

Math 017 Review for Exam 2

1. Without doing any calculations say which property of real numbers justifies each statement.

Assume any letters represent real numbers.

- (a) $0 + \frac{2+93}{5} = \frac{2+93}{5}$ (b) $17 + \pi = \pi + 17$ (c) $88(4 + 91) = 88(4) + 88(91)$
 (d) $8(9) = 9(8)$ (e) $8 + (9 + 4) = (8 + 9) + 4$ (f) $2x + 7x = (2 + 7)x = 9x$

2. Simplify and on each step state the property of real numbers used.

- (a) $5x + 4(2x + 3)$ (b) $(5x + 9y) + (4x - 2y)$ (c) $9 + (2x + 7)$

3. Simplify each of the following.

- (a) $4x - 6y - 7(2x - 3y)$ (b) $7[2(4 - 12) - 9]$ (c) $4\{[6(2x - 5) + 3] - 2[6(x - 2)]\}$
 (d) $4x - 7y - 8x - 9y$ (e) $-8 - 7(-2)$ (f) $\frac{2^3 - 3^2 + 8 \cdot 5}{9 - 6 \cdot 2}$

4. Factor completely.

- (a) $14x - 35y$ (b) $36 - 12y$ (c) $64x - 36y + 24$ (d) $6x - 18$

5. Solve for x and on each step state the properties of real numbers and/or properties of equality used.

- (a) $3(2x + 7) + 4 = 43$ (b) $x + 7 = 19$ (c) $6x + 8 = 50$ (d) $5x = 20$

6. Solve for x and check your answer by replacing x with your answer in the original equation:

- (a) $2x - 9 = 7x - 29$ (b) $6x + 8 = -16$ (c) $\frac{2}{3}x = \frac{5}{6}$ (d) $0.25x = 3$

7. Solve for x:

- (a) $3x - 5 = 5x + 7$ (b) $4(2x - 3) + 6 = 5x - 8$
 (c) $3(2x - 8) + 5 = 4(x - 9) + 2x$ (d) $5(x - 6) = 3(x - 10) + 2x$
 (e) $\frac{3}{4}x - \frac{2}{9} = \frac{5}{6}$ (f) $0.3x - 0.8 = 0.9x + 1$
 (g) $5(2x - 3) + 4(x - 9) = 8x + 5$ (h) $6 + 4[3 + 2(3x + 7)] = 5(3x - 1) + 6x$

8. Solve

- (a) $D = \frac{R(100 - x)}{100}$ for x. (b) $A = P(1 + rt)$ for t.
 (c) $P = 2(L + W)$ for W. (d) $C = 5(F - 32)/9$ for F.

9. Use algebra to solve the following.

You sell newspapers for 65 cents each at a newsstand. You pay 43 cents for each newspaper sold and you also pay \$88 to rent the newsstand. How many newspapers do you need to sell in order to break even?

Answers to Math 017 Review for Exam 2

- 1.(a) Zero is the identity element for addition. (b) Commutative law of addition.
 (c) Distributive law of multiplication over addition. (d) Commutative law of multiplication.
 (e) Associative law of addition. (f) Distributive law of multiplication over addition.

2.(a) $5x + 4(2x + 3)$
 $= 5x + (8x + 12)$ by the distributive property of multiplication over addition
 $= (5x + 8x) + 12 = 13x + 12$ by the associative property of addition.

(b) $(5x + 9y) + (4x - 2y)$
 $= 5x + (9y + 4x) - 2y$ by the associative property of addition
 $= 5x + (4x + 9y) - 2y$ by the commutative property of addition
 $= (5x + 4x) + (9y - 2y)$ by the associative property of addition
 $= (5 + 4)x + (9 - 2)y = 9x + 7y$ by the distribution property of multiplication over addition.

(c) $9 + (2x + 7)$
 $= (2x + 7) + 9$ by the commutative property of addition
 $= 2x + (7 + 9) = 2x + 16$ by the associative property of addition.

3. (a) $-10x + 15y$ (b) -175 (c) -12 (d) $-4x - 16y$ (e) 6 (f) -13
 4.(a) $7(2x - 5y)$ (b) $12(3 - y)$ (c) $4(16x - 9y + 6)$ (d) $6(x - 3)$

5.(a) $3(2x + 7) + 4 = 43$
 $(6x + 21) + 4 = 43$ by the distributive property
 $6x + (21 + 4) = 43$ by the associative property of addition
 $6x + 25 = 43$ by rules for adding real numbers
 $(6x + 25) + (-25) = 43 + (-25)$ by the additive property of equality
 $(6x + 25) + (-25) = 18$ by rules for adding real numbers
 $6x + (25 + (-25)) = 18$ by the associative property of addition
 $6x + 0 = 18$ by the additive inverse property
 $6x = 18$ by the additive identity (zero) property
 $\frac{1}{6}(6x) = \frac{1}{6}(18)$ by the multiplicative property of equality
 $\frac{1}{6}(6x) = 3$ by the rules for multiplying real numbers
 $(\frac{1}{6} \cdot 6)x = 3$ by the associative property of multiplication
 $1 \cdot x = 3$ by the multiplicative inverse property
 $x = 3$ by the multiplicative identity (one) property

(b) $x + 7 = 19$
 $(x + 7) + (-7) = 19 + (-7)$ by the addition property of equality
 $(x + 7) + (-7) = 12$ by the rules for adding real numbers
 $x + (7 + (-7)) = 12$ by the associative property of addition
 $x + 0 = 12$ by the additive inverse property
 $x = 12$ by the additive identity (zero) property

Answers to Math 017 Review for Exam 2

(c) $6x + 8 = 50$
 $(6x + 8) + (-8) = 50 + (-8)$ by the addition property of equality
 $(6x + 8) + (-8) = 42$ by the rules for adding real numbers
 $6x + (8 + (-8)) = 42$ by the associative property of addition
 $6x + 0 = 42$ by the additive inverse property
 $6x = 42$ by the additive identity (zero) property
 $\frac{1}{6}(6x) = \frac{1}{6}(42)$ by the multiplicative property of equality
 $\frac{1}{6}(6x) = 7$ by the rules for multiplying real numbers
 $(\frac{1}{6} \cdot 6)x = 7$ by the associative property of multiplication
 $1 \cdot x = 7$ by the multiplicative inverse property
 $x = 7$ by the multiplicative identity property

(d) $5x = 40$
 $\frac{1}{5}(5x) = \frac{1}{5}(40)$ by the multiplication property of equality
 $\frac{1}{5}(5x) = 8$ by the rules for multiplying real numbers
 $(\frac{1}{5} \cdot 5)x = 8$ by the associative property of multiplication
 $1 \cdot x = 8$ by the multiplicative inverse property
 $x = 8$ by the multiplicative identity property.

6.(a) answer: $x = 4$	(b) answer: $x = 12$
check: $2x - 9 = 7x - 29$	check: $x + 7 = 19$
$2(4) - 9 = 7(4) - 29 ?$	$12 + 7 = 19 ?$
$8 - 9 = 28 - 29 ?$	$19 = 19 ?$
$-1 = -1 ?$ yes	yes

(c) answer: $x = \frac{5}{4}$	(d) answer: $x = 12$
check: $\frac{2}{3}x = \frac{5}{6}$	check: $0.25x = 3$
$\frac{2}{3}(\frac{5}{4}) = \frac{5}{6} ?$	$0.25(12) = 3 ?$
$\frac{5}{6} = \frac{5}{6} ?$ yes	$3 = 3 ?$ yes

7.(a) -6 (b) $-2/3$ (c) no solution (d) all real numbers (e) $38/27$ (f) -3 (g) $28/3$ (h) $-79/3$

8.(a) $x = \frac{100(R - D)}{R}$ (b) $t = \frac{A - P}{Pr}$ (c) $W = \frac{P - 2L}{2}$ (d) $F = \frac{9C}{5} + 32$

9. equation: $0.65x = 0.43x + 88$ final answer: $x = 400$ newspapers.