$ **c)** $-\frac{a}{b}=\frac{-a}{b}=\frac{a}{-b}$

(inserting additional parentheses might be needed)

Write $-\frac{m+2}{k}-2\frac{n}{k}$ in its equivalent form as a single fraction.

Using the rule for multiplication of fractions, rewrite $4\cdot\frac{b-a}{n}$ in its equivalent form as a single fraction.

Using the rule for multiplication of fractions, rewrite $3\cdot\frac{1-m}{n}$ in its equivalent form as a single fraction.

Using the rule for multiplication of fractions, rewrite $\frac{c-b}{4}\cdot m$ in its equivalent form as a single fraction.

Using the rule for multiplication of fractions, rewrite $-a\cdot\frac{x-y}{c}$ in its equivalent form as a single fraction.

Using the rule for multiplication of fractions, rewrite $(s-4)\frac{t-1}{n}$ in its equivalent form as a single fraction.

Write $4\cdot\frac{-a}{n}-\frac{c+d}{n}$ in its equivalent form as a single fraction.

Fill in the blanks to make a true statement. $\frac{x-y}{2}=\frac{1}{2}\cdot$ _____

Replace X with an expression such that the resulting statement is true. $\frac{a+b}{-2}=\frac{X}{2}$

Circle all expressions that are equivalent to $3\frac{a-b}{m}$

$\frac{3a-b}{m}$ $\frac{3(a-b)}{m}$ $\frac{3}{m}a-b$

Circle all expressions that are equivalent to $-\frac{a+b}{6-d}$

$\frac{-a+b}{6-d}$ $\frac{-(a+b)}{6-d}$ $\frac{a+b}{-6-d}$

Circle all of the following expressions that are equivalent to $-\frac{a+4c}{b}$

$\frac{-a+4c}{b}$ $\frac{-(4c+a\cdot)}{b}$ $\frac{-4c-a\cdot}{b}$

Rewrite $x\frac{-a}{4s}-\frac{a^2-2}{4s}$ in its equivalent form as a single fraction.

Rewrite $-7\cdot\frac{y-1}{3}\cdot m$ in its equivalent form as a single fraction.

Rewrite $-\frac{1}{k+t}-2\frac{n+m}{k+t}$ in its equivalent form as a single fraction.

Rewrite $-2\frac{x}{t}-\frac{y-z}{t}(a+b)$ in its equivalent form as a single fraction.

Rewrite $-\frac{2+a}{xy}-3\frac{m-n}{xy}$ in its equivalent form as a single fraction.

Rewrite $3\frac{a-b}{t}+2\frac{cd-1}{t}$ in its equivalent form as a single fraction.

Circle all of the following expressions that are equivalent to $-\frac{a+2}{3-b}$

$\frac{-a+2}{3-b}$ $\frac{-(2+a)}{3-b}$ $\frac{a}{-(3-b)}+\frac{2}{-(3-b)}$

Circle all of the following expressions that are equivalent to $-\frac{a+2}{3-b}$

$\frac{-(2+a)}{-(3-b)}$ $\frac{a+2}{-3-b}$ $\frac{1}{3-b}(a+2)(-1)$

Circle all of the following expressions that are equivalent to $\frac{-b+da}{6}$

$-\frac{b+da}{6}$ $(-b+da)\div 6$ $-b+da\div 6$

Circle all of the following expressions that are equivalent to $2\frac{m}{x}-\frac{n-h}{x}$

$\frac{2m-n-h}{x}$ $\frac{2m-(n-h)}{x}$ $\frac{n-h}{x}-\frac{2m}{x}$

Circle all of the following expressions that are equivalent to $\frac{2(a+b)}{c-d}$

$\frac{2}{c-d}a+b$ $2(a+b)\div c-d$ $2\frac{a+b}{c-d}$

11. Simplification of expressions by performing numerical operations when possible (change the order of terms or factors might be needed). Possibly performing operations on fractions or on decimals .

Perform all numerical operations if possible. If not possible, write "not possible".

$$-2+x+1$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$\frac{2}{3}+\frac{1}{6}-Y$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$\frac{4x}{8}$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$12+3x$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$(2\times 3)^m$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$2\times 3^m$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$-(-x)$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$-0.2+x-0.03$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$\frac{x}{-1}$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$4a(-8)$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$\frac{8a}{4}$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$-\frac{1}{2}-x-\frac{1}{2}$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$\frac{3bd}{9ac}$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$2m(-3)n$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$4\cdot\frac{2}{5}-x$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$\frac{12y}{2xz}$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$2x^2\left(\frac{1}{2}\right)$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$10\cdot\frac{x}{5}$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$-0.1m(10n^2)$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$0.5(-0.3m)$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$0.5-0.6+m$$

Perform all numerical operations if possible. If not possible, write "not possible".

$$\frac{0.4y}{-0.02}$$

Theme IV:

THE USE OF EXPONETIAL NOTATION AND EXPONENTIAL LAWS

(understanding that the exponent pertains only to the closest expression, unless parentheses indicate otherwise)

12. Using (if possible) exponential notation (non-negative exponents only) and knowing how and when exponential laws could be applied (only one law used)

Rewrite using exponential notation whenever it is possible: $-aaaa-aa$

Rewrite using exponential notation whenever it is possible: $(-z)(-z)(-z)-z-z$

Rewrite using exponential notation whenever it is possible: $7mmm$

Rewrite using exponential notation whenever it is possible: $a-aa$

Rewrite using exponential notation whenever it is possible: $\frac{mmm}{4}$

Rewrite using exponential notation whenever it is possible: $\frac{mm}{p+p}$

Write using exponential notation whenever it is possible: $ab\cdot ab\cdot ab\cdot ab$

Write using exponential notation whenever it is possible: $-xyxyxxx$

Write using exponential notation whenever it is possible: $-a-aaaa$

Write using exponential notation whenever it is possible: $xxy-yyx$

Write using exponential notation whenever it is possible: $(a+b)(a+b)(a+b)$

Write using exponential notation whenever it is possible: $(2t^3)(2t^3)(2t^3)(2t^3)$

Write using exponential notation whenever it is possible: $m+nn+m$

Write using exponential notation whenever it is possible: $\frac{kkk}{n}\cdot k$

Write using exponential notation whenever it is possible: $x\cdot\frac{x}{2}\cdot x\cdot x$

Write using exponential notation whenever it is possible: $(3-x)(4-x)(3-x)$

Write using exponential notation whenever it is possible: $\left(\frac{2a}{b}\right)\left(2\frac{a}{b}\right)\left(\frac{2a}{b}\right)$

Write using exponential notation whenever it is possible: $\left(-\frac{3}{x}\right)\left(\frac{-3}{x}\right)\left(\frac{3}{-x}\right)$

Write using exponential notation whenever it is possible: $\frac{1}{(w+2v)(2v+w)(2v+w)}$

Write using exponential notation whenever it is possible: $\left(\frac{x-y}{m}\right)\left(\frac{x-y}{m}\right)$

Write using exponential notation whenever it is possible: $(m+n)(m+n)m+n$

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": a^3a^{15}

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": a^3+a^{15}

Simplify, using one of the exponential laws. If it is not possible to simplify write "not possible": $\left(b^4\right)^2$

Simplify, using one of the exponential laws. If it is not possible to simplify write "not possible": a^3b^4

If possible, eliminate parentheses by applying an exponential law. If it is not possible to simplify, write "not possible": $(ab)^7$

Simplify, using one of the exponential laws, If it is not possible to simplify, write "not possible": $\frac{a^7}{a^3}$

Simplify, using one of the exponential laws. If not possible, write "not possible" : $\left(m^{10}\right)^2$

Simplify, using one of the exponential laws. If not possible, write "not possible". m^3m^4m

If possible, eliminate parentheses by applying an exponential law. If not possible, write "not possible": $\left(\frac{m}{n}\right)^7$

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": xx^{15}

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": $\frac{s^{14}}{s^3}$

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": $\left(t^{15}\right)^3$

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": m^3-m^4

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": x^7x^{15}

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": aa^3a

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": $\frac{q^{28}}{q^{14}}$

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": $\frac{q^{14}}{q^{13}}$

Simplify, using one of the exponential laws. If it is not possible to simplify, write "not possible": $\frac{q^5}{q}$

13. Understanding that the exponent pertains only to the closest expression (questions might involve familiarity with concepts: numerical coefficient, exponent (power), base, and raising expressions to the 0-th power)

Expand by writing without exponential notation: $(5A)^3$ **Do not simplify.**

Expand by writing without exponential notation: $5A^3$ **Do not simplify.**

Evaluate $(2x)^0$

Evaluate $2x^0$

Write a direct translation of the phrase "$-b$ raised to 4th power" as an algebraic expression **Do not simplify.**

In the following expression, identify base, exponent and numerical coefficient: $(xy)^9$

base: _____ exponent: _____ numerical coefficient: _____

Expand by writing without exponential notation: $a(bc)^2$ **Do not simplify.**

Evaluate $3(2x)^0$

Evaluate $7x^0$

Evaluate $4\times(8m^7)^0$

Write the following expression without using exponential notation: $(-m)^3$

Write the following expression without using exponential notation: $-m^3$

Write the following expression without using exponential notation: $(xy)^3$

Write the following expression without using exponential notation: $2a^3$

Write the following expression without using exponential notation: $(a+b)^2$

Write the following expression without using exponential notation: $a+b^2$

In the following expression, identify base, exponent and numerical coefficient: $-3a^{27}$

base: _____ exponent: _____ numerical coefficient: _____

In the following expression, identify base, exponent and numerical coefficient: $\left(\frac{yz}{x}\right)^9$

base: _____ exponent: _____ numerical coefficient: _____

In the following expression, identify base, exponent and numerical coefficient: $-x^4$

base: _____ exponent: _____ numerical coefficient: _____

In the following expression, identify base, exponent and numerical coefficient: $\frac{2x^3}{3}$

base: _____ exponent: _____ numerical coefficient: _____

In the following expression, identify base, exponent and numerical coefficient: $-(a-bc)^2$

base: _____ exponent: _____ numerical coefficient: _____

In the following expression, identify base, exponent and numerical coefficient: $\left(\frac{x}{y}\right)^m$

base: _____ exponent: _____ numerical coefficient: _____

In the following expression, identify base, exponent and numerical coefficient: $\frac{(x+y)^7}{4}$

base: _____ exponent: _____ numerical coefficient: _____

In the following expression, identify base, exponent and numerical coefficient: $\frac{3}{4}\left(\frac{3x+z}{w}\right)^7$

base: _____ exponent: _____ numerical coefficient: _____

In the following expression, identify base, exponent and numerical coefficient: $-\frac{(ab)^5}{2}$

base: _____ exponent: _____ numerical coefficient: _____

Simplify by raising to the indicated power: $(3x)^0$

Simplify by raising to the indicated power: $3x^0$

Simplify by raising to the indicated power: $3^0 x$

Simplify by raising to the indicated power: $a(b+c)^0$

Simplify by raising to the indicated power: abc^0

Simplify by raising to the indicated power: $(abc)^0$

Simplify by raising to the indicated power: $ab+c^0$

Simplify by raising to the indicated power: ab^0c^0

Circle all expressions that are equivalent to $\left(\frac{a}{3}\right)^{20}$

$\frac{a^{20}}{3}$ $\frac{a^{20}}{3^{20}}$ $\frac{a}{3^{20}}$

14. Simplifying algebraic (or numerical) expressions by applying exponential laws (only non-negative exponents; one variable or a number, up to 2 types of operations). Performing an operation on fractions or on decimals might be needed.

Simplify: $9(m^2)^3m^5$

Simplify: $\frac{a^7}{aa^2}$

Perform the indicated operation and simplify: $(-2x^3)(-10x^2)$

Simplify: $2(x^2)^3x$

Simplify: $\left(\frac{b^3}{b^2}\right)^7$

Perform the indicated operation and simplify: $(-3x^5)(4x^2)$

Perform the indicated operation and simplify: $\frac{3x^4}{6x^2}$

Perform the indicated operation and simplify: $3x(-4x^2)$

Perform the indicated operation and simplify: $(2x^6)^3$

Perform the indicated operation and simplify: $\frac{8x^5}{6x^2}$

Perform the indicated operation and simplify: $\dfrac{-2x^3x^5}{x^4}$

Perform the indicated operation and simplify: $\dfrac{a^2}{a^4}\cdot a^2$

Perform the indicated operation and simplify: $\left(\dfrac{1}{v}\right)^2 v^7$

Perform the indicated operation and simplify: $\dfrac{(3x^2)^3}{x^4}$

Perform the indicated operation and simplify: $\dfrac{3x^5}{(3x)^2}$

Simplify: $(3aa^2)^2$

Simplify: $\dfrac{a^3}{aa^2}$

Perform the indicated operation and simplify: $\dfrac{(3x)^3}{-x}$

Perform the indicated operation and simplify: $\dfrac{(-a)^3}{2a^2}$

Perform the indicated operation and simplify: $-(x^2)^5x^7$

Perform the indicated operation and simplify: $(2x^6)^3$

Perform the indicated operation and simplify: $(3x^2)(4x^5x)$

Perform the indicated operation and simplify: $(3x)(-2)(x^3)$

Circle all expressions that are equivalent to $\left(\dfrac{a}{3}\right)^{20}$

$\dfrac{(a^{12})^8}{3^{20}}$ $\qquad$ $\dfrac{a^{12}a^8}{3^{20}}$ $\qquad$ $\left(\left(\dfrac{a}{3}\right)^{10}\right)^2$

Evaluate: $\dfrac{4^7\cdot 4^6}{4^{11}}$

Evaluate: $\dfrac{0.5^{16}}{(0.5^{7})^{2}}$

Evaluate: $\dfrac{9^{81}}{9^{80}}$

Evaluate: $\dfrac{10^{15}}{10^{11}\times 10}$

Evaluate: $\dfrac{15^{248}}{15^{247}}$

Evaluate: $\dfrac{(12^{3})^{6}}{-12^{17}}$

Evaluate: $\dfrac{3^{21}\cdot 3^{10}}{3^{29}}$

Evaluate: $\dfrac{0.1^{10}\times 0.1^{12}}{0.1^{20}}$

Evaluate: $\dfrac{(64^{3})^{11}}{64^{32}}$

Evaluate: $-\dfrac{2^{15}2^{16}}{2^{27}}$

15. <u>Simplifying expressions involving exponential expressions ("relatively difficult examples"). Operations on fractions or decimals might be needed.</u>

Perform the indicated operations and simplify: $(2a^{2}b)(-a^{3})$

Perform the indicated operations and simplify: $\dfrac{(ab)^{8}}{2ab^{4}}\cdot b$

Perform the indicated operations and simplify: $\dfrac{(3x^{2}y)^{3}}{x^{4}}$

Perform the indicated operations and simplify: $-\dfrac{ba^{4}}{a^{4}}\cdot a^{2}b$

Perform the indicated operations and simplify: $v\left(\frac{y}{v}\right)^2 vy$

Perform the indicated operations and simplify: $(2a^2b)(-a^3)$

Perform the indicated operations and simplify: $-2a \cdot \frac{a^7}{(-2a)^2}$

Perform the indicated operations and simplify: $\frac{-2x^3x^5}{x^4}$

Perform the indicated operations and simplify: $(3ba^2)^2 b$

Perform the indicated operations and simplify: $\left(\frac{x^2y}{x}\right)^3$

Perform the indicated operations and simplify: $2x(-2x^5y^3)^3$

Perform the indicated operations and simplify: $-3b(10b^5)^2$

Perform the indicated operations and simplify: $-3a(-ab^2)^8$

Perform the indicated operations and simplify: $-\left(\frac{a^3}{4b^2}\right)^2$

Perform the indicated operations and simplify: $x^2y(-x^3)y^4$

Perform the indicated operations and simplify: $\frac{s^2x}{(4s)^2}$

Perform the indicated operations and simplify: $\frac{-ab^7a}{ba^2b^6}$

Perform the indicated operations and simplify: $\frac{2x^2y^2}{x} \cdot y$

Perform the indicated operations and simplify: $\frac{a^{13}b^2c^4}{a^5c^2b}$

Perform the indicated operations and simplify: $\frac{(ab)^8}{2ab^4} \cdot b$

Theme V:
MULTIPLICATION, ADDITION, AND SUBTRACTION OF ALGEBRAIC EXPRESSIONS
(i.e. using the Distributive Law to remove parentheses or/and collecting like terms)

16. Collecting two terms (if possible) not involving operations on fractions or decimals.

If possible, collect like terms. If not possible, write "not possible": $7b^2 - 6b^2$

If possible, collect like terms. If not possible, write "not possible": $-mq - q$

If possible, collect like terms. If not possible, write "not possible": $MN - 2NM$

If possible, collect like terms. If not possible, write "not possible": $-3x + 4x$

If possible, collect like terms. If not possible, write "not possible": $a^2 - 6a^2$

If possible, collect like terms. If not possible, write "not possible": $mn - 3m$

If possible, collect like terms. If not possible, write "not possible": $xy - yx$

If possible, collect like terms. If not possible, write "not possible": $-4x - 2x$

If possible, collect like terms. If not possible, write "not possible": $a^2 - a$

If possible, collect like terms. If not possible, write "not possible": $y - y$

If possible, collect like terms. If not possible, write "not possible": $xy - yx$

If possible, collect like terms. If not possible, write "not possible": $a + ab$

If possible, collect like terms. If not possible, write "not possible": $st + ts$

If possible, collect like terms. If not possible, write "not possible": $-x - 9x$

If possible, collect like terms. If not possible, write "not possible": $4y^2 - 9y^2$

If possible, collect like terms. If not possible, write "not possible": $-m^3 + m^3$

If possible, collect like terms. If not possible, write "not possible": $xyz - 6zyx$

If possible, collect like terms. If not possible, write "not possible": $3cd - 4dcs$

If possible, collect like terms. If not possible, write "not possible": $2ab - ba$

If possible, collect like terms. If not possible, write "not possible": $-3x^3 + 4x^3y$

If possible, collect like terms. If not possible, write "not possible": $3a^{22} - 6a^{22}$

If possible, collect like terms. If not possible, write "not possible": $st - t$

If possible, collect like terms. If not possible, write "not possible": $2mnk - 5kmn$

17. Collecting two terms involving operations on fractions or decimals.

If possible, collect like terms. If not possible, write "not possible" $\frac{a^2}{3} - \frac{3}{7}a^2$

If possible, collect like terms. If not possible, write "not possible": $-0.5xy^2 - 0.5y^2x$

If possible, collect like terms. If not possible, write "not possible" $-0.03x^2 + 0.4x^2$

If possible, collect like terms. If not possible, write "not possible" $\frac{1}{2}a^2 - \frac{3}{7}a^2$

If possible, collect like terms. If not possible, write "not possible": $0.5mn - 0.7nm$

If possible, collect like terms. If not possible, write "not possible": $\frac{ab}{3} - \frac{1}{6}ba$

If possible, collect like terms. If not possible, write "not possible": $\frac{m}{4} - \frac{m}{6}$

If possible, collect like terms. If not possible, write "not possible": $-\frac{2m}{3} + \frac{2}{3}m$

If possible, collect like terms. If not possible, write "not possible": $-0.7abc - 0.08cba$

If possible, collect like terms. If not possible, write "not possible": $ab - 8.2ba$

If possible, collect like terms. If not possible, write "not possible": $-\frac{2}{11}s^3 - \frac{3s^3}{22}$

If possible, collect like terms. If not possible, write "not possible": $\frac{1}{3}x - \frac{2}{7}x$

If possible, collect like terms. If not possible, write "not possible": $0.2m^2n^2 - 7n^2m^2$

If possible, collect like terms. If not possible, write "not possible": $0.3xy - 0.5yx$

If possible, collect like terms. If not possible, write "not possible": $-\frac{7}{9}x - \frac{2x}{5}$

If possible, collect like terms. If not possible, write "not possible": $2x + \frac{3x}{10}$

If possible, collect like terms. If not possible, write "not possible": $\frac{x}{5} - \frac{2}{3}x$

If possible, collect like terms. If not possible, write "not possible": $\frac{1}{2}x + \frac{1}{2}x$

If possible, collect like terms. If not possible, write "not possible": $-0.4xy - 0.1xy$

If possible, collect like terms. If not possible, write "not possible": $\frac{1}{2}x - \frac{3}{2}x$

If possible, collect like terms. If not possible, write "not possible": $0.5c^3 - 10c^3$

If possible, collect like terms. If not possible, write "not possible": $-0.4x^2y - 0.8yx^2$

18. Collecting like terms: more than one type of like terms in the expression (fractions and decimals used but not as coefficients of variables).

Simplify by collecting like terms: $-0.2 - 4x + x + 0.3$

Simplify by collecting like terms: $-2 - xy + y + y + \frac{1}{3}$

Simplify by collecting like terms: $-3x + 8y - 8x - 2x$

Simplify by collecting like terms: $-x - a - 4x - a$

Simplify by collecting like terms: $7y + 5 - 12y + y - 6$

Simplify by collecting like terms: $a^2b^3 - 4b^2a^3 - 6a^2b^3$

Simplify by collecting like terms: $-0.2 - x - x - 0.8$

Simplify by collecting like terms: $\frac{2}{3} - xy - y + y + \frac{1}{3} - yx$

Simplify by collecting like terms: $-3x + 8y - 8x - 2x$

Simplify by collecting like terms: $-5a-3b-2b-7a$

Simplify by collecting like terms: $-2ab-4ba+2+3ab-1$

Simplify by collecting like terms: $3j^2-4j^2+2j$

Simplify by collecting like terms: $a^2b^3-4b^2a^3-6a^2b^3$

Simplify by collecting like terms: $0.2-2z-5z+z-0.4$

Simplify by collecting like terms: $-x^3+x^4-x^3$

Simplify by collecting like terms: $-x+\frac{1}{2}+2x-1$

Simplify by collecting like terms: $-3y+7x-x+4y$

Simplify by collecting like terms: $2-7m-4-\frac{2}{5}$

Simplify by collecting like terms: $ab-ba+0.7-0.9-ba$

Simplify by collecting like terms: $x^4y-2x+3yx^4-5x$

Simplify by collecting like terms: $\frac{2}{3}-cd+\frac{1}{3}-dc-d+c$

Simplify by collecting like terms: $2+a-2a-2.3$

Simplify by collecting like terms: $2x+y+x-2y$

19. Applying the Distributive Law when removing parentheses in multiplication of a monomial (including −1) by a polynomial with up to 3 terms. Application of exponential laws might be needed in the process. Performing operations on fractions or on decimals might be required.

Rewrite $-(x+3y-z)$ in its equivalent form without parentheses. Simplify.

Rewrite $0.4x(x+2y)$ in its equivalent form without parentheses. Simplify.

Rewrite $(b-c^2)c$ in its equivalent form without parentheses. Simplify.

Rewrite $\frac{1}{2}(4-c)$ in its equivalent form without parentheses. Simplify.

Rewrite $-4(x+3y-z)$ in its equivalent form without parentheses. Simplify.

Rewrite $(x+2y)(-1)$ in its equivalent form without parentheses. Simplify.

Rewrite $a(a+a^5)$ in its equivalent form without parentheses. Simplify.

Rewrite $(3x-10)\cdot 0.2$ in its equivalent form without parentheses. Simplify.

Rewrite $-\left(L-\frac{1}{x}+y\right)$ in its equivalent form without parentheses. Simplify.

Rewrite $\frac{2R}{5}\left(\frac{10}{11}-1\right)$ in its equivalent form without parentheses. Simplify.

Rewrite $\left(R^2-r^2\right)r$ in its equivalent form without parentheses. Simplify.

Rewrite $3P(1+0.1P)$ in its equivalent form without parentheses. Simplify.

Rewrite $(x^2-7z)(-2)$ in its equivalent form without parentheses. Simplify.

Rewrite $-(-a+a^2-2)$ in its equivalent form without parentheses. Simplify.

Rewrite $-\frac{2}{3}(3+xy)$ in its equivalent form without parentheses. Simplify.

Rewrite $-d(2d+\frac{1}{2})$ in its equivalent form without parentheses. Simplify.

Rewrite $(x-y)(-2x)$ in its equivalent form without parentheses. Simplify.

Rewrite $(x^3+x^2-1)x$ in its equivalent form without parentheses. Simplify.

Rewrite $(a-a^3)(a)$ in its equivalent form without parentheses. Simplify.

Rewrite $-(10-\frac{a^3-b}{c})$ in its equivalent form without parentheses. Simplify.

Use the Distributive Law to eliminate parentheses in the following expression. Simplify $x(2-x^2)$.

Use the Distributive Law to eliminate parentheses in the following expression. Simplify $a(a^3-a^4)$.

Use the Distributive Law to eliminate parentheses in the following expression. Simplify. $\left(3x-\frac{1}{2}\right)2x$

Use the Distributive Law to eliminate parentheses in the following expression. Simplify. $-2(x+3y-4z)$

Rewrite $(x^2-2x)x^4$ in its equivalent form without parentheses. Simplify.

Rewrite $-\frac{2}{3}(3c-33d)$ in its equivalent form without parentheses. Simplify.

Rewrite $a(a^2+ab+ab^2)$ in its equivalent form without parentheses. Simplify.

Rewrite $(2x^3y+\frac{3}{7}-xy^4)x$ in its equivalent form without parentheses. Simplify.

Rewrite $(a-\frac{2}{5}b)(-a^3)$ in its equivalent form without parentheses. Simplify.

Rewrite $\frac{1}{4}x(4x^5-8)$ in its equivalent form without parentheses. Simplify.

Rewrite $3y(6y^4+8y^3)$ in its equivalent form without parentheses. Simplify.

Rewrite $x^2(-x^5+2x^3)$ in its equivalent form without parentheses. Simplify.

Rewrite $2y^2(7y-y^2)$ in its equivalent form without parentheses. Simplify.

Rewrite $-a^4(9a^2+a^2b)$ in its equivalent form without parentheses. Simplify.

Rewrite $b(a^2b-ab^5)$ in its equivalent form without parentheses. Simplify.

Rewrite $-0.2c(0.3-100c^6)$ in its equivalent form without parentheses. Simplify.

Rewrite $-x^{10}(4x^5-xy)$ in its equivalent form without parentheses. Simplify.

Rewrite $mn^2(m-n)$ in its equivalent form without parentheses. Simplify.

Rewrite $-\left(\frac{y}{2}+2x^5-4x\right)$ in its equivalent form without parentheses. Simplify.

Rewrite $0.7(-0.3-n)$ in its equivalent form without parentheses. Simplify.

Rewrite $(2.3x-0.06)(100)$ in its equivalent form without parentheses. Simplify.

Rewrite $-(0.06x-2y+z)$ in its equivalent form without parentheses.Simplify.

Rewrite $0.6(-0.2n+4)$ in its equivalent form without parentheses. Simplify.

Rewrite $-(-0.2n+4-0.6t)$ in its equivalent form without parentheses. Simplify.

20. <u>Applying the Distributive Law when removing parentheses in multiplication of a binomial by a binomial (or a trinomial). Application of exponential laws might be needed in the process. Performing operations on fractions or on decimals might be required. Collecting terms might be needed at the end.</u>

Rewrite $(b+c-2)(b^2-b^3)$ in its equivalent form without parentheses. Simplify.

Rewrite $(0.3y+1)(0.5y-1)$ in its equivalent form without parentheses. Simplify.

Rewrite $(2ab-4)(\frac{1}{2}-ba)$ in its equivalent form without parentheses. Simplify.

Rewrite $(4x-8y)\left(\frac{3}{4}y+3x\right)$ in its equivalent form without parentheses. Simplify.

Rewrite $(x^3+2x^2-2x)(x-1)$ in its equivalent form without parentheses. Simplify.

Rewrite $(x-4)(zx^2+xz)$ in its equivalent form without parentheses. Simplify.

Rewrite $(a-3a^4)(10-a^3)$ in its equivalent form without parentheses. Simplify.

Rewrite $(a-g)(a+3g)$ in its equivalent form without parentheses. Simplify.

Rewrite $(x^3+x^2)(yx-yx^2)$ in its equivalent form without parentheses. Simplify.

Rewrite $(m^6+m)(3m^5-1)$ in its equivalent form without parentheses. Simplify.

Rewrite $(-4-b)(3b^2+7b^3)$ in its equivalent form without parentheses. Simplify.

Rewrite $(2b^4-1)(cb+cb^5)$ in its equivalent form without parentheses. Simplify.

Rewrite $(3x^2y-6xy)(2x-\frac{2}{3})$ in its equivalent form without parentheses. Simplify.

Rewrite $(2b-a^3)(2a^3-b)$ in its equivalent form without parentheses. Simplify.

Rewrite $(-xy^2-5x)(y+y^3)$ in its equivalent form without parentheses. Simplify.

Rewrite $(x^2 + ax)(a + 2x)$ in its equivalent form without parentheses. Simplify.

Rewrite.. $(3m + n)(0.2n + 2m)$ ..in its equivalent form without parentheses. Simplify.

Rewrite $(x - 30y)(2x - 0.2y)$ in its equivalent form without parentheses. Simplify.

Rewrite $(3x - xy)(-xy - 3x)$ in its equivalent form without parentheses. Simplify.

Rewrite $(2 - \frac{z}{2})(z - 8)$ in its equivalent form without parentheses. Simplify.

Rewrite $(xy + 2x - y)(x - 3)$ in its equivalent form without parentheses. Simplify.

Rewrite $(a - 2)(a - b + ab)$ in its equivalent form without parentheses. Simplify.

Rewrite $(x^2 - x)(x^3 + x^2 - 2x)$ in its equivalent form without parentheses. Simplify.

Rewrite $(y^2 + x + 3)(xy - 1)$ in its equivalent form without parentheses. Simplify.

Rewrite $(4 + m^2)(2 - m + 3m^2)$ in its equivalent form without parentheses. Simplify.

Rewrite $(2A - 3 + B)(A - B)$ in its equivalent form without parentheses. Simplify.

Rewrite $(3m - n)(10 - n - 2m)$ in its equivalent form without parentheses. Simplify.

Rewrite $(1 - ab)(ab + a - b)$ in its equivalent form without parentheses. Simplify.

Rewrite $(a + b)(a - b + 3)$ in its equivalent form without parentheses. Simplify.

Rewrite $(x - y)(x + y - 2)$ in its equivalent form without parentheses. Simplify.

Rewrite $(a - b)(2a + b)$ in its equivalent form without parentheses. Simplify.

Rewrite $(x^3 + x^2 - x)(x - 1)$ in its equivalent form without parentheses. Simplify.

Rewrite $(2 + c)(-c + 6)$ in its equivalent form without parentheses. Simplify.

21. Removing parentheses from expressions of the form $(a \pm b)^2$ and simplifying them by collecting like terms. Performing operations on fractions or on decimals might be required.

Eliminate parentheses and simplify by collecting like terms: $(\frac{1}{3}-3x)^2$

Eliminate parentheses and simplify by collecting like terms: $\left(x+\frac{2}{5}\right)^2$

Eliminate parentheses and simplify by collecting like terms: $\left(\frac{2}{9}-y\right)^2$

Eliminate parentheses and simplify by collecting like terms: $(0.1-x)^2$

Eliminate parentheses and simplify by collecting like terms: $(3+y^5)^2$

Eliminate parentheses and simplify by collecting like terms: $(2-3x)^2$

Eliminate parentheses and simplify by collecting like terms: $(3ab+1)^2$

Eliminate parentheses and simplify by collecting like terms: $(2x-y)^2$

Eliminate parentheses and simplify by collecting like terms: $(xy-3)^2$

Eliminate parentheses and simplify by collecting like terms: $(3a-b)^2$

Eliminate parentheses and simplify by collecting like terms: $(2-x^3)^2$

Eliminate parentheses and simplify by collecting like terms: $(0.1-x)^2$

Eliminate parentheses and simplify by collecting like terms: $(a^2b+1)^2$

Eliminate parentheses and simplify by collecting like terms: $(7+2m)^2$

Eliminate parentheses and simplify by collecting like terms: $(xyz+1)^2$

Eliminate parentheses and simplify by collecting like terms: $(0.5+y)^2$

Eliminate parentheses and simplify by collecting like terms: $(0.2-y)^2$

Eliminate parentheses and simplify by collecting like terms: $(8+x^2y)^2$

Eliminate parentheses and simplify by collecting like terms: $(3m-n)^2$

Eliminate parentheses and simplify by collecting like terms: $(2s-3t)^2$

22. Simplifying algebraic expressions by removing parentheses first (requiring multiplication of a monomial by a binomial), and then collecting like terms (up to two pairs of parentheses). Performing operations on fractions or on decimals might be needed.

Rewrite $5t-(t-2)+4t$ in its equivalent form without parentheses. Simplify.

Rewrite $\frac{2x}{7}-(\frac{x}{7}-1)$ in its equivalent form without parentheses. Simplify.

Rewrite $x-4(3x-y)-y$ in its equivalent form without parentheses. Simplify.

Rewrite $-2(t-5)+4t$ in its equivalent form without parentheses. Simplify.

Rewrite $3(x^5-2)-(4-x^5)$ in its equivalent form without parentheses. Simplify.

Rewrite $(q+6)(-8)-21q$ in its equivalent form without parentheses. Simplify.

Rewrite $a-\frac{3}{8}(8a+4)$ in its equivalent form without parentheses. Simplify.

Rewrite $-2.7x^2-(2x^2-1)-1$ in its equivalent form without parentheses. Simplify.

Rewrite $2(a-3)-(a+4)$ in its equivalent form without parentheses. Simplify.

Rewrite $\frac{1}{2}(2x-4)-x$ in its equivalent form without parentheses. Simplify.

Rewrite $2x-5y-4(3x+y)$ in its equivalent form without parentheses. Simplify.

Rewrite $-3xy+7yx-(xy+3)$ in its equivalent form without parentheses. Simplify.

Rewrite $(6x^4+3x^3-1)-(3x^3-3x^2-3)$ in its equivalent form without parentheses. Simplify.

Rewrite $a-0.1(2-3a)$ in its equivalent form without parentheses. Simplify.

Rewrite $-3cb+abc-2(a+bc)$ in its equivalent form without parentheses.Simplify.

Rewrite $\frac{1}{3}a-b-\frac{1}{3}(a-6b)$ in its equivalent form without parentheses. Simplify.

Rewrite $-6(\frac{2}{3}d-\frac{1}{2}a)-a-d$ in its equivalent form without parentheses. Simplify.

Rewrite $-(3a^2-1)-(4a^2+2)$ in its equivalent form without parentheses. Simplify.

Rewrite $3a-\frac{4b}{5}-(4a-\frac{4}{5}b)$ in its equivalent form without parentheses. Simplify.

Rewrite $-(2q+6)-2q-5q$ in its equivalent form without parentheses. Simplify.

Rewrite $(x-1)(-x)+x$ in its equivalent form without parentheses. Simplify.

Rewrite $-(x-1)-2(x+3)$ in its equivalent form without parentheses. Simplify.

Rewrite $-2(t-3)+\frac{2}{5}$ in its equivalent form without parentheses. Simplify.

Rewrite $0.2y-3(-y+0.3)$ in its equivalent form without parentheses. Simplify.

Rewrite $-(6a-2)+2(a-a^2-1)$ in its equivalent form without parentheses. Simplify.

Rewrite $4a+2(8a+1)-7a$ in its equivalent form without parentheses. Simplify.

23. Simplifying algebraic expressions by removing parentheses first (requiring multiplication of a binomial by a binomial), and then collecting like terms. Performing operations on fractions or on decimals might be needed

Eliminate parentheses and simplify by collecting like terms: $q^2-5q-(2q+1)^2$

Eliminate parentheses and simplify by collecting like terms: $-3xy-(7y+2)(x+3)$

Eliminate parentheses and simplify by collecting like terms: $-(x-3)^2+9$

Eliminate parentheses and simplify by collecting like terms: $-2y-(1+3y)(2-y)$

Eliminate parentheses and simplify by collecting like terms: $1+(3-x)^2-x^2$

Eliminate parentheses and simplify by collecting like terms: $4c^2-(c+1)(c-1)$

Eliminate parentheses and simplify by collecting like terms: $-6x-(3x+1)^2$

Eliminate parentheses and simplify by collecting like terms: $3-(a+2)^2+1$

Eliminate parentheses and simplify by collecting like terms: $4+(x-2)(x-3)+5x$

Eliminate parentheses and simplify by collecting like terms: $mn-(m+1)(n-2)$

Eliminate parentheses and simplify by collecting like terms: $4x - x^2 - (x-2)^2$

Eliminate parentheses and simplify by collecting like terms: $-(k-2)(3k+1)-2$

Eliminate parentheses and simplify by collecting like terms: $4s-(2s+3)^2$

Eliminate parentheses and simplify by collecting like terms: $1+(m-1)^2-2m$

Eliminate parentheses and simplify by collecting like terms: $-4-x-(1+x)^2$

Eliminate parentheses and simplify by collecting like terms: $10+(-x+1)(2+x)$

Eliminate parentheses and simplify by collecting like terms: $-(1+t)(2+t)+3$

Eliminate parentheses and simplify by collecting like terms: $-2m^2+(m-3)^2$

Eliminate parentheses and simplify by collecting like terms: $x-2x+(1-2x)^2$

Eliminate parentheses and simplify by collecting like terms: $2a-(a+3)^2$

Theme VI:

FACTORIZATION

24. Factorization of an indicated monomial, including −1 (factorization of "an entire term" and thus getting "1" as a term after factorization possible). No operations on fractions or decimals.

Factor ay from the following expression: $ay-3x^2ay$

Factor $3ab$ from the following expression: $6ab^5-3ba$

Factor a^2b from the following expression: a^3b-a^2b

Factor z^2y^3 from the following expression: $z^4y^6-7y^3z^2$

Factor $4y$ from the following expression: $4y+8xy$

Factor -1 from the expression: $-2+\frac{3x}{y}$

Factor -1 from the following expression: $2x-y+z$

Factor -1 from the following expression: $\frac{-X}{3}+y$

Factor -1 from the following expression: $-a+b+1$

Factor -1 from the following expression: $a-\frac{x+y-z}{2}$

Factor -1 from the following expression: $4x^3-5y^2+5z$

Factor -1 from the following expression: $\frac{1}{a+b}+s\frac{1}{a-b}$

Factor -1 from the following expression: $\frac{2}{3}x^2y-\frac{4}{3}z$

Factor -1 from the following expression: $-2(x-2y)+(x-2z)z^2$

Factor $7xy$ from the following expression: $7x^5y^3-21xy$

Factor $7a^3$ from the following expression: $-14b^3a^7-7a^3$

Factor $6x$ from the following expression: $6x-12x^4$

Factor $4y^2$ from the following expression: $16y^3-4y^2$

Factor $5xy$ from the expression: $5xy+5yx^2$

Factor $7a^2$ from the expression: $21a^5-49a^2$

Factor c from the expression: $3c^4-2c^5a-c$

Factor $2y^2$ from the expression: $-8xy^3+2y^2$

Factor -1 from the expression: $2lw-2lh+2wh$

Factor -1 from the expression: $4xz-\frac{z}{yx}$

Factor x from the following expression: $yx+zx^2-vx$

Factor 10 from the following expression: $1000yxz-100v+10$

Factor $9y$ from the expression: $18xy-9y+36y^2$

Factor -2 from the expression: $20-4a+2b$

Factor c from the expression: $3cd-c+7c^4$

Factor $4y$ from the expression: $-4y+12xy$

Factor -1 from the expression: $2x^4y-12bc+y$

Factor x from the expression: $7xz-4x^3y+5x$

Factor x from the following expression: $xy^2-8xy+x$

Factor z^3 from the following expression: $12z^4y^2+z^3$

Factor mn from the expression: $5mn+3mn^5$

Factor $5s$ from the expression: $5st-30s^{12}$

Factor x^2 from the following expression: $3x^5-2x^3+x^2$

Factor $4a$ from the following expression: $4a-12a^3$

Factor x^2 from the following expression: $3x^5-yx^2$

Factor xy^2 from the following expression: $4x^2y^2-3x^3y^3$

Factor $2xy$ from the following expression: $2xy+4x^2y^2$

Factor a^3b^3 from the following expression: $a^3b^4+5b^3a^7$

Factor $7xy$ from the following expression: $7x^5y^3+21xy$

Factor $7b^3$ from the following expression: $-14b^3-7ab^3$

Factor $4ac$ from the following expression: $-16ac+8ac^7$

Factor ab^2 from the following expression: $3ab^3-ab^4$

Factor $2y$ from the following expression: $2x^2y+4y^4$

Factor x^2 from the following expression: $2x^2-3x^4$

Factor $2x^2y$ from the following expression: $6x^2y+14yx^3$

Factor bc^2 from the following expression: $3abc^2 - 12bc^5$

Factor z^3 from the following expression: $3z^5 + z^4 - 2z^3$

Factor x^2 from the following expression: $2x^3 - x^2$

Factor x from the following expression: $3x - 2x^4y$

25. <u>"The difference of squares" factorization (formula not given).</u>

Factor the following expression: $\frac{x^2}{4} - 1$

Factor the following expression: $0.04 - x^2$

Factor the following expression: $25x^2 - 4$

Factor the following expression: $36x^2 - 1$

Factor the following expression: $x^2 - 0.09$

Factor the following expression: $m^4 - n^2$

Factor the following expression: $\frac{1}{4} - x^2$

Factor the following expression: $y^2 - 100a^2$

Factor the following expression: $x^2y^2 - 25$

Factor the following expression: $25s^2 - 4t^2$

Factor the following expression: $\frac{a^2}{b^2} - 64$

Factor the following expression: $b^2 - 0.01$

Factor the following expression: $m^2 - 81n^2$

Factor the following expression: $4x^2 - 36y^2$

Factor the following expression: $\frac{x^2}{36} - 1$

Factor the following expression: $1-m^2n^2$

Factor the following expression: $x^2-\frac{9}{25}$

Factor the following expression: $m^2-\frac{1}{16}$

Factor the following expression: $\frac{m^2}{16}-16$

Factor the following expression: x^6-16

Factor the following expression: $0.04-s^4$

Factor the following expression: $4-s^{12}$

Factor the following expression: $x^{10}-4$

26. Factoring an indicated expression involving parentheses, fractions or decimals. "Non standard" factoring of the difference of squares (formula not given).

Factor and then simplify the following expression: $m^2-(1-3m)^2$

Factor $(a+2b)$ from the following expression: $4x(a+2b)-(a+2b)$

Factor $\frac{1}{3}$ from the following expression: $\frac{2}{3}y-z$

Factor $\frac{2}{3}$ from the following expression: $\frac{2}{3}x^2y-\frac{4}{3}z$

Factor 0.01 from the following expression: $0.2x^2+0.03z$

Factor $\frac{1}{a+b}$ from the following expression: $\frac{1}{a+b}+s\frac{1}{a+b}$

Factor $\frac{1}{5}$ from the following expression: $\frac{1}{5}x-\frac{1}{25}$

Factor $a+b$ from the following expression: $6(a+b)-x(a+b)$

Factor $a+b$ from the following expression: $4(a+b)-3(a+b)^2$

Factor 0.02 from the following expression: $0.2lw+10lh+0.04wh$

Factor $\frac{11}{2}$ from the following expression: $\frac{11}{2}t^2+\frac{33}{2}t$

Factor $m-3n$ from the following expression: $5x(m-3n)-4(m-3n)^5$

Factor $s-t^2$ from the following expression: $s(s-t^2)-t(s-t^2)$

Factor 1.6 from the following expression: $1.6x-3.2x^2-16x^3$

Factor 0.001 from the following expression: $0.1a^4-0.01a^3-0.001a^4$

Factor $\frac{3}{8}$ from the following expression: $-\frac{6}{8}s-\frac{9}{8}t^2$

Factor $\frac{1}{2}$ from the following expression: $\frac{5}{2}x^2yz-\frac{1}{2}$

Factor $\frac{5}{6}$ from the following expression: $\frac{5}{6}ab-\frac{5}{6}bc+\frac{5}{6}ac$

Factor $\frac{2}{3}$ from the following expression: $\frac{4}{3}-\frac{5}{3}z$

Factor $\frac{9}{5}$ from the following expression: $\frac{9}{5}y-\frac{27}{10}y^2$

Factor and then simplify the following expression: $m^2-(1-3m)^2$

Factor and then simplify the following expression: $m^2-(2m+1)^2$

Factor and then simplify the following expression: $(x+1)^2-(3x+5)^2$

Factor and then simplify the following expression: $(2a-3)^2-9a^2$

Factor and then simplify the following expression: $(a-2b)^2-9$

Factor and then simplify the following expression: $(x^2-3y^2)^2-(2x^2+1)^2$

Factor and then simplify the following expression: $(3x+2)^2-(5x+1)^2$

Factor $\frac{1}{7}$ from the following expression: $\frac{6}{7}m+n$

Theme VII:

SIMPLIFYING RATIONAL EXPRESSIONS

27. Simplifying rational expression when factorization is not needed. Recognizing the cases when simplification is not possible.

Simplify $\frac{7x^7y}{21yx}$. If not possible, write "not possible".

Simplify . $\frac{2b^4a^2}{b^2a^2}$. If not possible, write "not possible".

Simplify $\frac{4a^2(b-c)}{8a}$. If not possible, write "not possible".

Simplify $\frac{3xy}{9yx}$. If not possible, write "not possible".

Simplify $\frac{-a^2}{b^2a^2}$. If not possible, write "not possible".

Simplify $\frac{a^2(b-c)}{2a}$. If not possible, write "not possible".

Simplify $\frac{4z}{4z-v}$. If not possible, write "not possible".

Simplify $\frac{-12xy}{9x}$. If not possible, write "not possible".

Simplify $\frac{2abc}{8ab}$. If not possible, write "not possible".

Simplify $\frac{-2mn^2}{4n^2}$. If not possible, write "not possible".

Simplify $\frac{5xy^4}{20y^3}$. If not possible, write "not possible".

Simplify $\frac{15x(a-b)}{25x}$. If not possible, write "not possible".

Simplify $\frac{4a^2b}{8b}$. If not possible, write "not possible".

Simplify $\frac{bc(b+e)}{b}$. If not possible, write "not possible".

Simplify $\frac{4x(-5x^2)}{x}$. If not possible, write "not possible".

Simplify $\frac{ab}{7ab}$. If not possible, write "not possible".

Simplify $\frac{2x+3}{2x-1}$. If not possible, write "not possible".

Simplify $\frac{4x^2y^3}{12x}$. If not possible, write "not possible".

Simplify $\frac{a+3b}{3b+a}$. If not possible, write "not possible".

Simplify $\frac{ab-c}{b}$. If not possible, write "not possible".

Simplify $\frac{-2(x+3y)}{x+3y}$. If not possible, write "not possible".

Simplify $\frac{2x^2z}{7xyz}$. If not possible, write "not possible".

Simplify $\frac{3}{9(mn+k)}$. If not possible, write "not possible".

28. Simplification (if possible) of rational expressions. Factorization (common factor, including -1) of a numerator OR a denominator (but not both) needed.

Simplify $\frac{a+2ab}{a}$. If not possible, write "not possible".

Simplify $\frac{xy}{x^2y-3xy^2}$. If not possible, write "not possible".

Simplify $\frac{a+4d}{-4d-a}$. If not possible, write "not possible".

Simplify $\cdot\frac{12x-4}{4x}$. If not possible, write "not possible".

Simplify $\frac{a+2b}{a-2b}$. If not possible, write "not possible".

Simplify $\frac{xy}{xy-3xy^2}$. If not possible, write "not possible".

Simplify $\frac{a+4d}{-4d-a}$. If not possible, write "not possible".

Simplify $\frac{2}{2x+2y}$. If not possible, write "not possible".

Simplify $\frac{xy+xz}{3x}$. If not possible, write "not possible".

Simplify $\frac{3x+3x^2}{6x}$. If not possible, write "not possible".

Simplify $\frac{4x-5x^2}{x}$. If not possible, write "not possible".

Simplify $\frac{m-3n}{3n-m}$. If not possible, write "not possible".

Simplify $\frac{a^3b-4b^4a^4}{a}$. If not possible, write "not possible".

Simplify $\frac{3x}{3x-9}$. If not possible, write "not possible".

Simplify $\frac{3x}{3x-9x^2}$. If not possible, write "not possible".

Simplify $\frac{x^2}{2x^2-x^5}$. If not possible, write "not possible".

Simplify $\frac{ab+c}{c+ab}$. If not possible, write "not possible".

Simplify $\frac{8y}{2y+4y^2}$. If not possible, write "not possible".

Simplify $\cdot\frac{12x-4x^4}{3x}$. If not possible, write "not possible".

Simplify $\frac{u+2v-s}{s-2v-u}$. If not possible, write "not possible".

Simplify $\frac{4uv^2+2vu}{2uv}$. If not possible, write "not possible".

Simplify $\frac{xy-xy^2}{3yx}$. If not possible, write "not possible".

Simplify $\frac{-4x+12y+8z}{4}$. If not possible, write "not possible".

Simplify $\frac{8z}{4x-8z}$. If not possible, write "not possible".

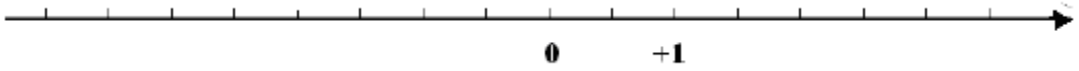
Theme VIII:

UNDERSTANDING "<", "≤" AND ">", "≥" NOTATION.
UNDERSTANDING PHRASES "AT LEAST", "AT MOST", "NOT MORE", "NOT LESS".
GRAPHS OF SETS ON A NUMBER LINE.

29. Understanding "<", "≤" and ">", "≥" notation. Understanding phrases "at least", "at most", "not more", "not less". Graphs of sets on a number line.

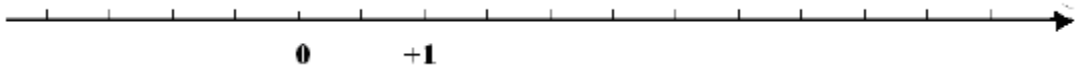
Graph the following number set on a number line. Assume that the distance between all marks is the same.

$x \le -1$

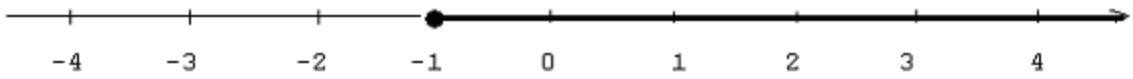


Graph the following number set on a number line. Assume that the distance between all marks is the same.

$x > 3$

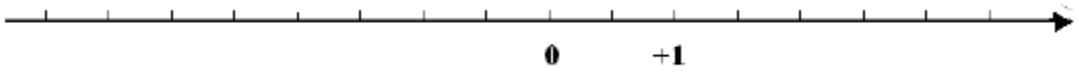


Using inequality symbols, describe the set that is graphed below:



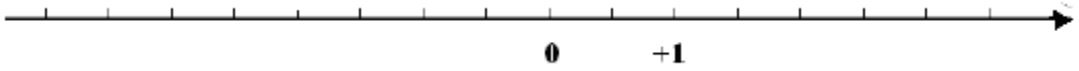
Graph the following inequality on the number line. Assume that the distance between all marks is the same.

$x \leq 3$



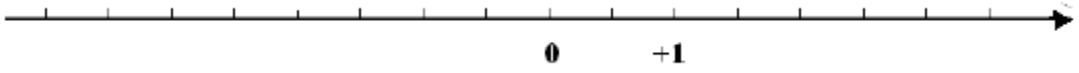
Graph the following inequality on the number line. Assume that the distance between all marks is the same.

$x > \frac{1}{2}$



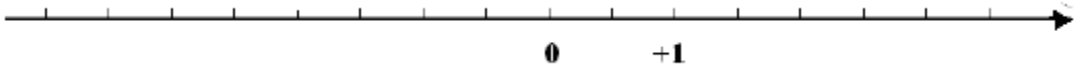
Graph the following inequality on the number line. Assume that the distance between all marks is the same.

$x > \frac{5}{2}$



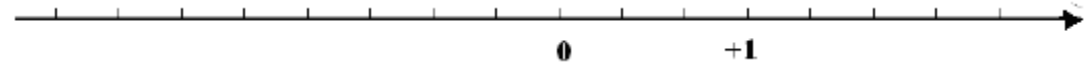
Graph the following inequality on the number line. Assume that the distance between all marks is the same.

$x \leq -\frac{1}{2}$



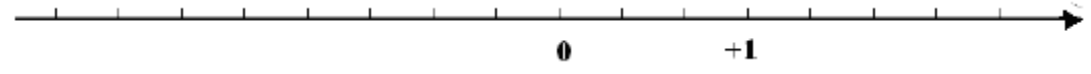
Graph the following inequality on the number line. Assume that the distance between all marks is the same.

$x \geq -2$



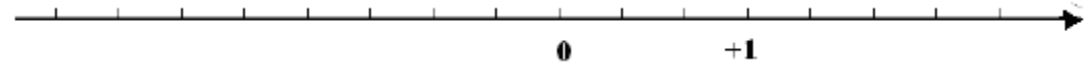
Graph the following inequality on the number line. Assume that the distance between all marks is the same.

$x \geq \frac{1}{3}$



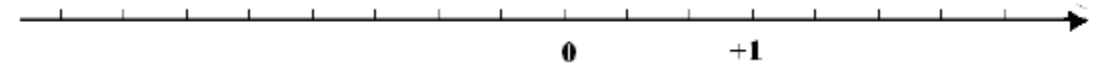
Graph the following inequality on the number line. Assume that the distance between all marks is the same.

$x < -\frac{2}{3}$



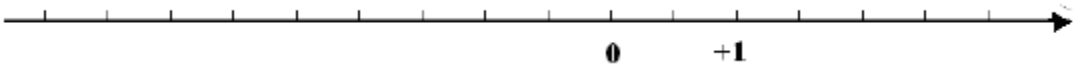
Graph the following inequality on the number line. Assume that the distance between all marks is the same.

$x < -2$

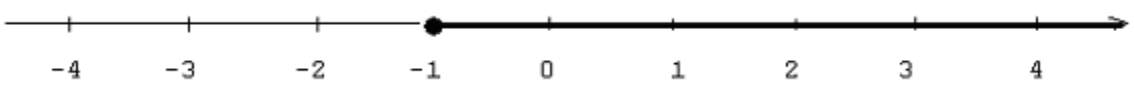


Graph the following inequality on the number line. Assume that the distance between all marks is the same.

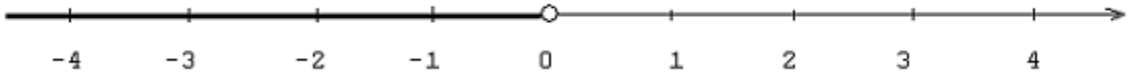
$x \leq -3$



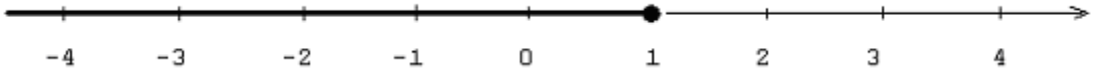
Using inequality symbols, describe the set that is graphed below:



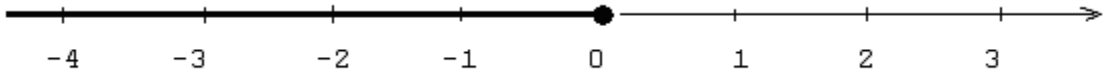
Using inequality symbols, describe the set that is graphed below:



Using inequality symbols, describe the set that is graphed below:



Using inequality symbols, describe the set that is graphed below:



Circle all of the numbers that satisfy the condition $x \leq -2$.

$-4, \quad -2.1, \quad -2, \quad -0.9, \quad 0, \quad 1$

Name three numbers that satisfy the condition: $x \leq -0.2$.

Write any inequality that is satisfied by -2 and -4.

Write any inequality that is satisfied by 6 but not by -1.

Describe the following set of numbers using inequality signs: All numbers x that are at most equal to -2.

Name three numbers that do NOT satisfy the condition: $x \leq -10$

Circle all of the numbers that satisfy the condition $x \leq -0.9$.

$-4, \quad -2.1, \quad -2, \quad -0.9, \quad 0, \quad 1$

Name three numbers that satisfy the condition: $x \le -1$.

Write any inequality that is satisfied by -2 and 3.

Write any inequality that is not satisfied by -2 and 3.

Write any inequality that is satisfied by -2, but not by 3.

Describe the following set of numbers using inequality signs: All numbers x that are positive.

Describe the following set of numbers using inequality signs: All numbers x that are non-negative.

Describe the following set of numbers using inequality signs: All numbers x that are at most equal to 9.

Describe the following set of numbers using inequality signs: All numbers x that are at least equal to 9.

Describe the following set of numbers using inequality signs: All numbers x that are not less than 9.

Describe the following set of numbers using inequality signs: All numbers x that are not more than -1

Describe the following set of numbers using inequality signs: All numbers x that are negative.

Describe the following set of numbers using inequality signs: All numbers x that are non-positive.

Describe the following set of numbers using inequality signs: All numbers x that are at least equal to 6.

Describe the following set of numbers using inequality signs: All numbers x that are at most equal to 6.

Describe the following set of numbers using inequality signs: All numbers x that are not more than 6.

Name three numbers that satisfy the condition: $x > -4$

Name three numbers that satisfy the condition: $x \le -3$

Name three numbers that satisfy the condition: $x > \frac{1}{2}$

Name three numbers that satisfy the condition: $x \ge -0.5$

Find a number that satisfies $x \ge 8$ but does not satisfy $x > 100$

Circle all numbers that satisfy the following inequality: $x > -3$

$-3, \quad -2, \quad -1, \quad 0, \quad 1, \quad 2, \quad 3, \quad 4, \quad 5$

Circle all numbers that **do not** satisfy the inequality: $x > -3$

$-3, \quad -2, \quad -1, \quad 0, \quad 1, \quad 2, \quad 3, \quad 4, \quad 5$

Circle all numbers that satisfy the inequality: $x \le -2$:

$-3, \quad -2, \quad -1, \quad 0, \quad 1, \quad 2, \quad 3, \quad 4, \quad 5$

Theme XIX:

ALGEBRAIC EXPRESSIONS VS. EQUATIONS
A SOLUTION VS. THE SOLUTION SET OF AN EQUATION (INEQUALITY)
WHAT IT MEANS TO SOLVE AN EQUATION (INEQUALITY)

30. Understanding the difference between algebraic expression and equation, what it means that a number is a solution of any equation (inequality) in one variable, the difference between a solution and the solution set, and what it means to solve an equation or inequality. Performing operations on fractions or on decimals might be needed.

Determine whether the following examples represent an equation or an algebraic expression. Circle ALL equations.

a) $4x-2$ b) $4x-2=7$ c) $A=0$

Determine whether the following examples represent an equation or an algebraic expression. Circle ALL equations.

a) $4x-x-2=9x$ b) $4x-2=7$ c) $x^2+3y^2=4-x$

Determine whether the following examples represent an equation or an algebraic expression. Underline the examples that represents an equation (might be more than one).

a) $4x-2+5y$ b) x^3-2x c) $4x-2=5y-9$

Determine whether the following examples represent an equation or an algebraic expression. Circle ALL algebraic expressions.

a) $3x-7y=5$ b) $x=0$ c) $9x-7y+3c+8$

Determine whether the following examples represent an equation or an algebraic expression. Circle ALL algebraic expressions.

a) $x^2-2y^2=0$ b) $-4x+5-y+z$ c) x

Is the number -5 a solution of the following inequality: $x+2<-4$?

Is the number -5 a solution of the following inequality: $-x+8\geq 13$?

Is the number 2 a solution of the following inequality: $-x+3<1$?

For each of the following equations determine if the number 0 is its solution. If 0 is a solution, circle the equation.

a) $3x=0$ b) $\frac{1}{x}=0$

For each of the following equations determine if the number 0 is its solution. If 0 is a solution, circle the equation. a) $x^2 = 0$ b) $-x = 0$

Is $x = -1$ a solution of: $(-x)(-x) = 2$?

Is $x = -1$ a solution of: $-x^{23} = 1$?

Is $x = 2$ a solution of $-6^x = 36$

Is $x = 2$ a solution of $(-6)^x = 36$

Is the number -2 a solution of the following inequality: $-x \geq -2$.

Is the number 9 is a solution of the following inequality: $\frac{x}{3} \geq 2$

Is the number -1 a solution of the following inequality: $4 - x + 3 < 8$

Is the number -3 a solution of the following equation.: $\frac{1}{x} = -3$?

Is the number -1 a solution of the following equation. $x^{26} = x$

Is the number -1 a solution of the following inequality: $\frac{x+1}{5} \leq 0$

Is the number 0 a solution of the following equation. $\frac{x^2 - x}{5} = 0$

Is the number 0 a solution of the following equation. $\frac{2}{x} = 0$

Does $x = 7$ make the statement $2(x+1) - x = 7$ true or false ?

Is $x = -2$ a solution of $-x^2 = 4$?

Does $x = -3$ make the statement $-x^2 = 9$ true or false ?

Does $x = 4$ make the statement $-x^2 = 16$ true or false ?

Is $x = -2$ a solution of $x \leq -2$?

The solution set of an equation is "all real numbers". If possible, list three solutions of this equation. If not possible, write "not possible".

Circle all of the numbers below that are solutions of the inequality: $x < 2$

$x = 2$ $x = -2$

Circle all of the numbers below that are solutions of the equation $x \geq -2$

$x = 2$ $\quad$ $x = -2$

Determine if $y = 2$ is a solution of the equation: $\frac{0.4}{y} = 5$

Determine if $x = 10$ is a solution of the equation: $0.2x^2 = 20$

Determine if $x = -1$ is a solution of the equation: $\frac{-1}{x} = -1$

Does $a = \frac{1}{2}$ make the statement $\frac{2}{a} = 1$ true or false ?

Does $a = -\frac{1}{2}$ make the statement $a^2 = -\frac{1}{4}$ true or false ?

Is $y = 0$ a solution of $2y^2 = 2$?

Is $x = -1$ a solution of $2x \leq 0$?

Is $x = -1$ a solution of $-1 - x \geq 0$?

Is $x = -1$ a solution of $3x - 2 < 0$?

Is $x = \frac{1}{2}$ a solution of $2x > 1$?

Theme X:

SOLVING LINEAR EQUATIONS AND INEQUALITIES IN ONE UNKNOWN

SOLVING EQUATIONS FOR A GIVEN VARIABLE IN TERMS OF OTHER VARIABLES

31. Solving "one-step" linear inequalities in one variable. Knowing when to reverse the inequality sign when solving inequalities.

Fill in blanks to make the following statement true: Any time we _____ or _____ both sides of an inequality by a negative number, the direction of the inequality must be reversed.

Determine which of the following operations requires the change of inequality sign (all, none, or some answers might be right).

a) multiplying both sides of an inequality by -3

b) dividing both sides of an inequality by 7

c) adding -3 to both sides of an inequality

Determine which of the following operations requires the change of inequality sign (all, none, or some answers might be right).
a) multiplying both sides of an inequality by 9
b) dividing both sides of an inequality by -5
c) subtracting 8 from both sides of an inequality

Determine which of the following operations requires the change of inequality sign (all, none, or some answers might be right).
a) adding 2 to both sides of an inequality
b) dividing both sides of an inequality by -1
c) multiplying both sides of an inequality by -12

Determine which of the following operations requires the change of inequality sign (all, none, or some answers might be right).
a) adding -2 to both sides of an inequality
b) dividing both sides of an inequality by 5
c) multiplying both sides of an inequality by 9

Solve the following inequality $x-8>-2$

Solve the following inequality: $98>-2x$

Solve the following inequality: $-7+x\le -2$

Solve the following inequality: $3x\ge -4$

Solve the following inequality: $-x\le 0$

Solve the following inequality: $-2a>5$

Solve the following inequality: $x+5<-1$

Solve the following inequality: $-2>7+y$

Solve the following inequality: $4x>-8$

Solve the following inequality: $3+b\le -2$

Solve the following inequality: $-9+x\ge 8$

Solve the following inequality: $-3\ge -6w$

Solve the following inequality: $2x>-4$

Solve the following inequality: $-2\ge x+5$

Solve the following inequality: $-2x<-1$

Solve the following inequality: $10>-2x$

Solve the following inequality: $-9 < x - 2$

Solve the following inequality: $-x \leq 0$

Solve the following inequality: $-x \leq 8$

Solve the following inequality: $x + 3 \leq -4$

Solve the following inequality: $-7x \geq 0$

Solve the following inequality: $9 > -x$

Solve the following inequality: $-4 > 3x$

Solve the following inequality: $0 > -3 + x$

Solve the following inequality: $9 < -2 + x$

Solve the following inequality: $x + 2 \geq -1$

Solve the following inequality: $4x > 2$

Solve the following inequality: $-2x > 5$

Solve the following inequality: $-3 \leq 5 + x$

Solve the following inequality: $-3x > 18$

Solve the following inequality: $7x > -7$

Solve the following inequality: $-9 \leq -2 + x$

Solve the following inequality: $12 > -2x$

Solve the following inequality: $-x \leq 4$

Solve the following inequality: $-7x > -1$

32. Solving linear equations in one variable (variables only on one side of the equation, no parentheses, no fractions, no decimals)

Solve the following equation: $0 = 3a - 1$

Solve the following equation: $-3 - a + 5 = 4$

Solve the following equation: $-2 = 1 - 7a + 5$

Solve the following equation: $8+6x=-3$

Solve the following equation: $6=-x+1$

Solve the following equation: $-7=3-x$

Solve the following equation: $-x+2=1$

Solve the following equation: $2-3x=14$

Solve the following equation: $8=2-3x$

Solve the following equation: $-2=-9-x$

Solve the following equation: $1-2x=8$

Solve the following equation: $-7x-5=0$

Solve the following equation: $0=1-x$

Solve the following equation: $-8=1-x$

Solve the following equation: $2-6x=-8$

Solve the following equation: $-1=-7x-5$

Solve the following equation: $-x+1=-2$

Solve the following equation: $2-3x=-1-3$

Solve the following equation: $6=4-x-2$

Solve the following equation: $0=2-x-5$

33. Solving linear equations or inequalities with a variable on both sides. No fractions or parentheses involved. "No solution" or "all real numbers" as a solution possible. No operations on fractions or decimals needed.

Solve the following inequality: $4x-1\le 2x-5$

Solve the following inequality: $2x-1+4x>-1+6x$

Solve the following equation: $x=-x$

Solve the following inequality: $x-8>x-9$

Solve the following inequality: $2-a>4a-5a-2$

Solve the following inequality: $-5x+2 \le -3x+2$

Solve the following equation: $3x = 5-4x$

Solve the following inequality: $x \le x$

Solve the following inequality: $x < x$

Solve the following equation: $4x-5 = 15+x$

Solve the following equation: $x-8 = x-9$

Solve the following equation: $2+a = -a$

Solve the following equation: $3j-4j = 2j$

Solve the following equation: $2-7m-4 = m$

Solve the following equation: $z-1 = -z+z$

Solve the following equation: $7x = 8x$

Solve the following equation: $-4x = x+12$

Solve the following equation: $6x = 15x$

Solve the following equation: $3-7x = x$

Solve the following equation: $3x = 5-4x$

Solve the following equation: $-4x+2 = 3x$

Solve the following equation: $3x-7 = -1-4x$

Solve the following equation: $4x-3 = 12x$

Solve the following equation: $-6+6x = 2x+5$

Solve the following equation: $30+x-9 = 21+x$

Solve the following equation: $-x+3+3x = 2x$

Solve the following equation: $x-4 = -x+2$

Solve the following equation: $-2x-3 = -x+4$

Solve the following inequality: $3x+1 < 3x+11$

Solve the following inequality: $2-a>4a-5a-2$

Solve the following inequality: $-5x+2\le -3x+2$

Solve the following inequality: $3-2a<-6a$

Solve the following inequality: $3<2-5x$

Solve the following inequality: $2x+5>6x+16$

34. Solving linear equations (inequalities) when the removal of parentheses is needed; no fractions involved. "No solution" or "all real numbers" as a solution is a possibility. Operations on decimals might be needed.

Solve the following equation: $3x=2-4(x-1)$

Solve the following inequality: $3x+1>-11+3(x+4)$

Solve the following inequality: $4x-1\le 7x-(5+2x)$

Solve the following equation: $6(2x+3)-x=11x$

Solve the following equation: $-(x+3)+x=-(2x-1)$

Solve the following equation: $0.2(x+3)=0.2x+3(0.1-x)$

Solve the following equation: $-2(4x-1)+7x=4-x$

Solve the following equation: $4(y-2)=-(1+y)$

Solve the following equation: $0=2(1+x)$

Solve the following equation: $4(x-3)=12$

Solve the following equation: $-6=2(x+5)$

Solve the following equation: $-0.7-2(x-0.3)=-x-0.1$

Solve the following equation: $3(2m-4)=6m+6$

Solve the following inequality: $-6\le 2(x+5)$

Solve the following inequality: $-x+1>6(x-2)$

Solve the following inequality: $4x-1 \le 2(x-5)$

Solve the following inequality: $-3(x+2) \le -3x+2$

Solve the following inequality: $3(2x+5) > 6x+16$

Solve the following inequality: $3-2(3a-5) < -6a$

Solve the following inequality: $3(2x-1) < 2(x-2)$

Solve the following inequality: $0.1(10x-100) > x$

Solve the following equation: $5y = -4(1+y)+2$

36. Solving linear equations (inequalities) involving fractions. "No solution" or "all real numbers" as a solution is a possibility.

Solve the following equation: $\frac{4x}{5}+1=\frac{2}{3}$

Solve the following inequality: $\frac{4-x}{2}-\frac{x+2}{4} > 5$

Solve the following inequality: $\frac{3x+6}{3} \le x+2$

Solve the following inequality: $\frac{-x-2}{4} \le -5$

Solve the following inequality: $\frac{-y}{2}-\frac{y+3}{3} \le -1$

Solve the following inequality: $\frac{2a-3}{5}-1 > -5a+\frac{2}{3}$

Solve the following inequality: $\frac{x}{4}+1 \ge -1+x$

Solve the following inequality: $\frac{x+1}{4} \ge \frac{x-1}{3}$

Solve the following inequality: $\frac{3x}{4} < -15+\frac{x}{8}$

Solve the following inequality: $-5 \geq \frac{-x}{4} - 2x$

Solve the following inequality: $\frac{3-x}{2} - \frac{x+2}{3} > 5$

Solve the following equation: $\frac{x-2}{4} = -5 + x$

Solve the following equation: $-3x - \frac{x}{5} - 1 = 0$

Solve the following equation: $\frac{x-1}{3} = 1 - \frac{x}{2}$

Solve the following equation: $-1 = 8x - \frac{x}{2}$

Solve the following equation: $\frac{1}{5}y - \frac{1}{5} = \frac{3}{10}y$

Solve the following equation: $\frac{x}{2} + \frac{2}{3} = \frac{3}{4}$

Solve the following equation: $-\frac{3x}{2} = -1 + \frac{3x}{5}$

Solve the following equation: $1 - \frac{2}{3}a = \frac{5}{6}$

37. <u>Solving literal equations (variable one is seeking will not appear in the denominator). Up to two operations needed. Simplification might be needed at the end.</u>

Solve for x and simplify: $\frac{x}{b} = b$

Solve for x and simplify: $x + a = 3a$

Solve for x and simplify: $ax = a^2$

Solve for x and simplify: $bx + a = 0$

Solve for x. Simplify your answer whenever possible: $\frac{x}{m} = 3m$

Solve for x. Simplify your answer whenever possible: $x - 2y = 5y$

Solve for x. Simplify your answer whenever possible: $ax = a^4$

Solve for x. Simplify your answer whenever possible: $xy - d = 0$

Solve for d. Simplify your answer whenever possible: $xy - d = 0$

Solve the equation $-\frac{b}{a} = 7c$ for b. Simplify your answer whenever possible.

Solve the equation $-a + b = 4a$ for b. Simplify your answer whenever possible.

Solve for m. Simplify your answer whenever possible: $\frac{m}{4x} = x$

Solve for x. Simplify your answer whenever possible: $x + Y - W = Z$

Solve for x. Simplify your answer whenever possible: $-x + 2b = c$

Solve for x. Simplify your answer whenever possible: $\frac{2x}{v} = z$

Solve for x. Simplify your answer whenever possible: $-a + y + x = z$

Solve for x. Simplify your answer whenever possible: $-4m = x + m$

Solve for x. Simplify your answer whenever possible: $3 = xy + y$

Solve for x. Simplify your answer whenever possible: $y = 2c - x$

Solve the equation $b - 7z = z$ for b. Simplify your answer whenever possible

Solve the equation $sa = s$ for a. Simplify your answer whenever possible

Solve for m. Simplify your answer whenever possible: $6xy = 3mx$

Solve for x. Simplify your answer whenever possible: $-\frac{x}{a} = -c$

Solve for x. Simplify your answer whenever possible: $\frac{x}{a+c} = b$

Solve for x. Simplify your answer whenever possible: $x(2 - y) = b$

Solve for x. Simplify your answer whenever possible: $2x + a = b$

Solve for x. Simplify your answer whenever possible: $ax - b = c$

Solve for a. Simplify your answer whenever possible : $ax + b = 4$

Solve for y. Simplify your answer whenever possible: $2x + y = t + 3$.

Solve for x. Simplify your answer whenever possible: $-xy = a$.

Solve for b. Simplify your answer whenever possible: $-\frac{b}{a} = 2a$

Solve for *b.* Simplify your answer whenever possible*:* $abc^2 = 1 - c$

Solve for y. Simplify your answer whenever possible: $2x + y = t + 3x$

Solve for *s.* Simplify your answer whenever possible: $\frac{s}{-t^3} = 4t$

Solve for the indicated variable. Simplify your answer whenever possible: $2x + b = 5b$ for x

Solve for the indicated variable. Simplify your answer whenever possible: $bac^2 = (ac)^2$ for b

37. <u>Solving equations for a given variable. Factorization of this variable might be needed in the process. Variable might be on both sides of the equation. Variable could be in the denominator. Simplification might be needed at the end. More than two operation might be needed in the process.</u>

Solve for x and simplify: $ax - bx - c = 0$

Solve the following equation for y and simplify: $\frac{x}{y} = d + e$

Solve for x: $ax - bx - c = 0$

Solve for x: $\frac{a+b}{x} = 2b$

Solve for the indicated variable. Simplify your answer whenever possible: $\frac{b^4}{a} = bc$ for a

Solve for the indicated variable: $\frac{m^2}{u} = a + 1$ for u.

Solve for the indicated variable: $AX - A = 1$ for *A.*

Solve for the indicated variable: $x^3 + sy = y$ for *y.*

Solve for the indicated variable: $3v - t = s + v$ for v.

Solve for x: $ax - by = 3x$.

Solve for m: $\frac{2m}{n^2} = 4 + k$

Solve for x: $\frac{m - 2n}{x} = a$

Solve for s: $sx - s = t$

Solve for x: $ax - 2x = a - 2$

Solve the following equation $\frac{x}{y} = d + e$ for y.

Solve for the indicated variable. Simplify your answer whenever possible: $\frac{a}{b^3} = \frac{b}{c}$ for a

Solve for the indicated variable. Simplify your answer whenever possible: $2X - A = X - 1$ for X

Solve for the indicated variable. Simplify your answer whenever possible: $\frac{3a^2}{u} = 3a$ for u

Solve for the indicated variable. Simplify your answer whenever possible: $xa - a^2 = 3a^2$ for x

Solve for the indicated variable. Simplify your answer whenever possible: $ax - 3ax = 4$ for x

Solve for the indicated variable. Simplify your answer whenever possible: $-2t = tx$ for t.

Solve for the indicated variable. Simplify your answer whenever possible: $2ys - xys = y$ for s.

Solve for the indicated variable. Simplify your answer whenever possible: $\frac{m^8}{x} = m^2 n^3$ for x.

Solve for the indicated variable. Simplify your answer whenever possible: $\frac{a^2}{u} = a$ for u

Solve for the indicated variable. Simplify your answer whenever possible: $\frac{2m^3}{n} = 4m$ for n

Solve for the indicated variable. Simplify your answer whenever possible: $x^3 + xy = 2x^3$ for y

Solve for the indicated variable. Simplify your answer whenever possible: $s(x - 1) = s^2$ for x

Solve for the indicated variable. Simplify your answer whenever possible: $ax - by = 3ax + 4by$ for a

Solve for the indicated variable. Simplify your answer whenever possible: $3(v - s) = s$ for v

Solve for the indicated variable. Simplify your answer whenever possible: $a(x+2)=1$ for x

Theme XI:
REWRITING ALGEBRAIC EXPRESSIONS TO MATCH A PRESCRIBED FORMAT AND RECOGNIZING THE VALUE OF PARAMETERS IN THE REPRESETATION.
IDENTIFYING LINEAR EQUATIONS AND WRITING THEM IN A STANDARD FORM.

38. Recognizing the value of parameters in the representation of expression (equation) that is already written in a prescribed form.

The equation $y=3x+4$ is written in the form $y=mx+b$, where *m* and *b* are any numbers. Identify the values of *m* and *b*.

The equation $y-3=x-4$ is written in the form $y-m=x-b$, where *m* and *b* are any numbers. Identify the values of *m* and *b*.

The equation $y=2(x-4)^2$ is written in the form $y=a(x-b)^2$, where *a* and *b* are any numbers. Identify the values of *a* and *b*.

The equation $y=2(x-4)^2$ is written in the form $y=a(x-b)^2$, where *a* and *b* are any numbers. Identify the values of *a* and *b*.

The equation $y=-2x^3+5$ is written in the form $y=cx^3+d$, where *c* and *d* are any numbers. Identify the values of *c* and *d*.

The equation $y=(3x)^2+\frac{1}{2}$ is written in the form $y=a^2+b$, where *a* and *b* are any algebraic expressions. Identify the *a* and *b* in this representation.

The expression $(4x)^5$ is written in the form A^5, where *A* represents any algebraic expression. Identify the *A* in this representation.

The expression $\frac{x}{3^2}$ is written in the form $\frac{x}{a^2}$, where *a* represents any number. Identify the a in this representation.

The expression $\frac{x}{7}$ is written in the form $\frac{x}{a}$, where *a* represents any number. Identify the a in this representation.

The expression $\frac{x}{-3}$ is written in the form $\frac{x}{a}$, where *a* represents any number. Identify the a in this representation.

The expression $\frac{x}{-3}$ is written in the form $\frac{x}{-a}$, where *a* represents any number. Identify the a in this representation.

The expression $2(x+1)$ is written in the form $2A$, where *A* represents any algebraic expression. Identify the *A* in this representation.

The expression $-2x$ is written in the form $-ax$, where *a* represents any number. Identify the a in this representation.

The expression $-2x$ is written in the form ax, where *a* represents any number. Identify the a in this representation

The expression $(7-x)^2$ is written in the form $(a-x)^2$, where *a* represents any number. Identify the a in this representation

The expression $(-7-x)^2$ is written in the form $(a-x)^2$, where *a* represents any number. Identify the a in this representation

The expression $(7-x)^2$ is written in the form B^2, where *B* represents any algebraic expression. Identify the B in this representation

The expression $-abc$ is written in the form $-M$, where M represents any algebraic expression. Identify the M in this representation.

The expression $7-3x$ is written in the form $7-A$, where *A* represents any algebraic expression. Identify the *A* in this representation.

The expression $\frac{4}{x+y}$ is written in the form $\frac{4}{m}$, where *m* represents any algebraic expression. Identify the *m* in this representation.

The expression $3x^2-2x$ is written in the form ax^2-bx, where *a* and *b* represent any numbers. Identify the *a* and *b* in this representation

The expression $7x^2+2x$ is written in the form ax^2+bx, where *a* and *b* represent any numbers. Identify the *a* and *b* in this representation.

39. Rewriting algebraic expressions in their equivalent form to match a prescribed format

Write the expression $81x^2$ in the form A^2, where A is any algebraic expression.

Write the expression x^8 in the form A^2, where A is any algebraic expression.

Write the expression $\frac{0.09x^2}{y^6}$ in the form A^2, where A is any algebraic expression.

Write the expression $\frac{-x+8y}{4}$ in the form $Ax+By$, where A *and* B are any numbers.

Write the expression $3x-4y+5x$ in the form $Ax+By$, where A *and* B are any numbers.

Write the expression $3x-(y+x)$ in the form $Ax+By$, where A *and* B are any numbers.

Write the expression x^{10} in the form A^5, where A is any algebraic expression.

Write the expression $36x^2y^2$ in the form A^2, where A is any algebraic expression.

Write the expression x^{24} in the form a^4, where a is any algebraic expression.

Write the expression x^{24} in the form a^{12}, where a is any algebraic expression.

Write the expression x^{36} in the form a^{12}, where a is any algebraic expression.

Write the expression x^8 in the form a^4, where a is any algebraic expression.

Write the expression $\frac{x^3}{5}+3$ in the form ax^3+b, where a and b are any numbers.

Write the expression $-x^3+3$ in the form ax^3+b, where a and b are any numbers.

Write the expression $2x^3-3$ in the form ax^3+b, where a and b are any numbers.

Write the expression $\frac{4x^3+3}{2}$ in the form ax^3+b, where a and b are any numbers.

Write the expression $(2x)^3+4$ in the form ax^3+b, where a and b are any numbers.

Write the expression $(x-2)^2$ in the form $(a+b)^2$, where a and b are any algebraic expressions.

Write the expression $(\frac{m+n}{2})^2$ in the form $(a+b)^2$, where a and b are any algebraic expressions.

Write the expression $(x-2)^2$ in the form $(a+b)^2$, where a and b are any algebraic expressions.

40. Rewriting equations in their equivalent form to match a prescribed format

Rewrite the equation $\frac{x}{4}-1=0$ in its equivalent to match the form $ax+b=0$, where a and b are any numbers.

Write the expression $2y=-4x+3$ in the form $y=mx+b$, where m, b are any numbers.

Write the expression $(x-2)^2+(y+1)^2=1$ in the form: $(x-p)^2+(y-q)^2=1$

Write the expression $y - x = 0$ in the form $y = mx + b$, where m, b are any numbers.

Write the expression $x^2 + 9 = 0$ in the form $x^2 = b$, where b is any numbers.

Rewrite the equation $7x + 2 = 3x$ in its equivalent form to match the form $ax + b = 0$, where a and b are any numbers.

Rewrite the equation $2(x + 3) = 0$ in its equivalent form to match the form $ax + b = 0$, where a and b are any numbers.

Rewrite the equation $3x - 1 = 2x$ in its equivalent form to match the form $ax + b = 0$, where a and b are any numbers.

Rewrite the equation $5x + 7 = 7$ in its equivalent form to match the form $ax + b = 0$, where a and b are any numbers.

Rewrite the equation $\frac{3x - 1}{2} = 0$ in its equivalent form to match the form $ax + b = 0$, where a and b are any numbers.

Rewrite the equation $4x + 5 - 7z = -2$ in its equivalent form to match the form $ax + b = 0$, where a and b are any numbers.

Rewrite the equation $\frac{5x}{2} = -1$ in its equivalent form to match the form $ax + b = 0$, where a and b are any numbers.

Write the expression $y = 2x - 4$ in the form $y = mx + b$, where m *and* b are any numbers.

Write the expression $2(y - x) = 0$ in the form $y = mx + b$, where m *and* b are any numbers.

Write the expression $y - 1 = x$ in the form $y = mx + b$, where m *and* b are any numbers.

Write the expression $\frac{y + 3x}{5} = 0$ in the form $y = mx + b$, where m *and* b are any numbers.

Write the expression $-y = 4x - 9$ in the form $y = mx + b$, where m *and* b are any numbers.

Write the expression $-x^2 = -7$ in the form $x^2 = b$, where b is any number.

Write the expression $3x^2 + 2 = 0$ in the form $x^2 = b$, where b is any number.

Write the expression $\frac{x^2}{5} = -10$ in the form $x^2 = b$, where b is any number.

Write the expression $x^2 - \frac{1}{5} = \frac{4}{5}$ in the form $x^2 = b$, where b is any number.

Write the expression $10x^2 = 9.2$ in the form $x^2 = b$, where b is any number.

Write the expression $2 - x^2 = 5$ in the form $x^2 = b$, where b is any number.

Write the expression $(x-3)^2 + 5 = 2$ in the form $(x-m)^2 + n = 0$, where m and n are any numbers.

Write the expression $(x-0.3)^2 = 3$ in the form $(x-m)^2 + n = 0$, where m and n are any numbers.

Write the expression $(-4+x)^2 + 5 = 0$ in the form $(x-m)^2 + n = 0$, where m and n are any numbers.

Write the expression $0 = -7 + (x-1)^2$ in the form $(x-m)^2 + n = 0$, where m and n are any numbers.

Write the expression $-3x + x^2 + 5x = 0$ in the form $x^2 + bx + c = 0$, where b and c are any numbers.

Write the expression $x^2 + 1 = -7x + 2$ in the form $x^2 + bx + c = 0$, where b and c are any numbers.

Write the expression $x^2 + 5(x-0.2) = 0$ in the form $x^2 + bx + c = 0$, where b and c are any numbers.

Write the expression $\frac{x^2 + 4x + 5}{9} = 0$ in the form $x^2 + bx + c = 0$, where b and c are any numbers.