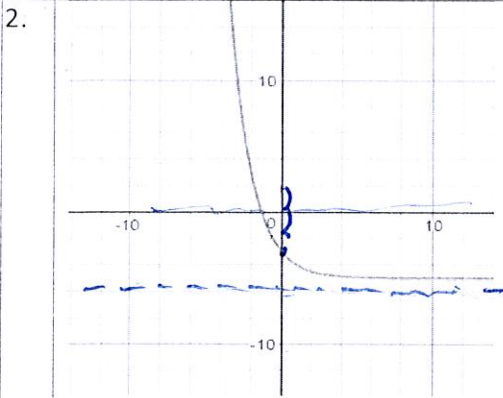
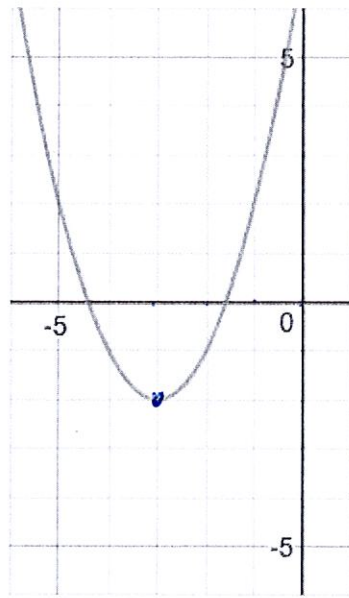


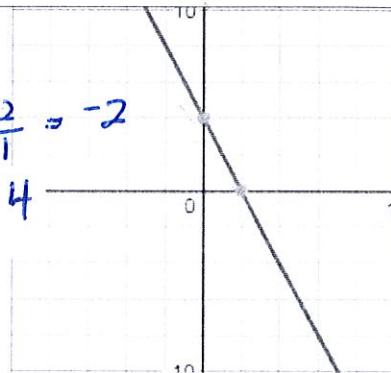
1. a) Function Family: Quadratic
 b) Equation of Parent Function: $f(x) = x^2$
 c) Vertical translation: 2 units up or down
 d) Horizontal translation: 3 units left or right
 e) Reflection over x-axis or y-axis? NO
 f) Equation of Function: $f(x) = (x+3)^2 - 2$
 g) Domain: \mathbb{R} or $(-\infty, \infty)$
 h) Range: $y \geq -2$ or $[-2, \infty)$
 i) End behavior:
 As $x \rightarrow \infty$, $f(x) \rightarrow \infty$
 As $x \rightarrow -\infty$, $f(x) \rightarrow \infty$



2. a) Function Family: Exponential
 b) Equation of Parent Function: $f(x) = 2\left(\frac{1}{4}\right)^x$
 c) Vertical translation: 5 units up or down
 d) Horizontal translation: 0 units left or right
 e) Reflection over x-axis or y-axis? NO
 f) Equation of Function: $f(x) = 2\left(\frac{1}{4}\right)^x - 5$
 g) Domain: \mathbb{R} or $(-\infty, \infty)$
 h) Range: $y > -5$ or $(-5, \infty)$
 i) End behavior:
 As $x \rightarrow \infty$, $y \rightarrow -5$
 As $x \rightarrow -\infty$, $y \rightarrow \infty$

3. a) Function Family: Linear
 b) Equation of Parent Function: $f(x) = x$
 c) Equation of Function: $f(x) = -2x + 4$
 d) Domain: \mathbb{R} or $(-\infty, \infty)$
 e) Range: \mathbb{R} or $(-\infty, \infty)$
 f) End behavior:
 As $x \rightarrow \infty$, $y \rightarrow -\infty$
 As $x \rightarrow -\infty$, $y \rightarrow \infty$

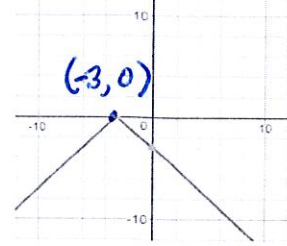
Slope = $\frac{\text{rise}}{\text{run}} = \frac{-2}{1} = -2$
 y-intercept 4



Key p. 2

4. The parent function for the graph to the right is $f(x) = |x|$. Alter the equation of the parent function to represent any translation(s), reflection, stretch or compression.

Reflected over X-axis
 Shifted 3 units to the left
 $f(x) = -|x + 3|$



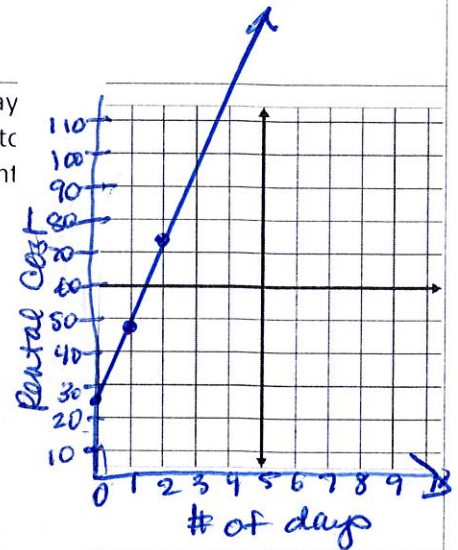
5. Describe the transformation of $f(x) = \sqrt{x - 3}$ from the parent function.

Parent is $f(x) = \sqrt{x}$
 This function has been shifted three units to the right.

6. The Wertz car rental company charges \$27 to rent a crossover, plus \$22 per day (Assume a partial day pays a partial fee.) What type of function could be used to represent the cost of renting the car, c , as a function of the number of days rent d ?

linear $c = 22d + 27$

Make a rough sketch of the graph of this situation. Be sure to label both axes.



7. A U.S. Marshal needs to travel 160 miles across state lines to retrieve an escaped convict. What type of function could be used to represent the time (t) in hours that it takes the Marshal to arrive as function of the speed (s in mph) at which he drives?

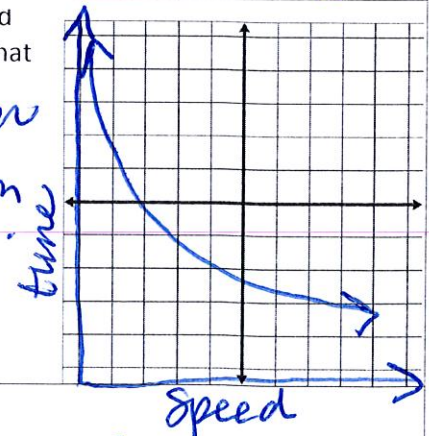
$$d = s \cdot t$$

$$160 = s \cdot t$$

$$\frac{160}{s} = t$$

inverse variation
 or
 rational function

Make a rough sketch of the graph of this situation. Be sure to label both axes



8. The admission rates for an amusement park are as follows:

- Children 5 years old and under - FREE
- Children between 5 years and 12 years - \$10
- Children between 12 years and 18 years - \$25
- Adults (18 years and above) - \$35

Write a piecewise function that give the admission price for a given age. $f(x) =$

$$f(x) = \begin{cases} 0, & 0 \leq x \leq 5 \\ 10, & 5 < x \leq 12 \\ 25, & 12 < x \leq 18 \\ 35, & x \geq 18 \end{cases}$$

Key p. 3

9. Write a piecewise function that describes the situation.
 For a cellular data plan, \$50 per month buys 400 minutes. Additional time cost \$0.30 per minute. Let the monthly cost $C(x)$ be the function of the time x .

$$C(x) = \begin{cases} 50, & 0 \leq x \leq 400 \\ 50 + 0.30(x - 400), & x > 400 \end{cases}$$

10. For the following function, $f(x) = \begin{cases} x^2 - 1, & x \leq 0 \\ 2x - 1, & 0 < x \leq 5 \\ 3, & x > 5 \end{cases}$

$$f(-2) = (-2)^2 - 1 = 4 - 1 = 3$$

$$f(0) = (0)^2 - 1 = 0 - 1 = -1$$

$$f(5) = 2(5) - 1 = 10 - 1 = 9$$

Evaluate $f(-2) + f(0) - f(5)$.

$$f(-2) + f(0) - f(5) = 3 + (-1) - 9 = 2 - 9 = \boxed{-7}$$

11. Solve each inequality and graph it's solution on a number line.

a) $|7x + 4| \geq 74$

$$7x + 4 \leq -74$$

$$\begin{array}{r} -4 \\ -4 \end{array}$$

$$\frac{7x}{7} \leq \frac{-78}{7}$$

$$x \leq -11\frac{1}{7}$$

or $7x + 4 \geq 74$

$$\begin{array}{r} -4 \\ -4 \end{array}$$

$$\frac{7x}{7} \geq \frac{70}{7}$$

or $x \geq 10$



b) $\frac{|2+3x|}{2} \geq 5$

$$2 \cdot \frac{|2+3x|}{2} \geq 5 \cdot 2$$

$$|2+3x| \geq 10$$

$$2+3x \leq -10 \text{ or } 2+3x \geq 10$$

$$\begin{array}{r} -2 \\ -2 \end{array}$$

$$\frac{3x}{3} \leq \frac{-12}{3}$$

$$x \leq -4$$

or

$$\frac{3x}{3} \geq \frac{8}{3}$$

$$x \geq \frac{8}{3}$$

$$x \geq 2\frac{2}{3}$$



c) $7\left|\frac{x}{3}\right| - 9 < 12$

$$\begin{array}{r} +9 \\ +9 \end{array}$$

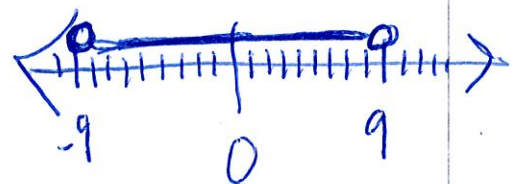
$$\frac{7\left|\frac{x}{3}\right|}{7} < \frac{21}{7}$$

$$\left|\frac{x}{3}\right| < 3$$

$$-3 < \frac{x}{3} < 3$$

$$3(-3) < 3 \cdot \frac{x}{3} < 3 \cdot 3$$

$$-9 < x < 9$$



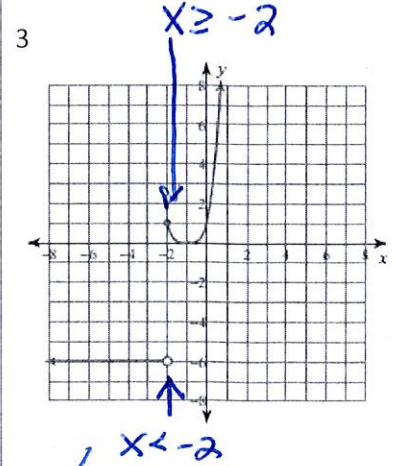
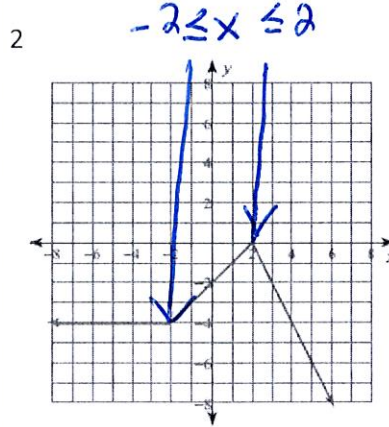
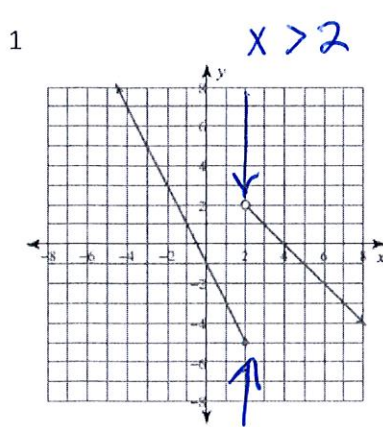
12. Match the following piecewise functions to their graphs.

Function A = Graph 3 Function B = Graph 1 Function C = Graph 2

A $f(x) = \begin{cases} -6, & x < -2 \\ (x+1)^4, & x \geq -2 \end{cases}$

B $f(x) = \begin{cases} -2x-1, & x \leq 2 \\ -x+4, & x > 2 \end{cases}$

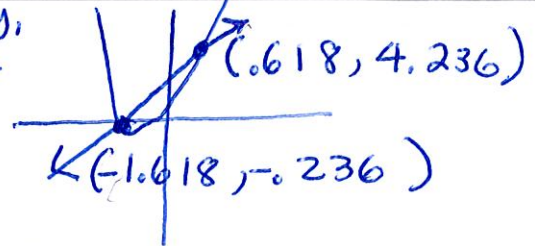
C $f(x) = \begin{cases} -4, & x \leq -2 \\ x-2, & -2 < x < 2 \\ -2x+4, & x \geq 2 \end{cases}$



13. Find the solution(s) to the following system: $\begin{cases} f(x) = x^2 + 3x + 2y \\ g(x) = 2x + 3y \end{cases}$

$x = .618$
 $x = -1.618$

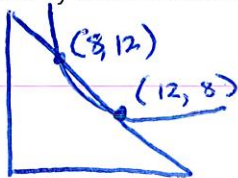
2nd trace 5: intersect



14. Let x represent one number and let y represent another number. Use the given conditions to write a system of nonlinear equations. Solve the system and find the numbers.

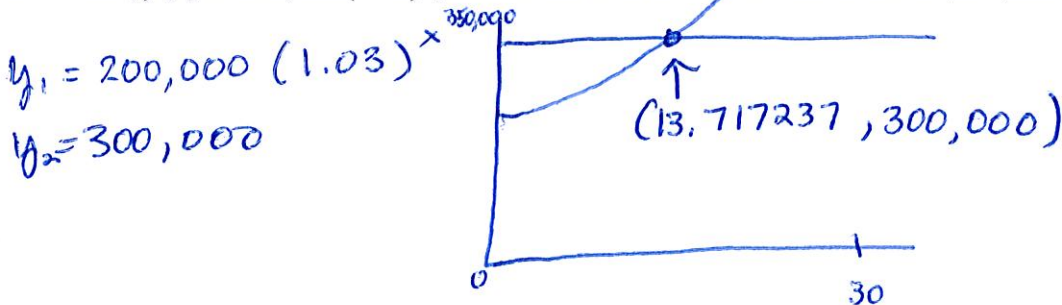
The sum of two numbers is 20 and their product is 96.

$x + y = 20$ $y = 20 - x$
 $x \cdot y = 96$ $y = \frac{96}{x}$



One number is 8 and the other is 12.

15. A house that costs \$200,000 will appreciate in value by 3% each year. Using the function, $f(x) = 200,000(1.03)^x$, determine when the house will be worth \$300,000.



Between the 13th and 14th year the house will be worth \$300,000