

1. Describe the transformation from $f(x)$ to $g(x)$.

a) $f(x) = 4x^2$ $g(x) = -4x^2$
 Reflected over x axis

b) $f(x) = x^2 + 4x + 7$
 $g(x) = x^2 + 4x - 2$
 Vertical Translation
 9 units down

c) $f(x) = (x + 2)^2$, $g(x) = (x + 5)^2$
 $V: (-2, 0)$ $V: (-5, 0)$
 Horizontal Translation
 3 units Left

2. Rewrite in Vertex form. $y = a(x-h)^2 + k$

a) $f(x) = x^2 + 4x + 7$
 $y = (x+2)^2 + 3$
 $-\frac{b}{2a} = -\frac{4}{2(1)} = -2$
 $4 - 8 + 7 = 3$
 $a = 1$

b) $g(x) = x^2 + 4x - 2$
 $y = (x+2)^2 - 6$
 $-\frac{4}{2(1)} = -2$
 $4 - 8 - 2 = -6$
 $a = 1$

3. a) Solve for M ; $P = \frac{M-y}{M}$ *GCF
 $MP = M - y$
 $MP - M = -y$
 $M(P-1) = \frac{-y}{P-1} \Rightarrow M = \frac{-y}{P-1}$

b) Solve for b ; $A = \frac{Mb}{M}$
 $Ar = \frac{Mb}{M}$
 $b = \frac{Ar}{M}$

c) Solve for x ; $ax = x - 2z$ *GCF
 $ax - x = -2z$
 $x(a-1) = \frac{-2z}{a-1} \Rightarrow x = \frac{-2z}{a-1}$

4. a) The function $h(x) = 3x - 5$ is translated 2 units to the right to create $m(x)$. What is $m(x)$?
 $m(x) = 3(x-2) - 5$
 $3x - 6 - 5$
 $m(x) = 3x - 11$

b) The function $h(x) = 3x - 5$ is translated 4 units to the left to create $m(x)$. What is $m(x)$?
 $m(x) = 3(x+4) - 5$
 $3x + 12 - 5$
 $m(x) = 3x + 7$

c) The function $h(x) = 3x - 5$ is translated 2 units down to create $m(x)$. What is $m(x)$?
 $m(x) = 3x - 5 - 2$
 $m(x) = 3x - 7$

5. Mr. Winston bought 7 tickets to a football game and spent \$43. He bought a combination of child tickets for \$4 each and adult tickets for \$9 each. Write and solve a system of equations to determine the number of adult and child tickets he bought.

$x = \text{child}$
 $y = \text{adult}$

$x + y = 7$
 $4x + 9y = 43$
 $-4x - 4y = -28$
 $5y = 15$
 $y = 3$ adult
 $x + 3 = 7$
 $x = 4$ child

6. Alice is 6 years older than Bert. The sum of 3 times Alice's age and 2 times Bert's age is 63. Write and solve a system of equations to find Bert's age.

$A = B + 6$ $A = \text{Alice}$
 $B = \text{Bert}$

$3A + 2B = 63$
 $3(B+6) + 2B = 63$
 $3B + 18 + 2B = 63$
 $5B + 18 = 63$
 $-18 \quad -18$
 $5B = 45$
 $B = 9$
 $A = 9 + 6$
 $A = 15$
 Bert is 9 years old

7. Simplify

a) $2\sqrt{50} + 4\sqrt{50}$
 $10\sqrt{2} + 20\sqrt{2} = 30\sqrt{2}$

b) $(5\sqrt{3})^2$
 $(5\sqrt{3})(5\sqrt{3})$
 $25 \cdot 3 = 75$

c) $\frac{2}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$

d) $(\sqrt{7})^2 (\sqrt{7})(\sqrt{7}) = \sqrt{49} = 7$

8. Multiply $(x+5)(x^2 - 4x - 7)$

$x^3 - 4x^2 - 7x + 5x^2 - 20x - 35$
 $x^3 + x^2 - 27x - 35$

9. $(x-5)^2$ is equivalent to

a. $x^2 - 25$
 b. $x^2 + 25$
 c. $x^2 - 5x + 25$
 d. $x^2 - 10x + 25$
 e. $x^2 + 10x + 25$

$(x-5)(x-5)$
 $x^2 - 5x - 5x + 25$
 $x^2 - 10x + 25$

$(\sqrt{\text{of a \#}})(\sqrt{\text{of a \#}})$ is THAT #!

10. a) What is the y-intercept of

$$f(x) = 8x^2 - 2x - 5$$

$$y = -5$$

$$(0, -5)$$

b) What are the x-intercepts of

$$f(x) = 2x^2 + x - 15$$

$$0 = (2x - 5)(x + 3)$$

$$x = 5/2, -3$$

let $y=0$

11. Solve

$$a) \frac{3}{5}(20x - 15) - (4x - 7) = 8$$

$$12x - 9 - 4x + 7 = 8$$

$$8x - 2 = 8$$

$$\frac{8x}{8} = \frac{10}{8}$$

$$x = 5/4$$

$$b) 5x - (3x + 8) - 2 = -10 - 6x$$

$$5x - 3x - 8 - 2 = -10 - 6x$$

$$2x - 10 = -10 - 6x$$

$$8x = 0$$

$$x = 0$$

12.a) Rewrite in radical form.

$$4x^2 y^3 z^2$$

$$4\sqrt{x} \sqrt[5]{y} \sqrt[3]{z}^2$$

b) Rewrite $\sqrt[4]{ab^3} \cdot \sqrt[5]{a^3b}$ as

$$a^x \cdot b^y$$

What is x and y?

$$(ab^3)^{1/4} \cdot (a^3b)^{1/5}$$

$$a^{1/4} b^{3/4} \cdot a^{3/5} b^{1/5}$$

$$a^{1/4 + 3/5} b^{3/4 + 1/5}$$

$$a^{5/20 + 12/20} b^{15/20 + 4/20}$$

$$a^{17/20} b^{19/20}$$

$x = 17/20$
 $y = 19/20$

13. Write an equivalent expression with no radical.

$$a) \sqrt[4]{n^3} \cdot \sqrt{2^3}$$

$$n^{3/4} \cdot 2^{3/2}$$

$$b) \sqrt[6]{n^5} \cdot \sqrt{5^3}$$

$$n^{5/6} \cdot 5^{3/2}$$

14 a) Write in radical form. $5m^{1/3}p^{1/4}$

$$5 \cdot \sqrt[3]{m} \cdot \sqrt[4]{p}$$

b) Simplify $(\sqrt[6]{m})^2$

$$m^{2/6} = m^{1/3} \text{ or } \sqrt[3]{m}$$

15) If x represents a positive real number, which expression is equivalent to $\sqrt[3]{x^2} \cdot \sqrt{x^5}$?

F) $\sqrt[3]{x^7}$

G) $\sqrt[3]{x^{10}}$

H) $\sqrt[6]{x^{10}}$

I) $\sqrt[6]{x^{19}}$

$$x^{2/3} \cdot x^{5/2}$$

$$x^{4/6} \cdot x^{15/6}$$

$$x^{19/6}$$

$\sqrt[6]{x^{19}}$

*keep base add exp

16. Write the equation of the quadratic function whose vertex is (0, 0) and passes through the point

a) (-1, 5)

$$y = ax^2$$

$$5 = a(-1)^2$$

$$5 = a$$

$$y = 5x^2$$

b) (4, -4)

$$y = ax^2$$

$$-4 = a(4^2)$$

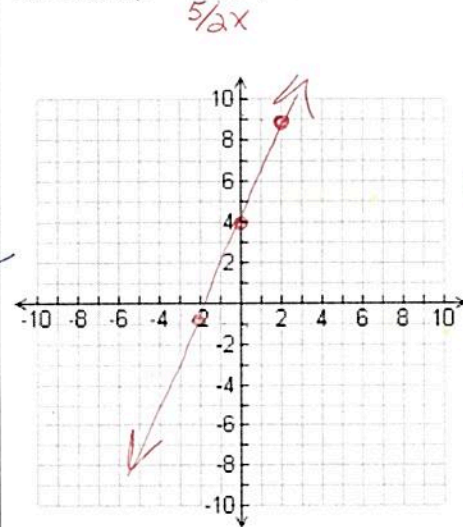
$$-4 = 16a$$

$$\frac{-4}{16} = \frac{16a}{16}$$

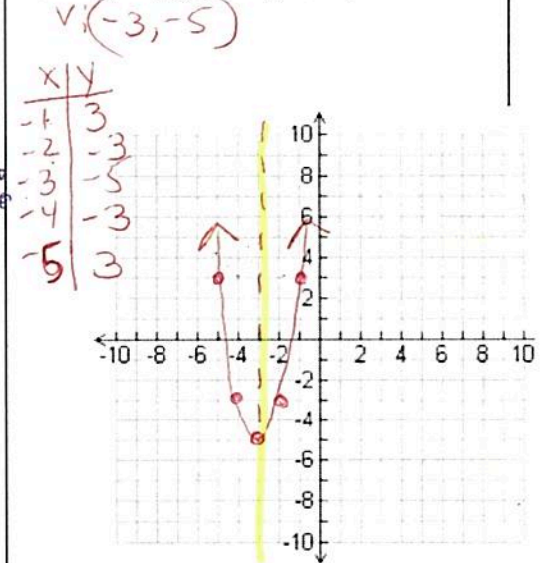
$$-1/4 = a$$

$$y = -1/4 x^2$$

17. Graph $y = 2.5x + 4$



18. Graph $f(x) = 2(x + 3)^2 - 5$



19. Rewrite $f(x) = 4x^2 + 8x - 2$ in vertex form. Identify the vertex and the axis of symmetry.

$$y = a(x-h)^2 + k$$

$$-\frac{8}{2(4)} = (-1) \quad \text{V: } (-1, -6)$$

$$4 - 8 - 2 = (-6) \quad \text{AOS: } x = -1$$

$$y = 4(x + 1)^2 - 6$$

20. a) What are the zeros of $f(x) = -x^2(x - 5)(2x + 7)^3$. Explain if the graph crosses the x-axis or bounces at each zero.

$x = 0$ M2 Bounces
 $x = 5$ M1 Crosses
 $x = -7/2$ M3 Crosses

b) What is the degree? 6
c) What is the end behavior? Even Neg

21. Mary has saved \$40. She doubles her money every week. Write a function that models this relationship.

$$f(x) = 40(2)^x$$

22. A scientist records the number of cells in a colony of bacteria every hour. The colony starts with 3 cells. After 1 hours it, has 12 cells. After 2 hours, it has 48 cells. Write a function, assuming this pattern continues.

$$f(x) = 3(4)^x$$

$b = 4$

As $x \rightarrow -\infty$ $y \rightarrow -\infty$
As $x \rightarrow +\infty$ $y \rightarrow -\infty$