What you will learn about:
Graphing Rational Functions

X-intercepts:
Let $y=0$

y-intercept:
Let $x=0$

Find the x-intercept(s) and y-intercept of each function.

$\frac{a}{b}=0$

A) $f(x)=x^2-36$

X-intercepts
$0=x^2-36$
$\sqrt{x^2}=\sqrt{36}$
$x=\pm 6$

y-intercept
0^2-36
$(0,-36)$

B) $f(x)=\frac{x-5}{x+3}$

X-intercepts
$(x+3)0=\left(\frac{x-5}{x+3}\right)$
$0=x-5$
$x=5$

y-intercept
$\frac{0-5}{0+3}=-\frac{5}{3}$
$\left(0,-\frac{5}{3}\right)$

C) $f(x)=\frac{x}{x+6}$

X-intercept
$0=\frac{x}{x+6}$
$x=0$

y-intercept
$f(0)=\frac{0}{0+6}$
$=\frac{0}{6}=0$
$(0,0)$

D) $\frac{x^2+4}{x+2}$

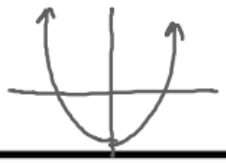
X-intercepts
$x^2+4=0$
$x^2=-4$
None

y-intercept
$\frac{0^2+4}{0+2}=\frac{4}{2}$
$(0,2)$

E) $f(x)=\frac{x^2-3x-10}{x}$

X-intercepts
$0=x^2-3x-10$
$(x-5)(x+2)$
$x=5 \quad x=-2$

y-intercept
$f(0)=\frac{0^2-3(0)-10}{0}$
$=-\frac{10}{0}$
None



Domain:

Input

X-values

Can not include X-values that make the bottom of Fraction Zero.

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

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

D: $(-\infty, \infty)$

B) $f(x) = \frac{1}{x+5}$

D: $(-\infty, -5) \cup (-5, \infty)$

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

$x^2+2x-3=0$

$(x+3)(x-1)=0$

$x=-3 \quad x=1$

D: $(-\infty, -3) \cup (-3, 1) \cup (1, \infty)$

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

$x=0 \quad x=1$

D: $(-\infty, 0) \cup (0, 1) \cup (1, \infty)$

E) $f(x) = \frac{x+6}{x^2-36}$

$0 = x^2 - 36$

$= (x-6)(x+6)$

$x = 6, -6$

D: $(-\infty, -6) \cup (-6, 6) \cup (6, \infty)$

Range:
y-values
Output

Look @ Graph

Determine the range of the function

A) $f(x)=4+x^2$

R: $[4,\infty)$

B) $f(x)=2+\sqrt{9-x}$

R: $[2,\infty)$

C) $f(x)=\frac{x^2}{4-x^2}$

$(-\infty,-1) \cup [0,\infty)$

D) $f(x)=\frac{3-2x^2}{4+x^2}$

$(-2, \frac{3}{4}]$

Points of Discontinuity
make bottom of Fraction Zero.

Hole
If x-value makes top + bottom zero.

Vertical Asymptote
If x-value make bottom only zero.

Graph the function and tell whether or not the function has a point of discontinuity at x = 0. If there is a discontinuity, tell whether the discontinuity is removable (Hole) or non-removeable (Vertical Asymptote).

A) $f(x)=\frac{5}{x}$

Yes x=0 is Pt of Discontinuity
Vertical Asymptote

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

Yes x=0 is pt of Discontinuity
Hole

C) $f(x)=\frac{|5x|}{x}$

Yes x=0 is Pt of Discontinuity
Hole

D) $f(x)=\frac{2x}{x-4}$

No x=0 is not Pt of Discontinuity