

Semester 2 Final Review

Name KEY

D. 1. Solve the system of equations.  $6x = 12$   
 $x = 2$   
 $-5x + y = -5$   
 $-4x + 2y = 2$   
 $\rightarrow 10x - 2y = 10$   
 $+ -4x + 2y = 2$   
 $\rightarrow 6x = 12$   
 $x = 2$

a. (-8, -15)    b. (-2, -15)    c. (0, 1)    d. (2, 5)

D. 2. Solve the system of equations.  
 $3x + 2y = 7$   
 $y = -3x + 11$   
 $3x + 2(-3x + 11) = 7$   
 $3x - 6x + 22 = 7$   
 $-3x + 22 = 7$   
 $-3x = -15$   
 $x = 5$

a. (6, -3)    b. (6, -7)    c. (-4, 19/2)    d. (5, -4)

A. 3. Sharon has some one-dollar bills and some five-dollar bills. She has 14 bills. The value of the bills is \$30. Solve a system of equations to find how many of each kind of bill she has.

a. 4 five-dollar bills, 10 one-dollar bills    c. 5 five-dollar bills, 5 one-dollar bills  
b. 3 five-dollar bills, 15 one-dollar bills    d. 5 five-dollar bills, 9 one-dollar bills

$x + y = 14$  bills  
 $1x + 5y = 30$  \$  
 $-x + -1y = -14$   
 $+ 1x + 5y = 30$   
 $4y = 16$   
 $y = 4$

See Work at end of review

B. 4. A jar containing only nickels and dimes contains a total of 60 coins. The value of all the coins in the jar is \$4.45. Solve the system to find the number of nickels and dimes that are in the jar.

a. 30 nickels and 30 dimes    c. 29 nickels and 31 dimes  
b. 31 nickels and 29 dimes    d. 28 nickels and 32 dimes

A. 5. Simplify:  $a^5 \cdot 3b^9 \cdot 6a$   
a.  $18a^6b^9$     b.  $10a^6b^9$     c.  $18ab^{15}$     d.  $18a^{45}b^9$

A. 6. Simplify:  $(5k^2)^3$   
a.  $125k^6$     b.  $125k^5$     c.  $5k^6$     d.  $5k^8$

A. 7. Simplify:  $\frac{x^{14}}{x^7}$   
a.  $x^7$     b.  $x^{98}$     c.  $\frac{1}{x^7}$     d.  $x^{21}$

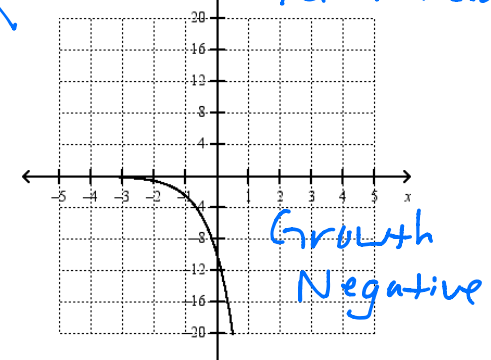
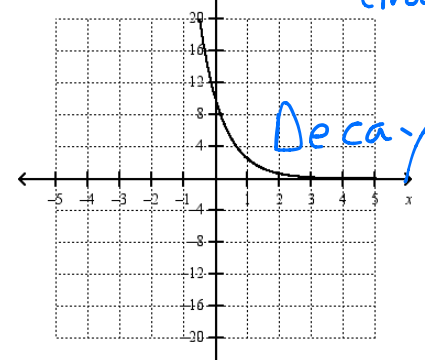
A. 8. Simplify:  $\left(\frac{3x}{2}\right)^4$   
a.  $\frac{81x^4}{16}$     b.  $6x^4$     c.  $\frac{12x^4}{8}$     d.  $\frac{81x^4}{2}$

C. 9. Simplify:  $(2x^0y^2)^3$   
a. 0    b.  $6y^5$     c.  $8y^6$     d.  $8x^3y^5$

B. 10. Simplify:  $(3p^4q^{-5})^{-2}$   
a.  $\frac{3p^2}{q^7}$     b.  $\frac{q^{10}}{9p^8}$     c.  $\frac{q^{25}}{6p^{16}}$     d.  $\frac{q^{25}}{9p^{16}}$

B. 11. Graph:  $y = 10 \cdot 4^x$   
~~a.~~ initial amount  
 Growth

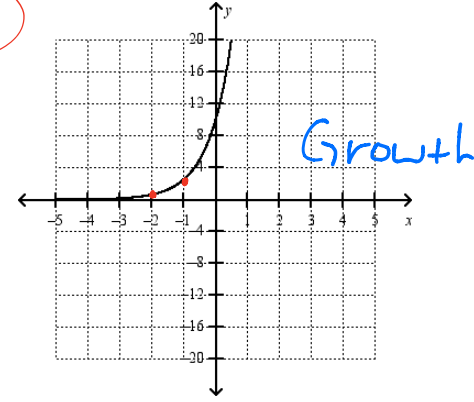
$y = a(b)^x$   
 $|b| > 1$  Growth  
 $|b| < 1$  Decay



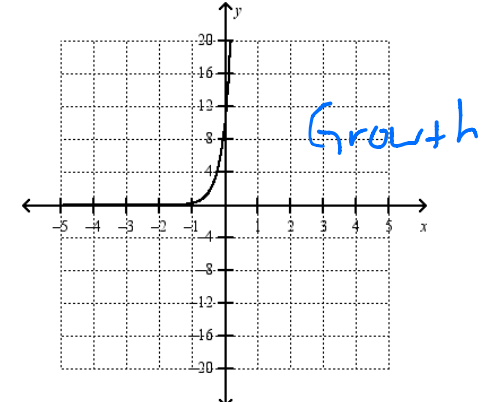
$$y = 10(4)^x$$

x	y
-2	.625
-1	2.5
0	10
1	40
2	160

b.



d.

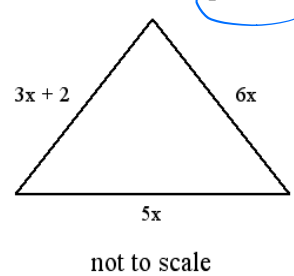


B. 12. Suppose the population of a town is 15,200 and is growing 2% each year.  
 a. Write an equation to model the population growth.  $y = 15,200(1 + .02)^t$   
 b. Predict the population after 11 years.  $15,200(1.02)^{11}$

- a.  $y = 15,200 \cdot 2^x$ ; about 18,899 people
- b.  $y = 15,200 \cdot 1.02^x$ ; about 18,899 people
- c.  $y = 2 \cdot 15,200^x$ ; about 334,400 people
- d.  $y = 15,200 \cdot 2^x$ ; about 31,129,600 people

A. 13. A boat costs \$11,850 and decreases in value by 10% per year. How much will the boat be worth after 8 years?  
 a. \$5,101.04      b. \$11,770.00      c. \$4,590.93      d. \$25,401.53

C. 14. Write the perimeter of the figure.



$$3x + 2 + 5x + 6x$$

$$14x + 2$$

$$11,850(1 - .10)^8$$

$$5101.04$$

- a.  $9x + 7x$
- b.  $11x + 3x + 2$
- c.  $14x + 2$
- d.  $14x$

- A. 15. Simplify:  $(4w^2 - 4w - 8) + (2w^2 + 3w + 6)$
- a.  $2w^2 - 7w - 2$       c.  $2w^2 - 1w - 14$   
 b.  $6w^2 - 1w - 14$       d.  $6w^2 + 7w + 2$

- D. 16. Simplify:  $8p(-3p^2 + 6p - 2)$
- a.  $5p^3 + 14p^2 - 6p$       c.  $14p^2 - 6p - 5p^3$   
 b.  $48p^2 - 16p - 24p^3$       d.  $-24p^3 + 48p^2 - 16p$

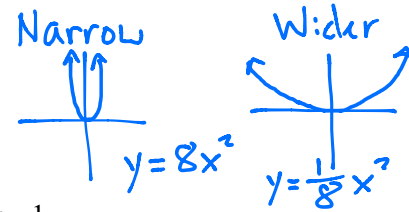
- D. 17. Multiply and simplify:  $(3x - 7)(3x - 5)$
- a.  $9x^2 + 6x + 35$       c.  $9x^2 - 36x - 35$   
 b.  $9x^2 + 36x + 35$       d.  $9x^2 - 36x + 35$

- C. 18. Factor:  $w^2 + 18w + 77$
- a.  $(w - 7)(w + 11)$       c.  $(w + 7)(w + 11)$   
 b.  $(w - 7)(w - 11)$       d.  $(w + 1)(w + 77)$

- A. 19. Factor:  $x^2 - x - 42$
- a.  $(x - 7)(x + 6)$       c.  $(x + 7)(x - 6)$   
 b.  $(x + 7)(x - 6)$       d.  $(x - 7)(x - 6)$

- A. 20. Factor:  $20x^2 + 22x - 12$
- a.  $2(5x - 2)(2x + 3)$       c.  $(10x - 2)(4x + 3)$   
 b.  $2(5x + 2)(2x - 3)$       d.  $2(5x + 4)(2x - 3)$

- C. 21. Which of the quadratic functions has the widest graph?
- a.  $y = \frac{1}{3}x^2$       b.  $y = -4x^2$       c.  $y = 0.3x^2$       d.  $y = -\frac{4}{5}x^2$



- D. 22. Find the coordinates of the vertex of the graph of the function  $y = 2x^2 + 8x - 1$ .
- a. (2, 23)      c. (4, 63)  
 b. (-4, -1)      d. (-2, -9)

$a = 2$   
 $b = 8$   
 $c = -1$   
 $x = \frac{-b}{2a} = \frac{-(8)}{2(2)} = \frac{-8}{4}$   
 $x = -2$

- C. 23. Solve:  $z^2 - 6z - 27 = 0$
- a.  $z = 3$  or  $z = 9$       c.  $z = -3$  or  $z = 9$   
 b.  $z = 3$  or  $z = -9$       d.  $z = -3$  or  $z = -9$

$(z - 9)(z + 3) = 0$   
 $z - 9 = 0 \Rightarrow z = 9$   
 $z + 3 = 0 \Rightarrow z = -3$

$5y^2 - 8y - 2 = 0$   
 $a = 5$   
 $b = -8$   
 $c = -2$   
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$   
 $x = \frac{8 \pm \sqrt{(8)^2 - (4)(5)(-2)}}{2(5)}$

- A. 24. Solve using the quadratic formula:  $5y^2 - 8y = 2$
- a. 1.82, -0.22      b. 11.2, -9.6      c. 3.64, -0.44      d. 0.22, -1.82

- D. 25. Solve using square roots:  $7x^2 + 6 = 13$
- a. no real number solutions  
 b. 1      c.  $\pm 7$   
 d.  $\pm 1$

$7x^2 = 7$   
 $x^2 = 1$   
 $x = \pm \sqrt{1} = \pm 1$

$\frac{8 \pm \sqrt{64 + 40}}{10}$   
 $\frac{8 \pm \sqrt{104}}{10}$

- A. 26. The height of a ball dropped from a height of 100 feet is given by the equation  $h = -16t^2 + 100$  where  $h$  is height in feet and  $t$  is time in seconds. When does the ball hit the ground?
- a. 2.5 seconds      b. 3.125 seconds      c. 6.25 seconds      d. never hits ground

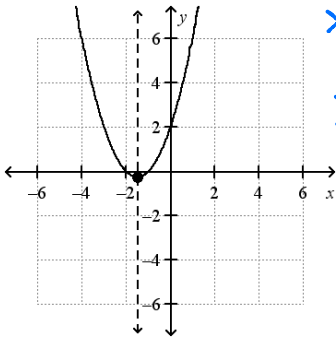
$0 = -16t^2 + 100$   
 $16t^2 = 100$   
 $t^2 = \frac{100}{16}$   
 $t = \sqrt{6.25}$   
 $t = 2.5 \text{ sec.}$

A. 27.

Graph  $f(x) = x^2 + 3x + 2$

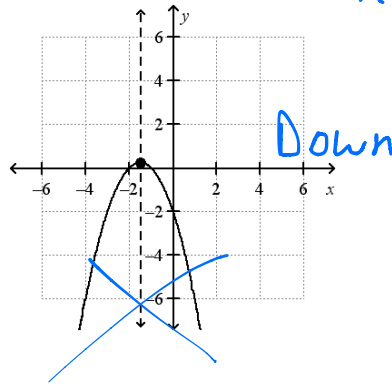
Opens Up because it's positive  $x^2$

a.

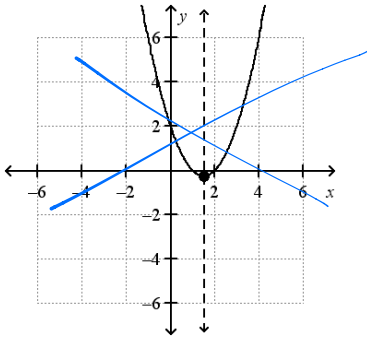


$x = \frac{-3}{2(1)}$   
 $x = -\frac{3}{2}$

c.



b.



A. 28.

Does the table represent a linear, exponential, or quadratic function?

x	y
0	3
1	0
2	-1
3	0
4	3

$> 3 > 2$   
 $> 1 > 2$   
 $> 1 > 2$   
 $> 3 > 2$

a. quadratic

b. linear

c. exponential

d. don't chose this answer!

C. 29.

Simplify:  $-4\sqrt{160}$

$\sqrt{160}$   
 $(16) \cdot \sqrt{10}$   
 $-4 \cdot 4 \cdot \sqrt{10}$

a.  $-4\sqrt{80}$

b.  $-4\sqrt{16}$

c.  $-16\sqrt{10}$

d.  $\sqrt{10}$

D. 30.

Simplify:  $4\sqrt{2} - 1\sqrt{2}$

a.  $5\sqrt{2}$

b.  $5\sqrt{4}$

c.  $3\sqrt{4}$

d.  $3\sqrt{2}$

D. 31.

Simplify:  $\sqrt{10}(\sqrt{6} - 8)$

a.  $\sqrt{60} - 8$

$\sqrt{60} - 8\sqrt{10}$   
 $(14) \sqrt{15} - 8\sqrt{10}$   
 $2\sqrt{15} - 8\sqrt{10}$

b.  $\sqrt{60} - 8\sqrt{10}$

c.  $\sqrt{16} - 8\sqrt{10}$

d.  $2\sqrt{15} - 8\sqrt{10}$

D. 32.

Simplify:  $\sqrt{50a^9b^{16}}$

a.  $25a^4b^4$

b.  $5a^3b^4\sqrt{2}$

$\sqrt{50}$   
 $(25) \sqrt{2}$   
 $5\sqrt{2}$

c.  $25ab^8\sqrt{a}$

d.  $5ab^8\sqrt{2a}$

Fix

B. 33.

Simplify:  $(4 + 2\sqrt{3})(1 - \sqrt{3})$

a. -2

b.  $-2 - 2\sqrt{3}$

c.  $4 - 4\sqrt{3}$

d.  $5 + \sqrt{3}$

$4 - 4\sqrt{3} + 2\sqrt{3} - 2\sqrt{9}$   
 $4 - 2\sqrt{3} - 2(3)$

#4

$$\frac{4-2\sqrt{3}-6}{-2-2\sqrt{3}}$$

$$\begin{cases} n+d = 60 \text{ coins} \\ \$.05n + \$.10d = \$4.45 \end{cases}$$

multiply by  
100

$$\begin{aligned} -10 * n + d &= 60 * -10 \\ 5n + 10d &= 445 \end{aligned}$$

$$\begin{aligned} -10n - 10d &= -600 \\ 5n + 10d &= 445 \end{aligned}$$

$$\begin{aligned} \frac{-5n}{-5} &= \frac{-155}{-5} \end{aligned}$$

$$n = 31 \text{ nickels}$$

$$31 + d = 60$$

$$d = 29 \text{ dimes}$$