What you'll Learn About

Domain:
Left to Right
x-axis
xmin – xmax

* 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.

$9 - x^2 \geq 0$
$+x^2 \quad +x^2$
$9 \geq x^2$

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

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

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

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

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

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

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

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

$f(x) = \frac{x}{x^2 + 2x}$
$x^2 + 2x \neq 0$
$x(x + 2) \neq 0$
$x \neq 0 \quad x + 2 \neq 0$
$x \neq -2$
$(-\infty, -2) \cup (-2, 0) \cup (0, \infty)$

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

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

$9 - x^2 \geq 0$
$-9 \quad -9$
$-x^2 \geq -9$
$\overline{-1} \quad \overline{-1}$
$\sqrt{x^2} \leq \sqrt{9}$
$x \leq 3 \quad x \geq -3$
$[-3, 3]$

Domain?

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

$x+2 \neq 0$

$x \neq -2$

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

$1-x \geq 0$
$+x \quad +x$

$1 \geq x$

$(-\infty, 1]$

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

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

$x^3-4x \geq 0$

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

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

$[0, \infty)$

$x^2 \geq 4$

$x \geq 2 \quad x \leq -2$

Domain $[2, \infty) \cup (-\infty, -2] \quad x=0$