

## Today's Agenda:

-Finish 4.7

-Rational Functions Test Review  
(kahoot)

-RATIONAL FUNCTIONS

TEST IS THURSDAY and 4.7 graphs  
are due.

Kahoot! | Play this quiz no x

https://play.kahoot.it/#/question?quizId=558b5d07-1b2c-49ad-ad5f-8c27eeb201ec

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Add or subtract the following. Simplify your

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

LCD:  $(x+4)(x+2)$

3.  $\frac{6x}{(x+2)}$  -  $\frac{3}{(x+4)}$

$$\frac{6x^2 + 12x - 3x - 12}{(x+4)(x+2)} - \frac{6x^2 + 9x - 12}{(x+4)(x+2)}$$

Next

End quiz

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Add or subtract the following. Simplify your

~~$$\frac{-3(2a^2 - 5a - 4)}{2(2a(a+4))} = \frac{-(2a^2 - 5a - 4)}{2a(a+4)}$$~~ LCD:  $2a(a+4)$  ~~x~~

4. 
$$\frac{3}{(a+4)} \cdot \frac{2a}{6a} - \frac{(a-2)}{(a+4)}$$

$$\frac{3a+12 - (6a^2+12a)}{6a(a+4)} = \frac{-(6a^2+15a+12)}{6a(a+4)}$$

Next

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Multiply or divide the following. Simplify

$$\frac{\cancel{(x-5)}(x-6)3x}{\cancel{(x-5)}4} = \frac{3x(x-6)}{4} \text{ or } \frac{3x^2 - 18x}{4}$$

5.  $\frac{x^2 - 11x + 30}{x - 5} \cdot \frac{\cancel{6}(x)}{\cancel{4}8}$

Next

End quiz

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Multiply or divide the following. Fully

$$\frac{1(n-8)\cancel{(n-9)}}{(n-9)\cancel{(n-9)}} = \frac{n-8}{n-9}$$

6. 
$$\frac{1}{n-9} \div \frac{n-9}{n^2-17n+72}$$

Next

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Multiply or divide. Simplify fully.

$r \neq 0$

7.  $\frac{1}{3r} \cdot \frac{(r+3)(3r)}{3r} \cdot \frac{1}{r}$

$\frac{1}{3r} \cdot \frac{(r+3)(3r)}{3r} \cdot \frac{1}{r}$

$1 + (r+3) = 3$

$r + 4 = 3$

$r = -1$

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Kahoot! | Play this quiz no x

https://play.kahoot.it/#/question?quizId=558b5d07-1b2c-49ad-ad5f-8c27eeb201ec

Solve the following, don't forget about

LCD:  $k(k-5)$   $\times$

$$\frac{\cancel{k(k-5)} \cdot 3}{k^2 - 5k} + \frac{\cancel{k(k-5)} \cdot 6}{\cancel{k}} = \frac{1}{\cancel{(k-5)} \cdot \cancel{k}}$$

$k(k-5)$

$3 + 6(k-5) = k$

$3 + 6k - 30 = k$

$-27 + 5k = 0$

$5k = \frac{27}{5}$

Next

End quiz

kahoot.it Game PIN: 65117

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

## Secondary Math 3 Honors Rational Functions Test Review

Simplify each rational expression fully and state what the excluded values are.

1. 
$$\frac{3 - 2r - r^2}{r^2 - 10r + 9}$$

2. 
$$\frac{5n^2 + 15n}{9n^2 + 27n}$$

Add or subtract each rational expression. Fully simplify your answer.

3. 
$$\frac{6x}{x+4} - \frac{3}{x+2}$$

4. 
$$\frac{3}{6a} - \frac{a-2}{a+4}$$



Multiply or divide each rational expression. Fully simplify your answer.

$$5. \quad \frac{x^2 - 11x + 30}{x - 5} \cdot \frac{6x}{8}$$

$$6. \quad \frac{1}{n - 9} \div \frac{n - 9}{n^2 - 17n + 72}$$

Solve each equation. Remember to check for extraneous solutions.

$$7. \quad \frac{1}{3r} + \frac{r + 3}{3r} = \frac{1}{r}$$

$$8. \quad \frac{3}{k^2 - 5k} + \frac{6}{k} = \frac{1}{k - 5}$$

Graph each rational function below. Write out or label any vertical, horizontal, or slant asymptotes; any x- and y-intercepts; holes. If there aren't any of what's asked for above, write "none."

9.

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

Horizontal Asymptote(s): \_\_\_\_\_

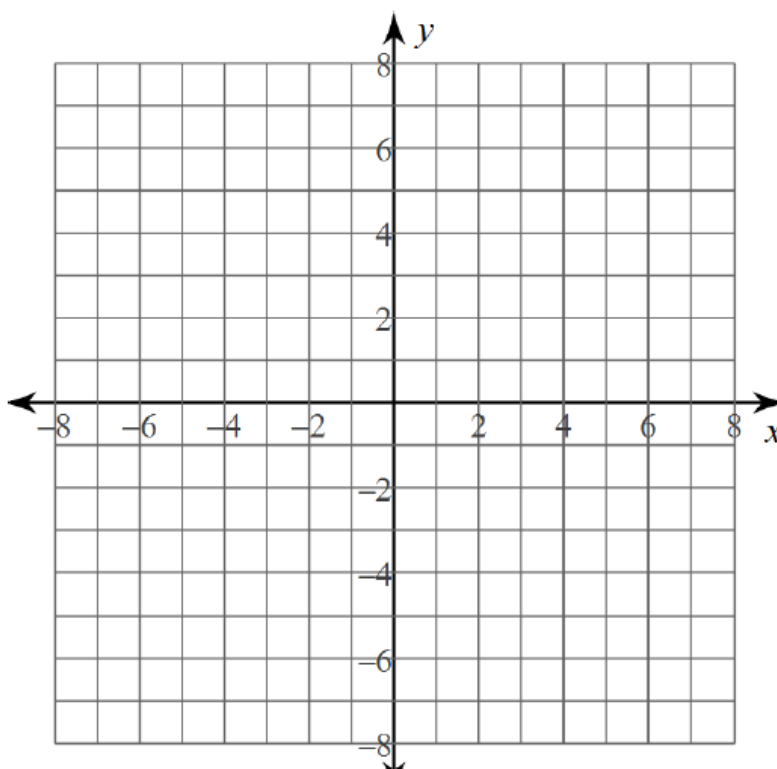
Vertical Asymptote(s): \_\_\_\_\_

Slant Asymptote(s): \_\_\_\_\_

x-intercept(s): \_\_\_\_\_

y-intercept(s): \_\_\_\_\_

Hole(s): \_\_\_\_\_



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

Horizontal Asymptotes: \_\_\_\_\_

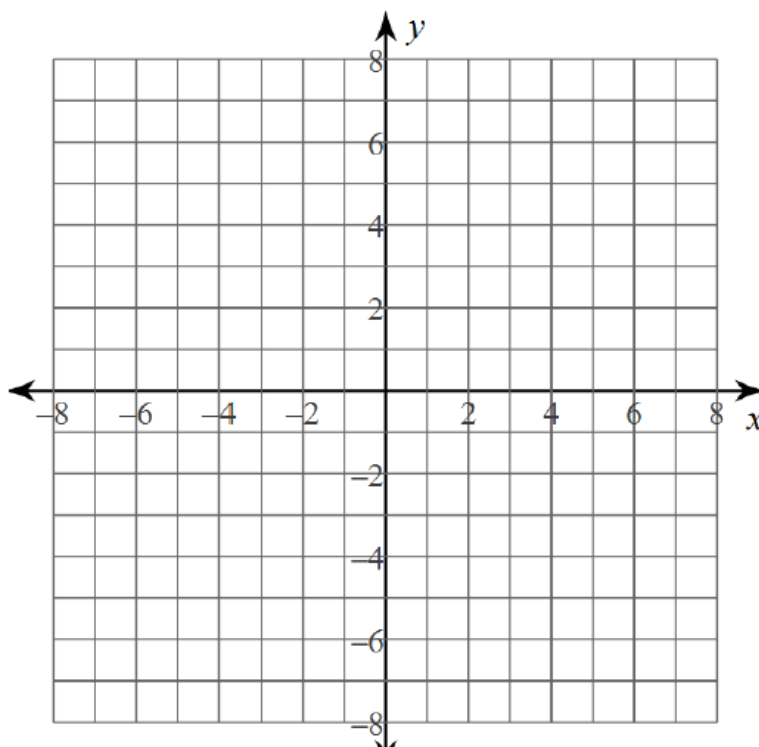
Vertical Asymptotes: \_\_\_\_\_

Slant Asymptotes: \_\_\_\_\_

x-intercept: \_\_\_\_\_

y-intercept: \_\_\_\_\_

Holes: \_\_\_\_\_



11. 
$$f(x) = \frac{x^2 - 16}{-2x^2 - 2x + 24}$$

Horizontal Asymptote(s): \_\_\_\_\_

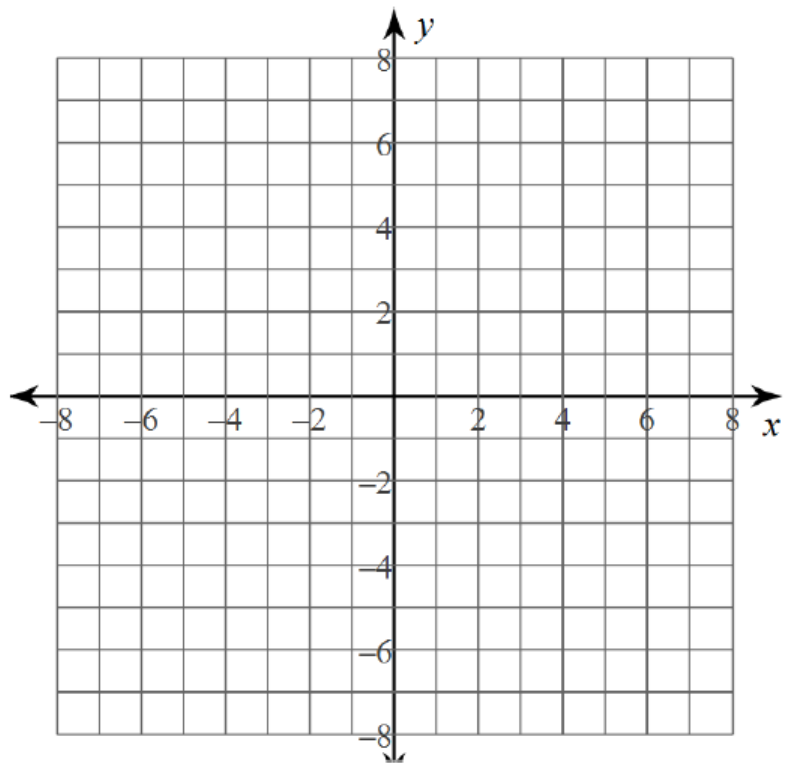
Vertical Asymptote(s): \_\_\_\_\_

Slant Asymptote(s): \_\_\_\_\_

x-intercept(s): \_\_\_\_\_

y-intercept(s): \_\_\_\_\_

Hole(s): \_\_\_\_\_



12.

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

Horizontal Asymptote(s): \_\_\_\_\_

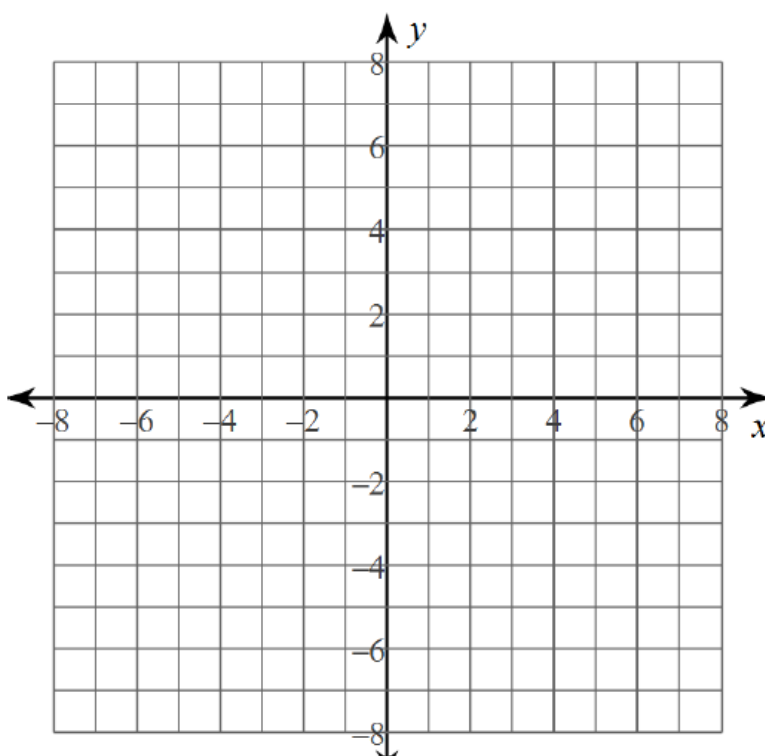
Vertical Asymptote(s): \_\_\_\_\_

Slant Asymptote(s): \_\_\_\_\_

x-intercept(s): \_\_\_\_\_

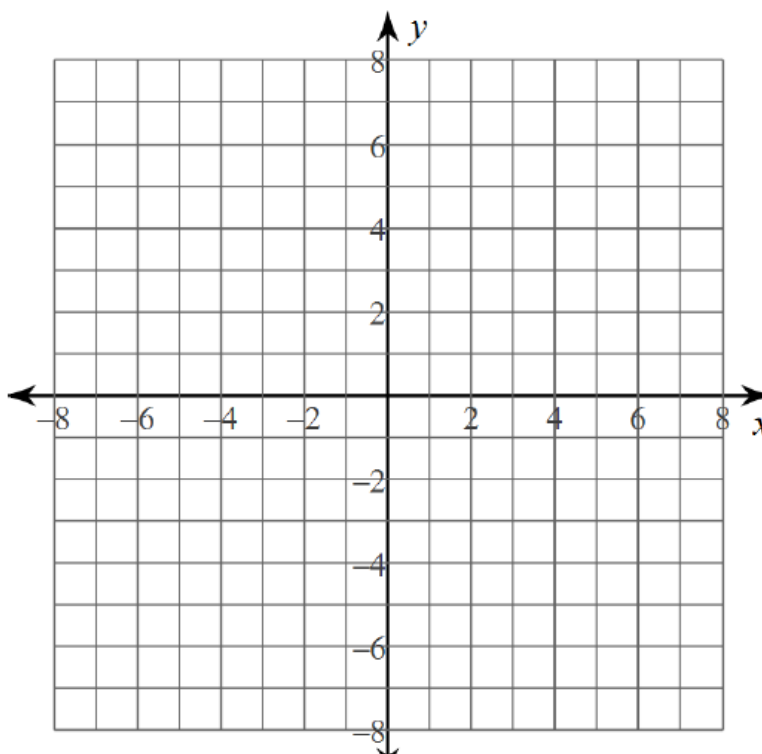
y-intercept(s): \_\_\_\_\_

Hole(s): \_\_\_\_\_



\*\*No calculator below. State the asymptotes, intercepts, and holes. Sketch a graph of the following.

$$f(x) = \frac{x^2 - 6x + 8}{4x - 12}$$



Horizontal Asymptote(s): \_\_\_\_\_

Vertical Asymptote(s): \_\_\_\_\_

Slant Asymptote(s): \_\_\_\_\_

x-intercept(s): \_\_\_\_\_

y-intercept(s): \_\_\_\_\_

Hole(s): \_\_\_\_\_

## 4.7 Graphing Rational Functions

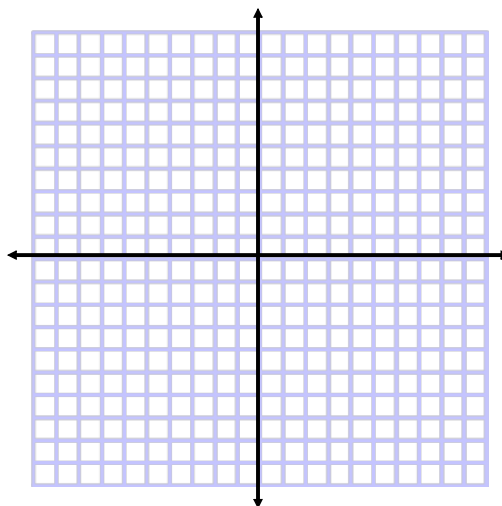
### *A Practice Understanding Task*

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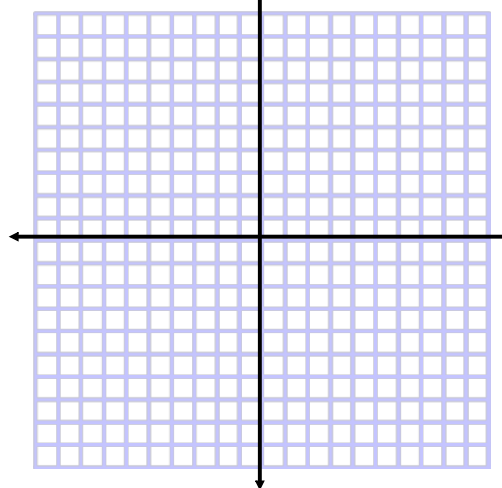
#### Part I: Seeing Structure

For each function, determine intercepts, domain, asymptotes, and complete a sign line. Use this information to sketch the graph.

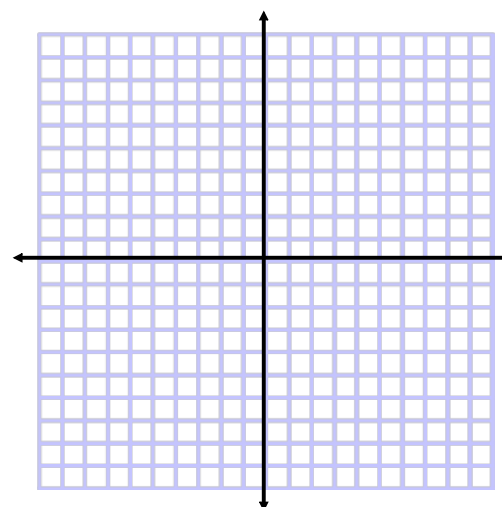
4.  $f(x) = \frac{(x-1)^2}{x^3+4x}$



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



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

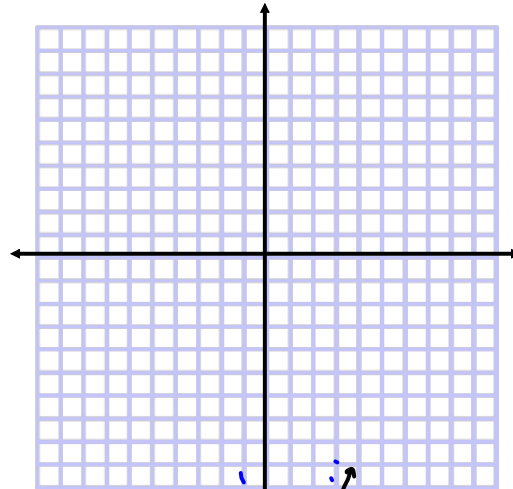


7. What observations do you notice about the various graphs from Part I?

Part II: Seeing More Structure

8. Determine the features and then sketch the graphs of the functions.

a.  $f(x) = \frac{x}{x^2+1}$



b.  $f(x) = \frac{2x(x-1)(x+2)}{(x+4)} \frac{d3}{d1}$

$\frac{2x}{x+4} = \frac{0}{2} = 0$   
 $\frac{x}{x+4} = 0$

VA:  $x = -4$   
 HA: none  
 SA:  $2x^2 - 6x + 20$

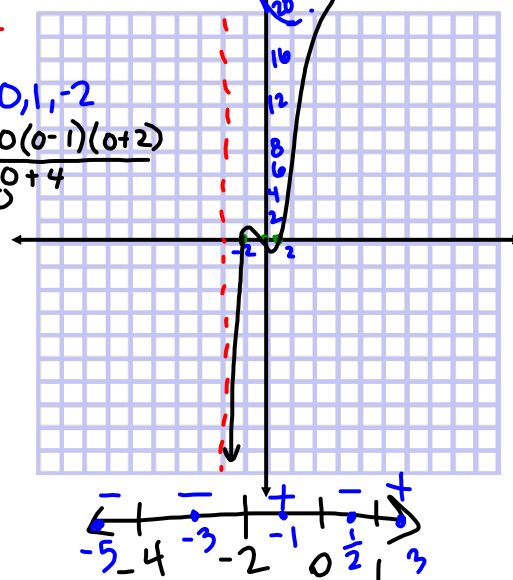
$x\text{-int: } x = 0, 1, -2$   
 $y\text{-int: } \frac{2 \cdot 0(0-1)(0+2)}{0+4} = 0$   
 $y = 0^{0+4}$

numerator

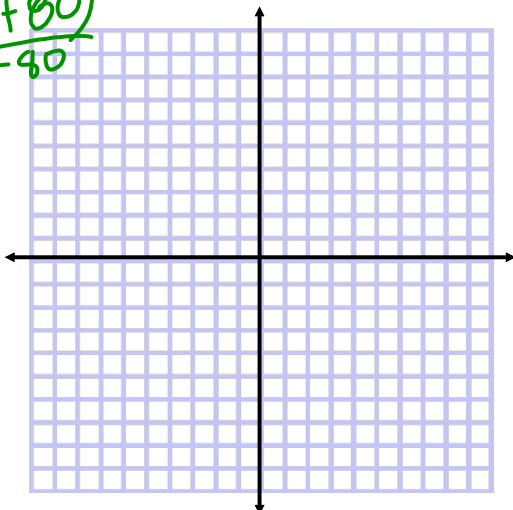
$(2x^2 - 2x)(x+2)$   
 $2x^3 + 4x^2 - 2x^2 - 4x$   
 $2x^3 + 2x^2 - 4x$

$\frac{2x^2 - 6x + 20}{x+4}$

$x+4 \overline{) 2x^3 + 2x^2 - 4x + 0}$   
 $\underline{-(2x^3 + 8x^2)}$   
 $\hline -6x^2 - 4x + 0$   
 $\underline{-(-6x^2 - 24x)}$   
 $\hline 20x + 0$   
 $\underline{-(20x + 80)}$   
 $\hline -80$

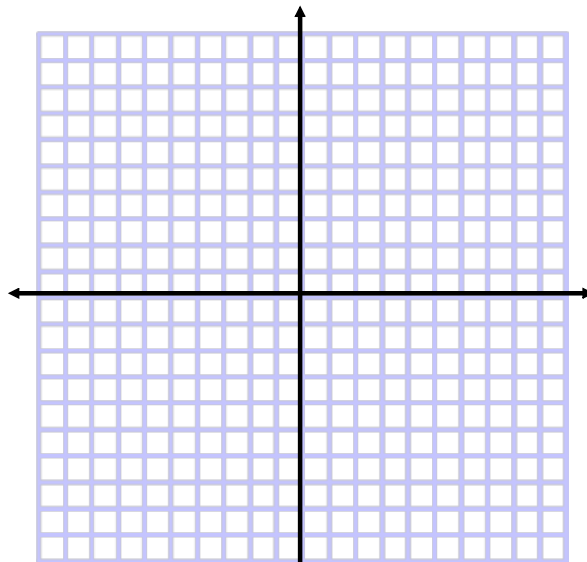


c.  $f(x) = \frac{(2x-1)(x+2)}{(x+3)(x-1)}$





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



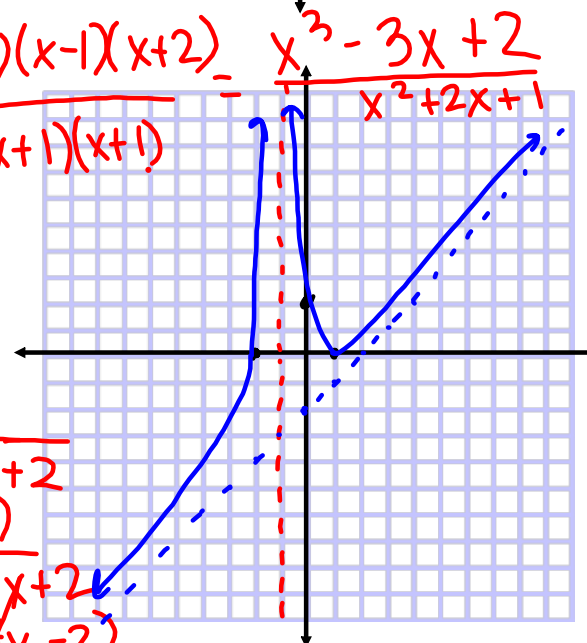
d3

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

VA:  $x = -1$

HA: none

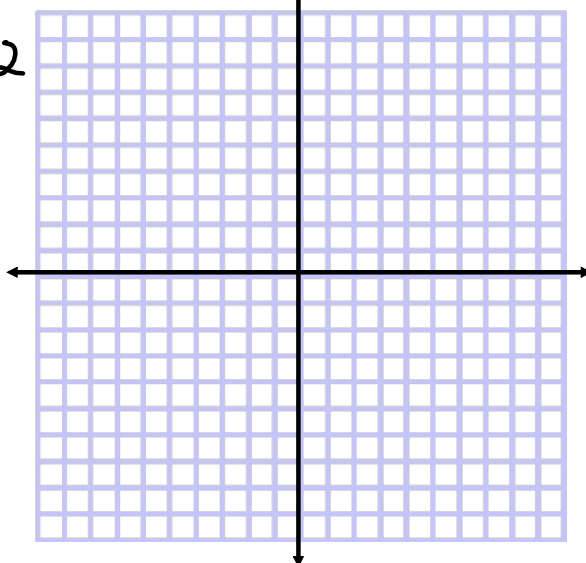
SA:  $y = x - 2$



$$\begin{array}{r}
 \textcircled{x-2} \\
 x^2 + 2x + 1 \overline{) x^3 + 0x^2 - 3x + 2} \\
 \underline{-(x^3 + 2x^2 + x)} \\
 -2x^2 - 4x + 2 \\
 \underline{-(-2x^2 - 4x - 2)} \\
 4
 \end{array}$$

x-int:  $x = 1, -2$

y-int:  $y = \frac{-1 \cdot -1 \cdot 2}{1 \cdot 1} = \frac{2}{1} = 2$



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