

## Review 3

**Simplify. Write the answer with positive exponents.**

1)  $4^5 \cdot 4^7$  1) \_\_\_\_\_  
A)  $16^{35}$  B)  $4^{35}$  C)  $16^{12}$  D)  $4^{12}$

2)  $8x^4 \cdot -4x^8$  2) \_\_\_\_\_  
A)  $-32x^{32}$  B)  $32x^{32}$  C)  $-32x^{12}$  D)  $32x^{12}$

**Simplify. Assume that variables in the exponent represent nonzero integers.**

3)  $x^{2a} \cdot x^{9a} \cdot x^{8a+2}$  3) \_\_\_\_\_  
A)  $ax^{144a+2}$  B)  $ax^{19a+2}$  C)  $x^{144a+2}$  D)  $x^{19a+2}$

**Simplify. Write the answer with positive exponents.**

4)  $(-8x)^0 - 8x^0$  4) \_\_\_\_\_  
A)  $-9$  B)  $-7$  C)  $-8x + 1$  D)  $-16$

5)  $\frac{x^9y^{13}}{x^5y^7}$  5) \_\_\_\_\_  
A)  $x^3y^6$  B)  $x^4y^6$  C)  $xy^6$  D)  $x^3y^5$

6)  $\frac{-40x^{11}y^9z^4}{8x^3y^3z^3}$  6) \_\_\_\_\_  
A)  $-5x^8y^6$  B)  $x^8y^6z$  C)  $-5x^7y^5z$  D)  $-5x^8y^6z$

**Simplify. Assume that variables in the exponent represent nonzero integers.**

7)  $\frac{x^{5a+7} \cdot x^{3a}}{x^a}$  7) \_\_\_\_\_  
A)  $x^9a$  B)  $x^{7a+7}$  C)  $x^{2a+7}$  D)  $x^{15a}$

**Simplify. Write the answer with positive exponents.**

8)  $\frac{1}{2^{-3}}$  8) \_\_\_\_\_  
A)  $-8$  B)  $\frac{1}{8}$  C)  $\frac{1}{6}$  D)  $8$

9)  $\frac{x^{-7}}{x^{-9}}$  9) \_\_\_\_\_  
A)  $\frac{1}{x^2}$  B)  $x^2$  C)  $-\frac{1}{x^2}$  D)  $-x^2$

10)  $\frac{x^{-5}y^7}{x^{-2}y^{-4}}$  10) \_\_\_\_\_

A)  $\frac{1}{x^3y^3}$       B)  $\frac{x^3}{y^3}$       C)  $\frac{y^{11}}{x^3}$       D)  $x^3y^{11}$

**Write the number in scientific notation.**

11) In a certain city, the bus system carried a total of 12,700,000,000 passengers. 11) \_\_\_\_\_

A)  $1.27 \times 10^{10}$       B)  $1.27 \times 10^9$       C)  $12.7 \times 10^{10}$       D)  $1.27 \times 10^{11}$

**Write the number in standard notation.**

12)  $5.482 \times 10^{-6}$  12) \_\_\_\_\_

A) 0.000005482      B) 0.00005482      C) -5,482,000      D) 0.0000005482

**Simplify. Write the answer with positive exponents.**

13)  $(3^4)^{-2}$  13) \_\_\_\_\_

A) -162      B)  $\frac{1}{6561}$       C)  $\frac{1}{729}$       D) -24

14)  $\left(\frac{4x^4y^2}{z^4}\right)^3$  14) \_\_\_\_\_

A)  $\frac{4x^{12}y^6}{z^{12}}$       B)  $\frac{64x^7y^5}{z^7}$       C)  $\frac{4x^{12}y^6}{z^7}$       D)  $\frac{64x^{12}y^6}{z^{12}}$

**Perform the indicated operations.**

15)  $(9x^5 + 9x^4 + 9x^3 - 4) - (5x^5 - 6x^4 - 2x^3 + 6)$  15) \_\_\_\_\_

A)  $14x^5 + 3x^4 + 7x^3 - 10$       B)  $4x^5 + 15x^4 + 11x^3 - 10$   
 C)  $14x^5 + 3x^4 + 7x^3 + 2$       D)  $4x^5 + 3x^4 + 7x^3 + 2$

**Multiply.**

16)  $(4y + 11)(3y^2 - 2y - 7)$  16) \_\_\_\_\_

A)  $12y^3 + 41y^2 + 50y + 77$       B)  $12y^3 - 8y^2 - 28y + 11$   
 C)  $45y^2 - 30y - 105$       D)  $12y^3 + 25y^2 - 50y - 77$

17)  $(8x - 9y)^2$  17) \_\_\_\_\_

A)  $8x^2 + 81y^2$       B)  $64x^2 + 81y^2$   
 C)  $64x^2 - 144xy + 81y^2$       D)  $8x^2 - 144xy + 81y^2$

**Simplify. Write the answer with positive exponents.**

18)  $\left(\frac{xy^4}{x^3y}\right)^{-2}$  18) \_\_\_\_\_

A)  $\frac{1}{x^8y^{10}}$       B)  $\frac{y^6}{x^4}$       C)  $\frac{x^4}{y^6}$       D)  $\frac{1}{x^5y^9}$

19)  $\left(\frac{3-1x-4y-4}{z^{-2}}\right)^{-4}$  19) \_\_\_\_\_

A)  $\frac{z^8}{81x^{16}y^{16}}$       B)  $\frac{81x^{16}y^{16}}{z^8}$       C)  $\frac{z^8}{3x^{16}y^{16}}$       D)  $\frac{3x^{16}y^{16}}{z^6}$

**Perform the indicated operation. Write the answer in scientific notation.**

20)  $\frac{270,000,000,000}{0.000003}$  20) \_\_\_\_\_

A)  $24 \times 10^{15}$       B)  $24 \times 10^{16}$       C)  $9 \times 10^{15}$       D)  $9 \times 10^{16}$

**Solve. Write the answer in scientific notation.**

21) If the mass of an object is  $2.45116 \times 10^{-8}$  tons and its density is  $4.66 \times 10^{-7}$  tons per cubic foot, find the volume of this object. (Use the formula  $D = \frac{M}{V}$ .) 21) \_\_\_\_\_

A)  $52.6 \times 10^{-2}$  cubic feet      B)  $5.26 \times 10^{-1}$  cubic feet  
 C)  $5.26 \times 10^{-3}$  cubic feet      D)  $5.26 \times 10^{-2}$  cubic feet

**Find the degree of the polynomial and indicate whether the polynomial is a monomial, binomial, trinomial, or none of these.**

22)  $-8x^2 + 8x^2y + 7$  22) \_\_\_\_\_

A) degree 2; trinomial      B) degree 5; trinomial  
 C) degree 3; trinomial      D) degree 2; none of these

**Perform the indicated operations.**

23)  $\left(-\frac{2}{3}x^2 - \frac{2}{5}x + \frac{1}{3}\right) + \left(\frac{1}{3}x^2 - \frac{4}{5}x + \frac{1}{2}\right)$  23) \_\_\_\_\_

A)  $-\frac{1}{3}x^4 - \frac{6}{5}x^2 + \frac{5}{6}$       B)  $-\frac{1}{3}x^2 - \frac{6}{5}x - \frac{5}{6}$   
 C)  $-\frac{23}{15}x^6 + \frac{5}{6}$       D)  $-\frac{1}{3}x^2 - \frac{6}{5}x + \frac{5}{6}$

**Multiply.**

24)  $(x^2 + 12y)(x^2 - 12y)$  24) \_\_\_\_\_

A)  $x^4 - 24y^2$       B)  $x^4 - 144y^2$   
 C)  $x^4 - 24x^2y - 144y^2$       D)  $x^4 + 24x^2y - 144y^2$

25)  $(x - 3)(x + 1)(4x - 3)$  25) \_\_\_\_\_

A)  $4x^3 - 6x^2 - 11x + 9$       B)  $4x^3 + 9$   
 C)  $4x^3 + 11x^2 + 6x + 9$       D)  $4x^3 - 11x^2 - 6x + 9$

**Factor the polynomial completely.**

26)  $24x^9y^9 - 32x^7y^5 + 64x^3y^2$  26) \_\_\_\_\_

A)  $8x^3y^2(3x^6y^7 - 4x^4y^3 + 8)$       B)  $x^3y^2(24x^6y^7 - 32x^4y^3 + 64)$   
 C)  $8x^3(3x^6y^9 - 4x^4y^5 + 8y^2)$       D)  $8(3x^9y^9 - 4x^7y^5 + 8x^3y^2)$

27)  $xy - 4yz + 11x - 44z$  27) \_\_\_\_\_  
 A)  $(y - 4)(x + 11z)$  B)  $(y + 4)(x - 11z)$  C)  $(y + 11)(x - 4z)$  D)  $(y - 11)(x + 4z)$

28)  $x^2 - x - 35$  28) \_\_\_\_\_  
 A)  $(x - 35)(x + 1)$  B)  $(x - 5)(x + 7)$   
 C)  $(x + 5)(x - 7)$  D) prime polynomial

29)  $20x^2 + 7x - 6$  29) \_\_\_\_\_  
 A)  $(20x + 3)(x - 2)$  B)  $(4x + 3)(5x - 2)$   
 C)  $(4x - 3)(5x + 2)$  D) prime polynomial

30)  $49x^3y - 84x^2y^2 + 36xy^3$  30) \_\_\_\_\_  
 A)  $xy(7x - 6y)^2$  B)  $(49x^2y + xy)(x + 36y^2)$   
 C)  $xy(7x - 6y)(7x + 6y)$  D)  $xy(7x + 6y)^2$

31)  $72x^2y - 98y$  31) \_\_\_\_\_  
 A)  $2y(6x + 7)^2$  B)  $2y(6x + 7)(6x - 7)$   
 C)  $2y(6x - 7)^2$  D) prime polynomial

32)  $512y^3 + 343$  32) \_\_\_\_\_  
 A)  $(512y - 7)(y^2 + 56y + 49)$  B)  $(8y - 7)(64y^2 + 56y + 49)$   
 C)  $(8y + 7)(64y^2 + 56y + 49)$  D)  $(8y + 7)(64y^2 - 56y + 49)$

33)  $375x^3y - 81y^4$  33) \_\_\_\_\_  
 A)  $3y(125x - 3y)(x^2 + 15xy + 9y^2)$  B)  $3y(5x + 3y^2)(25x^2 - 15xy + 9xy^2)$   
 C)  $3y(5x - 3y)(25x^2 + 15xy + 9y^2)$  D)  $(15xy - 9y^2)(25x^2 + 9y^2)$

**Solve the equation.**

34)  $x^3 - x = -7x^2 + 7$  34) \_\_\_\_\_  
 A) 1, -7, 7 B) -7, 7 C) 49 D) -1, 1, -7

**Solve.**

35) Find the length of the shorter leg of a right triangle if the longer leg is 24 meters and the hypotenuse is 6 more than twice the shorter leg. 35) \_\_\_\_\_  
 A) 9 m B) 17 m C) 18 m D) 10 m

**Find the domain of the rational function.**

36)  $f(x) = \frac{1 - 6x}{x^2 - 4x - 32}$  36) \_\_\_\_\_  
 A)  $\left\{ x \mid x \text{ is a real number and } x \neq 8, x \neq -4, x \neq \frac{1}{6} \right\}$   
 B)  $\left\{ x \mid x \text{ is a real number and } x \neq 8, x \neq -4, x \neq \frac{1}{6}, x \neq 0 \right\}$   
 C)  $\{ x \mid x \text{ is a real number and } x \neq -8, x \neq -4 \}$   
 D)  $\{ x \mid x \text{ is a real number and } x \neq 8, x \neq -4 \}$

**Simplify the rational expression.**

37)  $\frac{x^2 + 11x + 30}{x^2 + 12x + 35}$  37) \_\_\_\_\_

- A)  $-\frac{x^2 + 11x + 30}{x^2 + 12x + 35}$  B)  $\frac{11x + 30}{12x + 35}$  C)  $\frac{11x + 6}{12x + 7}$  D)  $\frac{x + 6}{x + 7}$

**Multiply or divide as indicated. Simplify completely.**

38)  $\frac{x^2 + 8x + 15}{x^2 + 10x + 21} \cdot \frac{x^2 + 7x}{x^2 + 9x + 20}$  38) \_\_\_\_\_

- A)  $\frac{x^2 + 7x}{x + 4}$  B)  $\frac{1}{x + 4}$  C)  $\frac{x}{x + 4}$  D)  $\frac{x}{x^2 + 10x + 21}$

39)  $\frac{x^2 + 5x - 6}{x^2 + 9x + 18} \div \frac{x^2 - 1}{x^2 + 7x + 12}$  39) \_\_\_\_\_

- A)  $\frac{x + 4}{x - 1}$  B)  $\frac{x + 1}{x + 4}$  C)  $\frac{x + 4}{x + 1}$  D)  $\frac{x - 1}{x + 4}$

**Perform the indicated operation. Simplify if possible.**

40)  $\frac{8x^2}{x - 1} + \frac{-8x}{x - 1}$  40) \_\_\_\_\_

- A)  $8x$  B)  $\frac{8x}{x - 1}$  C)  $0$  D)  $\frac{8x(x + 1)}{x - 1}$

**Solve the equation.**

41)  $\frac{x + 5}{x^2 + 3x + 2} - \frac{5}{x^2 + 4x + 4} = \frac{x - 5}{x^2 + 3x + 2}$  41) \_\_\_\_\_

- A)  $-15$  B)  $-3$  C)  $3$  D)  $0$

**Perform the indicated operation. Simplify if possible.**

42)  $\frac{m - 5}{m^2 - 7m + 6} + \frac{2m + 1}{m^2 - 5m + 4}$  42) \_\_\_\_\_

- A)  $\frac{3m - 4}{2m^2 - 12m + 10}$  B)  $\frac{3m^2 - 20m + 14}{(m + 1)(m + 6)(m + 4)}$   
C)  $3m - 4$  D)  $\frac{3m^2 - 20m + 14}{(m - 1)(m - 6)(m - 4)}$

**Divide.**

43)  $(-8x^3 + 14x^2 - 15x + 3) \div (-4x + 1)$  43) \_\_\_\_\_

- A)  $x^2 - 3x + 3$  B)  $2x^2 + 3$  C)  $2x^2 - 3x + 3$  D)  $x^2 + 3x - 3$

Use synthetic division to divide.

$$44) \frac{3x^3 + 10x^2 + 13x - 14}{x - \frac{2}{3}}$$

44) \_\_\_\_\_

$$A) 3x^2 + 8x + \frac{23}{3} + \frac{\frac{2}{3}}{x - \frac{2}{3}}$$

$$B) 3x^2 - 12x + 21$$

$$C) 3x^2 + 12x + 21 - \frac{28}{x - \frac{2}{3}}$$

$$D) 3x^2 + 12x + 21$$

Solve.

- 45) One conveyor belt can move 1000 boxes in 10 minutes. Another can move 1000 boxes in 11 minutes. If another conveyor belt is added and all three are used, the boxes are moved in 3 minutes. How long would it take the third conveyor belt alone to do the same job?

45) \_\_\_\_\_

A)  $7\frac{1}{47}$  minutes

B)  $\frac{47}{330}$  minute

C)  $1\frac{157}{173}$  minutes

D)  $\frac{173}{330}$  minute

- 46) The pressure of a gas varies jointly as the amount of the gas (measured in moles) and the temperature and inversely as the volume of the gas. If the pressure is 1014 kPa (kiloPascals) when the number of moles is 8, the temperature is 260° Kelvin, and the volume is 640 cc, find the pressure when the number of moles is 9, the temperature is 320° K, and the volume is 1080 cc.

46) \_\_\_\_\_

A) 1768

B) 780

C) 832

D) 1664

## Answer Key

Testname: REVIEW 3

- 1) D
- 2) C
- 3) D
- 4) B
- 5) B
- 6) D
- 7) B
- 8) D
- 9) B
- 10) C
- 11) A
- 12) A
- 13) B
- 14) D
- 15) B
- 16) D
- 17) C
- 18) C
- 19) B
- 20) D
- 21) D
- 22) C
- 23) D
- 24) B
- 25) D
- 26) A
- 27) C
- 28) D
- 29) B
- 30) A
- 31) B
- 32) D
- 33) C
- 34) D
- 35) D
- 36) D
- 37) D
- 38) C
- 39) C
- 40) A
- 41) B
- 42) D
- 43) C
- 44) D
- 45) A
- 46) C