

AP Calculus AB: 1.2 Pre-Calculus Review

Find all the discontinuities and label them either; hole, vertical or horizontal asymptote.

$$1) y = \frac{x}{x^2+5x} = \frac{x}{x(x+5)}$$

hole: $x=0$
 HA: $y=0$
 VA: $x=-5$

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

hole: $x=-2$
 HA: $y=1/2$
 VA: $x=3/2$

$$3) y = \frac{2x^2-x-10}{(x+2)(x-3)}$$

hole: $x=-2$
 HA: $y=2$
 VA: $x=3$

$$4) y = \frac{3x^2}{(x-7)(4x+3)}$$

hole: $x=\text{none}$
 HA: $y=3/4$
 VA: $x=7$ $x=-3/4$

$$5) y = \frac{x(2x-5)}{x^3-2x^2-8x}$$

hole: $x=0$
 HA: $y=0$
 VA: $x=4$ $x=-2$

$$6) y = \frac{x^2-9}{x^2+3x}$$

hole: $x=-3$
 HA: $y=1$
 VA: $x=0$

$$7) y = \frac{x^4-16}{(x+2)(x^2+4)} = \frac{(x^2-4)(x^2+4)}{(x+2)(x^2+4)}$$

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

↑
imaginary solutions

hole: $x=-2$
 HA: slant
 VA: none

$$8) y = \frac{3x^2-2x-21}{(x-7)}$$

hole: none
 HA: slant
 VA: ~~$x=7$~~

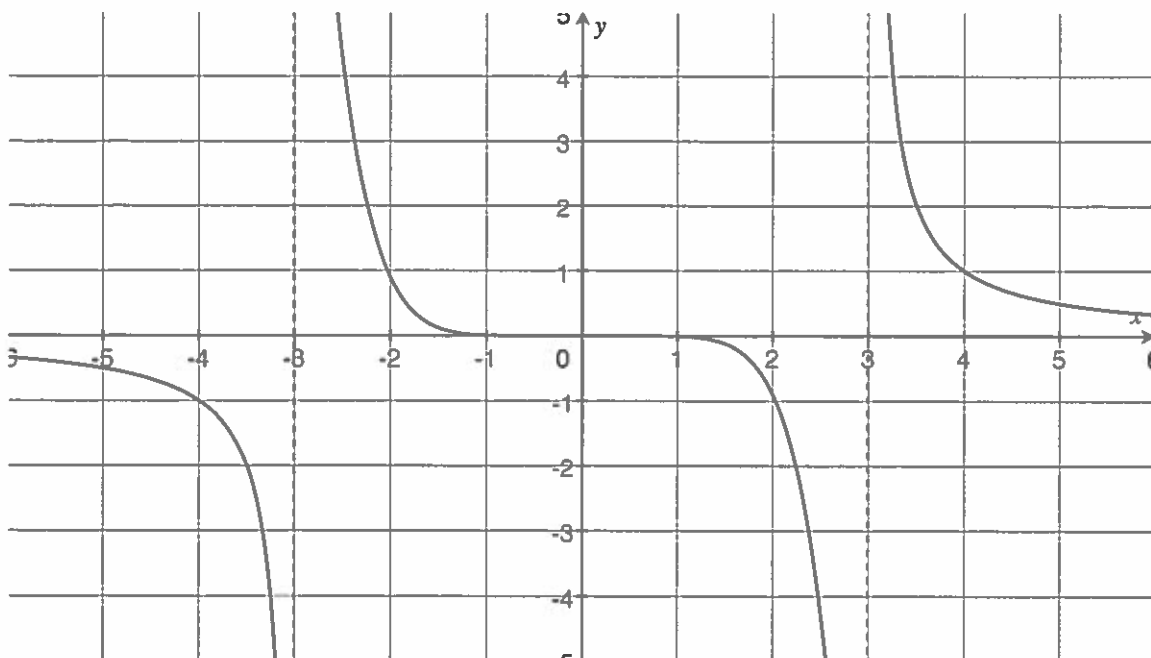
9) Write a function that has two vertical asymptotes at $x=4$ and $x=-\frac{2}{3}$ and one horizontal asymptote at $y=0$. (There are many possible answers)

One possible solution: Don't use mine!!!

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

10) Write a function that has one vertical asymptote at $x=\frac{3}{4}$ and a horizontal asymptote at $y=\frac{1}{2}$. (There are many possible answers)

Find the end behavior of the sections of the graph asked for below



1) As $x \rightarrow \infty, y \rightarrow 0$

2) As $x \rightarrow -\infty, y \rightarrow 0$

3) As $x \rightarrow -3^-, y \rightarrow -\infty$

4) As $x \rightarrow -3^+, y \rightarrow \infty$

5) As $x \rightarrow 3^-, y \rightarrow -\infty$

6) As $x \rightarrow 3^+, y \rightarrow \infty$

Evaluate each of the piecewise functions below at the desired values.

7) $f(x) = \begin{cases} -x^2 + 5x - 2, & x \geq -1 \\ 5x + 2, & x < -1 \end{cases}$ Find $f(-3), f(-1), f(0)$
 $f(-3) = -13$
 $f(-1) = -8$
 $f(0) = -2$

8) $f(x) = \begin{cases} \ln(x), & x = 1 \\ \frac{x}{5} + \frac{3}{x}, & x \neq 1 \end{cases}$ Find $f(-2), f(3), f(1)$
 $f(-2) = -19/10$
 $f(3) = 8/5$
 $f(1) = 0$

9) $f(x) = \begin{cases} \frac{-x^2+5}{\frac{1}{x}}, & x < 0 \\ 6x + 7, & x = 0 \\ 5, & 0 < x < 5 \\ e^{2x-12}, & x \geq 5 \end{cases}$ Find $f(-1), f(0), f(2), f(6)$
 $f(-1) = -4$ $f(2) = 5$
 $f(0) = 7$ $f(6) = 1$