

UNIT 3 LESSON 5 - INVERSE VARIATION & RADICAL FUNCTIONS

INVERSE VARIATION: As one quantity increases, one quantity decreases

EQUATION: $y = \frac{k}{x}$, k is a number

“ k ” can also be found using the product rule for inverse variation. The product rule for inverse variation is

$$x_1y_1 = x_2y_2 = k$$

EX 1) Write an equation to represent the following relationship: y varies inversely with x . When $x = 6$, $y = 25$. Then determine the value of y when $x = -5$.

Take the product rule for inverse variation to write the equation.

$$x_1y_1 = x_2y_2$$

$$(6)(25) = x_2y_2$$

$$150 = x_2y_2$$

$$\frac{150}{x_2} = y_2 \quad \longrightarrow \quad \text{If } y \text{ varies inversely with } x, \text{ then } y = \frac{150}{x}$$

Then determine the value of y when $x = -5$ \longrightarrow plug $x = -5$ into the equation $y = \frac{150}{x}$

$$y = \frac{150}{-5} = -30$$

When $x = -5$, $y = -30$

RADICAL FUNCTIONS - The inverse of a quadratic function is known as a square root function. \sqrt{x}

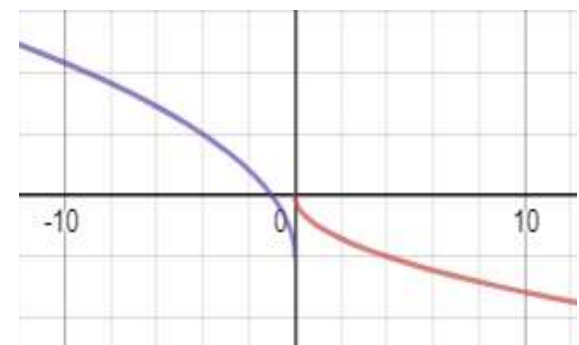
Domain: set of all possible inputs (x -values)

Function \sqrt{x} (Increasing function (positive rate))



Range: set of all possible outputs (y -values)

Function $-\sqrt{x}$ (Decreasing function (negative rate))



EX 2) Graph the function $\sqrt{x-4}$. Determine the domain and range, intervals where the function is increasing or decreasing, positive or negative.

ANSWER:

Graph the function in the calculator (picture to the right).

Function is increasing; no decrease

Function is positive; not negative

Domain is set of all x-values: $x \geq 4$ (where the graph starts on the x-axis)

Range is set of all y-values: $y \geq 0$ (where the graph starts on the y-axis)



EX 3) Graph the function $2\sqrt{-x} - 2$. Determine the domain and range, intervals where the function is increasing or decreasing, positive or negative.

ANSWER:

Graph the function in the calculator (picture to the right).

Function is decreasing; no increase

Function is negative; not positive

Domain is set of all x-values: $x \leq 0$ (where the graph starts on the x-axis)

Range is set of all y-values: $y \geq -2$ (where the graph starts on the y-axis)

