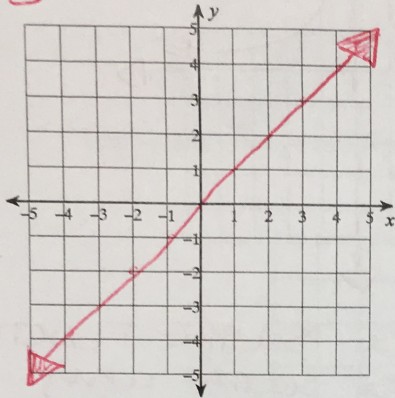


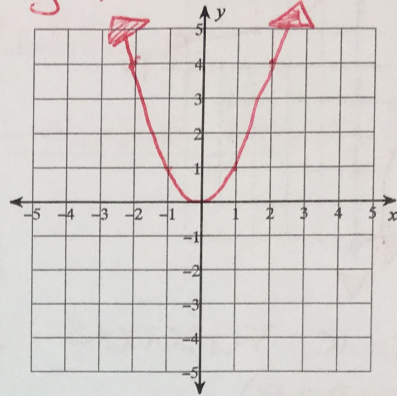
### Graphs of Parent Functions - NOTES

1)  $y = x$



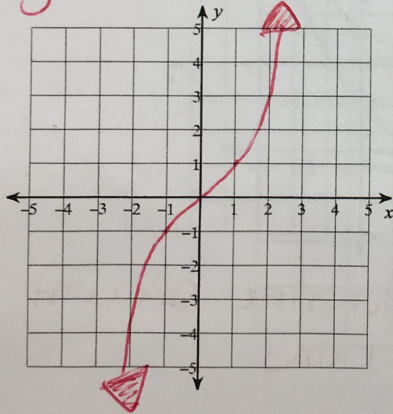
\* LINEAR FUNCTION  
(LINE)

2)  $y = x^2$



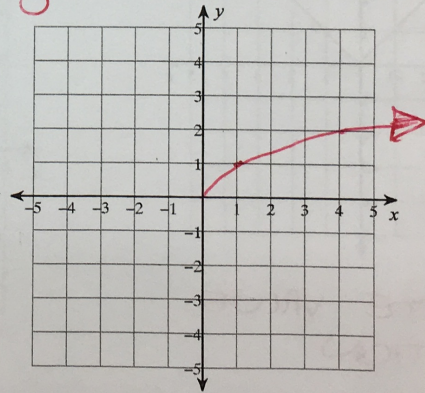
\* QUADRATIC FUNCTION  
(PARABOLA)

3)  $y = x^3$



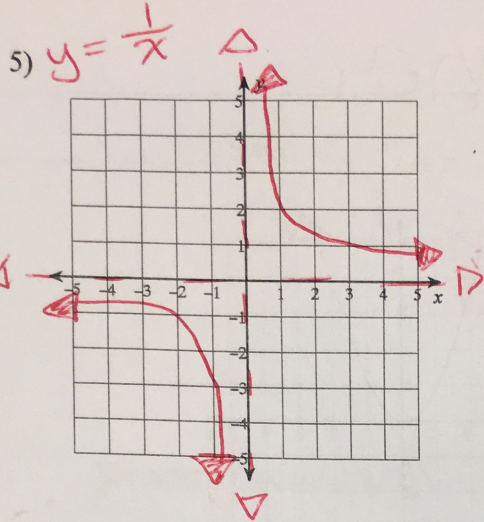
\* CUBIC FUNCTION

4)  $y = \sqrt{x}$



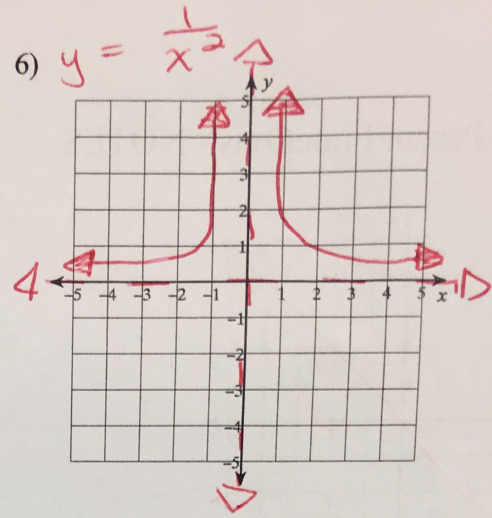
\* SQUARE ROOT  
FUNCTION





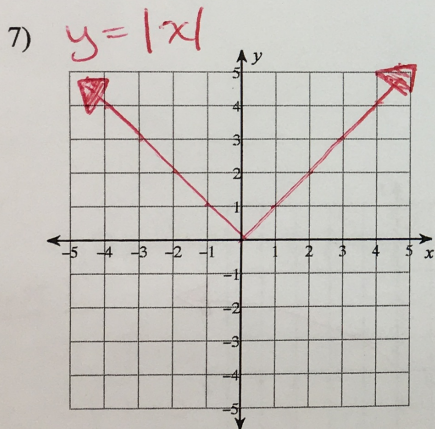
\* HYPERBOLIC FUNCTION  
(HYPERBOLA)

\* X-AXIS AND Y-AXIS  
ARE ASYMPTOTES

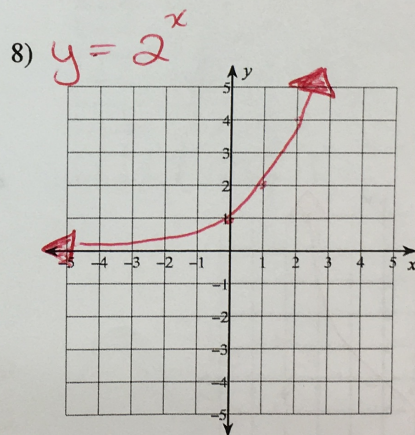


\* INVERSE SQUARE FUNCTION  
(INVERSE SQUARE CURVE)

\* X-AXIS AND Y-AXIS ARE  
ASYMPTOTES



\* ABSOLUTE VALUE  
FUNCTION



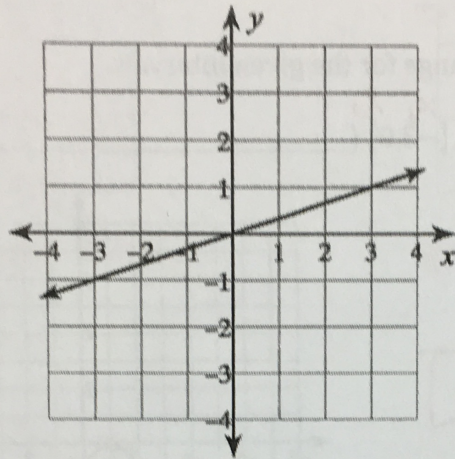
\* EXPONENTIAL GROWTH  
FUNCTION



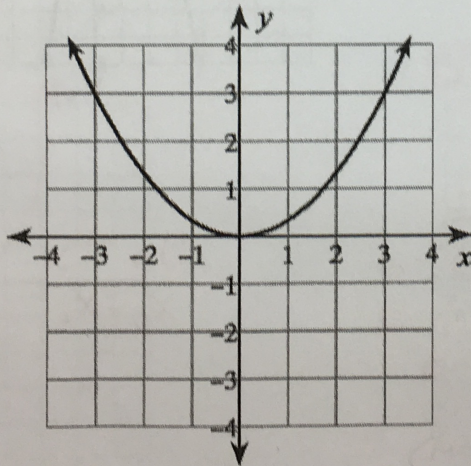
## RATE OF CHANGE

\* The rate of change of a graph is its STEEPNESS.

\* The rate of change of a line is ~~its~~ SLOPE CONSTANT.



\* The rate of change of any other kind of function CHANGES THROUGHOUT THE GRAPH





Slope/Rate of Change Formula:

$$\frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$$

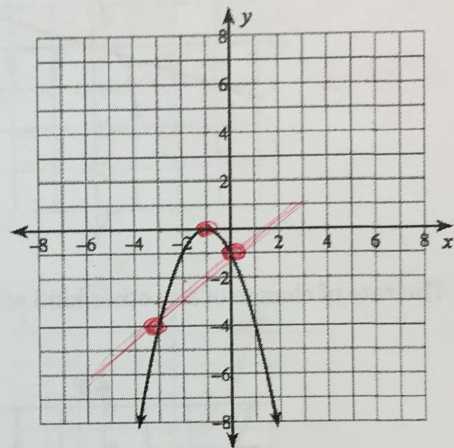
Examples: Find the average rate of change for the given intervals.

1) For the graph below, in the interval  $[-3, 0]$  (  $x_1, x_2$  )

POINT 1:  
 $(-3, -4)$   
 $x_1, y_1$

POINT 2:  
 $(0, -1)$   
 $x_2, y_2$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - (-4)}{0 - (-3)} = \frac{3}{3} = \boxed{1}$$



2)  $y = -2x^2 - 2$ ;  $[-1, 1]$  ( $x_1, x_2$ )

POINT 1:  
 $y_1 = -2(-1)^2 - 2$   
 $y_1 = -2(1) - 2$   
 $= -2 - 2$   
 $y_1 = -4$   
 $(-1, -4)$

POINT 2:  
 $y_2 = -2(1)^2 - 2$   
 $y_2 = -2(1) - 2$   
 $y_2 = -2 - 2$   
 $y_2 = -4$   
 $(1, -4)$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-4 - (-4)}{1 - (-1)} = \frac{0}{2} = \boxed{0}$$

3)  $y = 2x^2 + x - 2$ ;  $[-2, -1]$  ( $x_1, x_2$ )

POINT 1:  
 $y_1 = 2(-2)^2 + (-2) - 2$   
 $y_1 = 2(4) + (-2) - 2$   
 $y_1 = 8 + (-2) - 2$   
 $y_1 = 4$   
 $(-2, 4)$

POINT 2:  
 $y_2 = 2(-1)^2 + (-1) - 2$   
 $y_2 = 2(1) + (-1) - 2$   
 $y_2 = 2 + (-1) - 2$   
 $y_2 = -1$   
 $(-1, -1)$

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 4}{-1 - (-2)} = \frac{-5}{-1} = \boxed{5}$$

