

Objective: Students will be able to find the domain of a function algebraically and graphically. Students will find the range of a function graphically. Students will attend to precision when writing solutions using proper notation.

Finding the Domain

Algebraically:

1) When is the denominator 0?

$$f(x) = \frac{5}{x-12} \rightarrow \begin{array}{r} x-12=0 \\ +12 \quad +12 \\ \hline x=12 \end{array}$$

$$D: \{x \mid x \neq 12\}$$

2) When is the value under a square root negative?

$$g(x) = \sqrt{x+4} \quad \begin{array}{r} x+4 \geq 0 \\ -4 \quad -4 \\ \hline x \geq -4 \end{array}$$

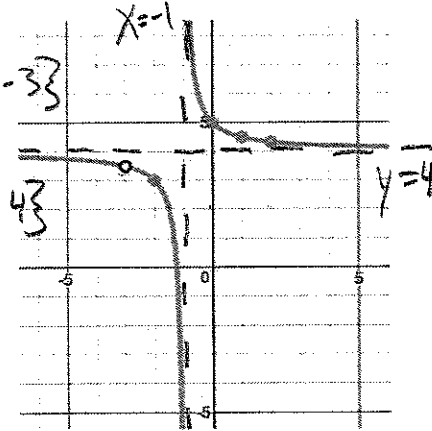
$$D: \{x \mid x \geq -4\}$$

Graphically:

What are the boundaries for the x-values in the graph? Are there holes (open circles) or asymptotes in the graph?

$$D: \{x \mid x \neq -1, x \neq -3\}$$

$$R: \{y \mid y \neq 3.5, y \neq 4\}$$



Find the domain of the following functions.

a) $h(x) = \sqrt{x+8}$

$$\begin{array}{r} x+8 \geq 0 \\ -8 \quad -8 \\ \hline x \geq -8 \end{array}$$

$$D: \{x \mid x \geq -8\}$$

b) $f(x) = \frac{5x}{x^2-9x+20}$

$$x^2 - 9x + 20 = 0$$

$$\begin{array}{r} \cancel{20 \cdot 2} \\ \cancel{-4x} \quad -5x \quad -4 \quad -4x \quad 20 \\ \hline x \quad x^2 \quad -5x \quad x \quad -5 \end{array}$$

$$(x-4)(x-5) = 0$$

$$x=4 \quad x=5$$

$$D: \{x \mid x \neq 4, x \neq 5\}$$

c) $g(x) = \frac{(x+5)}{(x+5)(x-3)}$

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

$$x+5=0$$

$$x=-5$$

$$x-3=0$$

$$x=3$$

$$D: \{x \mid x \neq -5, x \neq 3\}$$