

Discontinuity Assignment - PreCalc

Rational Functions / Piece Wise Functions

Name _____

Date _____ Period ____

Simply determine the type and location of any discontinuities. No graph is required, although you may use a graphing calculator to help obtain an answer.

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

Classification _____
(and give location)

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

Classification _____
(and give location)

3. $f(x) = \frac{|2x|}{x}$

Classification _____
(and give location)

4. $f(x) = \frac{x-6}{x^2+9}$

Classification _____
(and give location)

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

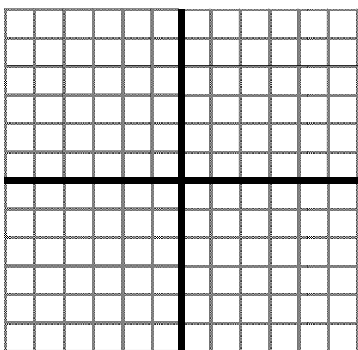
Classification _____
Classification _____
(and give locations)

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

Classification _____
(and give location)

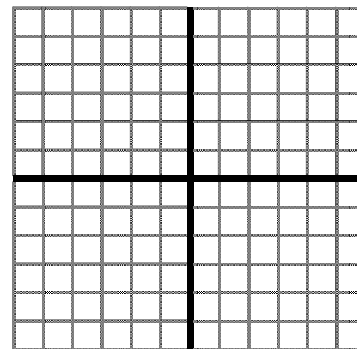
Graph each piece wise function. State and clearly show (on the graph) any discontinuities.

7. $f(x) = \begin{cases} -x & x \leq 0 \\ 2x+3 & x > 0 \end{cases}$



Classification _____
(and location)

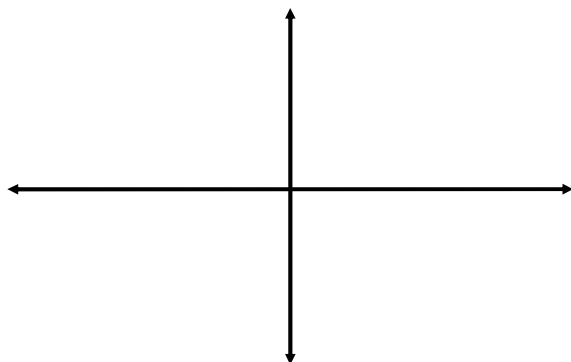
8. $f(x) = \begin{cases} x^2 & x < 0 \\ 0 & 0 < x < 3 \\ \sqrt{x-3} & x \geq 3 \end{cases}$



Classification _____
(and location)

9a. Draw a function that has the following...

- ✓ infinite discontinuity @ $x = 3$
- ✓ point/hole discontinuity @ $x = -3$



9b. Now write an equation for the rational function described in 9a.

(Graph it too... does it match?)

$f(x) =$ _____

10. Explain why it is impossible to have point/hole AND jump discontinuity at the same x value

11. Explain why the existence of a horizontal asymptote does not give infinite discontinuity?
say more than "vertical asymptotes give infinite discontinuity"

12. Suppose as $x \rightarrow 5$ we know $y \rightarrow \pm\infty$. What type of asymptote exist on this graph?

13. Suppose as $x \rightarrow \infty$ we know $y \rightarrow 2$. What type of asymptote exist on this graph?

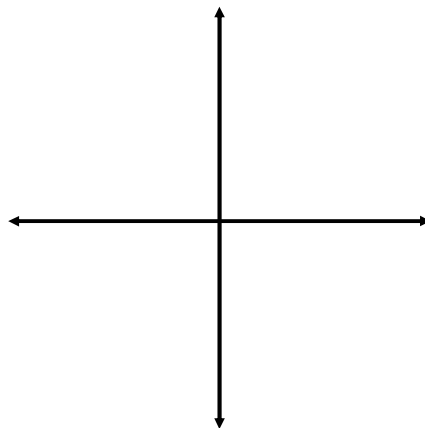
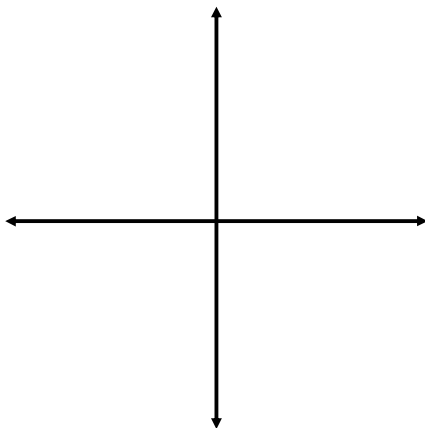
Identify any asymptote, holes and y intercepts for the $f(x)$. Then use your answers and the graphing calculator to produce a very accurate sketch. Changing the WINDOW/ZOOM as needed.

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

Vertical _____
Horiz. _____
Slant _____
Hole _____
y intercept _____
x intercept _____

15. $f(x) = \frac{3x^3 - 4x^2 + x - 4}{x^2 - 9}$

Vertical _____
Horiz. _____
Slant _____
Hole _____
y intercept _____
x intercept _____



16. Find the (5) significant points on the following parabola, then sketch its graph. Remember, this will be a NO CALCULATOR problem on the test... so try it that way today!
Show all supporting work.

$y = 2x^2 - 5x - 12$

