

Day 3

Unit 2B

Learning Target 6

I can graph a rational function and find key information.

Holes

Occur when two factors cancel



$$1.) f(x) = \frac{x^2 - 9}{x^2 - 2x - 3} = \frac{(x-3)(x+3)}{(x-3)(x+1)}$$

V.A.: $x = -1$ H.A.: $y = 1$

Holes: $(3, 3/2)$

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

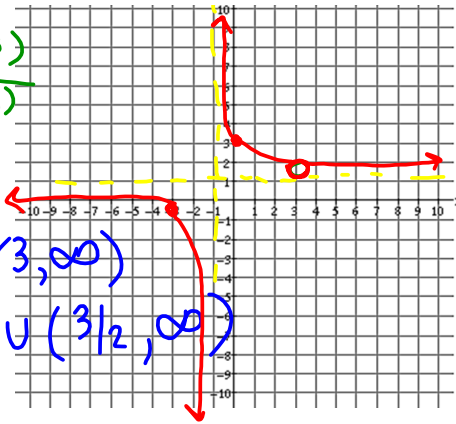
Range: $(-\infty, 1) \cup (1, 3/2) \cup (3/2, \infty)$

x-intercept(s): $x = -3$

y-intercept: $y = 3$

End behavior: As $x \rightarrow -\infty, f(x) \rightarrow 1$

As $x \rightarrow \infty, f(x) \rightarrow 1$



① Factor everything

$$\frac{\cancel{(x-3)}(x+3)}{\cancel{(x-3)}(x+1)}$$

VA: $x+1=0 \rightarrow x=-1$

HA: $y=1$ (look at degrees)

Hole: $x-3=0 \rightarrow x=3$

$$\frac{x+3}{x+1} = \frac{3+3}{3+1} = \frac{6}{4} = \frac{3}{2}$$

x-int: $x+3=0 \rightarrow x=-3$

y-int: plug in $x=0$

$$\frac{x+3}{x+1} = \frac{0+3}{0+1} = \frac{3}{1} = 3$$

$$2.) f(x) = \frac{x^2 - 16}{x - 4}$$

V.A.: none H.A.: none

Holes: (4, 8)

Domain: $(-\infty, 4) \cup (4, \infty)$

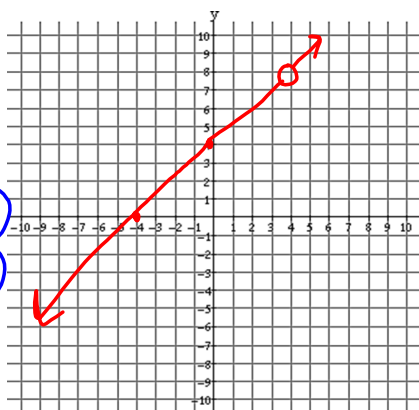
Range: $(-\infty, 8) \cup (8, \infty)$

x-intercept(s): $x = -4$

y-intercept: $y = 4$

End behavior: As $x \rightarrow -\infty, f(x) \rightarrow -\infty$

As $x \rightarrow \infty, f(x) \rightarrow \infty$



$$\textcircled{2} \quad \frac{\cancel{(x-4)}(x+4)}{\cancel{(x-4)}}$$

VA: none

HA: none

Hole: $x - 4 = 0 \rightarrow x = 4$

$x + 4 \rightarrow 4 + 4 \rightarrow 8$

x-int: $x + 4 = 0 \rightarrow x = -4$

y-int: $x + 4 \rightarrow 0 + 4 \rightarrow 4$

