

Notes: 27.3 Key Features of Rational Graphs (when can't use translations)

<p><u>y-intercept</u></p> <p>It is a point: $(0, y)$</p> <p>Find y-value when $x = 0$</p>	<p><u>x-intercept</u></p> <p>It is a point: $(x, 0)$</p> <p>Find x-value when numerator = 0 <i>top</i></p>
<p><u>Vertical asymptote</u></p> <p>It is a line: <u>$x = \#$</u></p> <p>Find x-value when denominator = 0 <i>bottom</i></p> <p>A vertical asymptote can NEVER be crossed</p> <p>$\frac{\#}{0} = \text{undefined}$</p>	<p><u>Horizontal asymptote</u></p> <p>It is a line: <u>$y = \#$</u></p> <p>FOR TODAY ONLY*: $\frac{\text{leading coefficient}}{\text{leading coefficient}} = y$</p> <p>A horizontal asymptote CAN be crossed (but not in any of the functions I'll give you in Algebra 2...wait for Precalculus for that!)</p>

*See notes for 29.3/29.4 for more

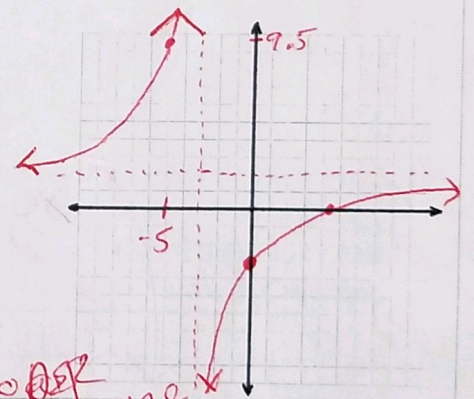
Graph the function by identifying the y-intercept, the x-intercept(s), the vertical asymptote(s), the horizontal asymptote, and possibly getting one more point to the left/right of the vertical asymptote. Then state D & R.

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

y-int: $(0, -3)$
 x-int: $(4.5, 0)$
 VA: $x = -3$
 HA: $y = 2$

$y = \frac{2(0)-9}{0+3} = \frac{-9}{3} = -3$
 $2x-9=0$
 $2x=9$
 $x=9/2=4.5$
 $x+3=0$
 $x=-3$
 test $x=-5$
 $y = \frac{2(-5)-9}{-5+3} = \frac{-19}{-2} = 9.5$

$\frac{\text{leading coeff}}{\text{leading coeff}} = \frac{2}{1} = 2$

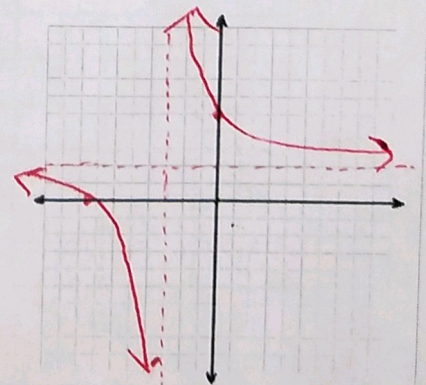


also ~~ASP~~ for the same

2) $f(x) = \frac{2x+15}{x+3}$

y-int: $(0, 5)$
 x-int: $(-7.5, 0)$
 VA: $x = -3$
 HA: $y = 2$

$D: (-\infty, -3) \cup (-3, \infty)$
 $R: (-\infty, 2) \cup (2, \infty)$



$$3) f(x) = \frac{2x-1}{3x+15}$$

$$y\text{-int: } (0, -\frac{1}{15})$$

$$x\text{-int: } (\frac{1}{2}, 0)$$

$$VA: x = -5$$

$$HA: y = \frac{2}{3}$$

$$y = \frac{2(0)-1}{3(0)+15} = -\frac{1}{15}$$

$$2x-1=0$$

$$x = \frac{1}{2}$$

$$3x+15=0$$

$$3x = -15$$

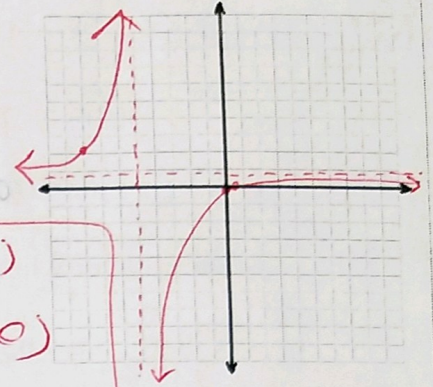
$$x = -5$$

$$\text{test } x = -8$$

$$y = \frac{-17}{-9} \approx 2$$

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

$$R: (-\infty, \frac{2}{3}) \cup (\frac{2}{3}, \infty)$$



We'll finish on Wednesday!

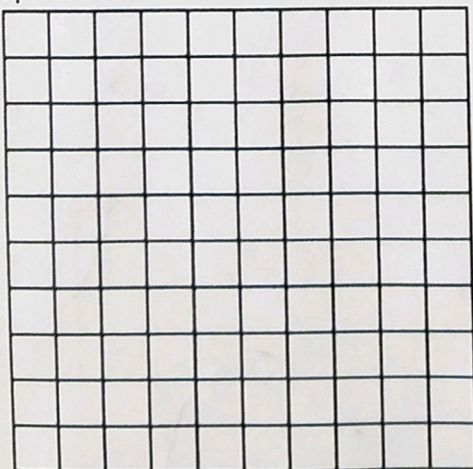
Word Problem

KitKat Kondos makes kitty condos. They have \$10,000 per week in fixed operating costs and each kitty condo costs \$12 to make.

- Write a function representing the cost of making x kitty condos.
- Create a table and label the columns: Number of Condos, Total Cost, and Cost per Condo. Use 25, 50, 75, 100, 125, 150, 200, 250, 300, 400, and x for the number of condos.

- Write a rational function that represents the cost per condo of x kitty condos.

- Draw a graph showing the relationship between the number of condos and the cost per condo. Use your table from #2 to determine an appropriate scale.



- If the cost per condo was \$13, how many condos did the company make?