

PRE-CALCULUS: by Finney, Demana, Waits and Kennedy
 Chapter 1: Functions and Graphs 1.2: Functions and their properties

What you'll Learn About

Domain:

Left to Right +

x-axis

$x_{\min} - x_{\max}$

* Set the denominator = 0

- These are the x-values that don't work (not in domain)

* You can only sq. root positive numbers and 0.

$$\begin{array}{r} 9-x^2 \geq 0 \\ +x^2 +x^2 \\ \hline 9 \geq x^2 \end{array}$$

Find the domain of the function algebraically.
 Support your answer graphically

A) $f(x) = x^2 - 9$

All real #'s
 $-\infty \leq x \leq \infty$
 $(-\infty, \infty)$

C) $f(x) = \frac{x}{x^2 + 2x - 3}$

$x^2 + 2x - 3 \neq 0$
 $(x+3)(x-1) \neq 0$
 $x+3 \neq 0 \quad x-1 \neq 0 \quad (x \neq -3)$

E) $f(x) = \frac{\sqrt{9-x^2}}{x-5}$

$x-5 \neq 0$
 $x \neq 5$

$$\begin{array}{r} 9-x^2 \geq 0 \\ -9 \\ \hline -x^2 \geq -9 \\ -1 \\ \hline x^2 \leq 9 \end{array}$$

$x \leq 3 \quad x \geq -3$

$[-3, 3]$

B) $f(x) = \frac{3}{x} + \frac{7}{x-1}$

$x \neq 0 \quad x-1 \neq 0 \quad x \neq 1$
 $(-\infty, 0) \cup (0, 1) \cup (1, \infty)$

D) $f(x) = \frac{x}{x^2 + 2x}$

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$x^2 + 2x \neq 0$
 $x(x+2) \neq 0$
 $x \neq 0 \quad x+2 \neq 0$
 $x \neq -2$

$(-\infty, -2) \cup (-2, 0) \cup (0, \infty)$

Domain?

F) $f(x) = \frac{\sqrt{1-x}}{(x+2)(x^2+4)}$

$$\begin{aligned}x+2 &\neq 0 & x^2+4 &\neq 0 \\x &\neq -2 & &\end{aligned}$$

$\sqrt{x^2+4} \neq 0$

$$\begin{aligned}1-x &\geq 0 \\+x &+x\end{aligned}$$

$$\begin{array}{|c|}\hline 1 \geq x \\ \hline (-\infty, 1] \end{array}$$

G) $f(x) = \sqrt{x^3 - 4x}$

$$x^3 - 4x \geq 0$$

$$x(x^2 - 4) \geq 0$$

$$x \geq 0 \quad x^2 - 4 \geq 0$$

$$x \geq 0 \quad x^2 \geq 4$$

$$\begin{array}{|c|}\hline \text{Domain } [2, \infty) \cup (-\infty, -2] \quad x=0 \\ \hline \end{array}$$

* If you have
a sq. root
- take what is
underneath the
sq. rt. ≥ 0