REVIEW 5A No Calculator

1. If $P(x) = \frac{(2x-1)(x-5)}{(x-5)(x+1)}$, then which of the following statements is/are true?

I. The graph of $P(x)$ has a vertical asymptote at $x = 5$.

II. The graph of $P(x)$ has a point discontinuity at $\left(5, \frac{9}{6}\right)$.

III. The graph of $P(x)$ has a y – intercept at (0, −1).

A. I and II only

B. I and III only

C. II and III only

D. I only

E. I, II, and III

2. Identify the x – value(s) of any removable discontinuity in the function $f(x) = \frac{5x^2-9x-2}{x^2-4}$.

I. $x = 2$ II. $x = -2$ III. $x = -\frac{1}{5}$

A. I only

B. II only

C. I and II only

D. I and III only

E. I, II and III

3. What does the graph of $f(x) = \frac{x^2-3x}{x^2+2x-15}$ look like at the value $x = 3$?

A. There is a vertical asymptote at $x = 3$.

B. There is a hole in the graph at $x = 3$.

C. There is a jump in the graph at $x = 3$.

D. The graph is continuous at $x = 3$.

4. Which of the following statements is/are true about the rational function $f(x) = \frac{(x-2)(x+5)(x-3)}{(x-2)(x-3)}$?

Hole @ $x=2, y=7$ Hole @ $x=3, y=8$

I. The graph of $f(x)$ has a hole in it at the point $(2, 7)$. True

II. The graph of $f(x)$ has a vertical asymptote at $x = 2$. X

III. The graph of $f(x)$ will cross the x – axis at $x = 2$ and $x = 5$. X

A. I only

B. I and II only

C. II only

D. II and III only

E. I, II and III

Zero $(x-8)$ N

5. If it is known that $p(8) = 0$, which of the following statements is true?

A. $(x + 8)$ is a non-canceling factor in the numerator.

B. $(x + 8)$ is a non-canceling factor in the denominator.

C. The ratio of the constant terms of the numerator and denominator is −3.

D. $(x – 8)$ is a non-canceling factor in the numerator.

E. $(x – 8)$ is a non-canceling factor in the denominator.

6. Which of the following statements is true about the function $f(x) = \frac{x^2-7x+12}{x^2-25}$? $= \frac{(x-3)(x-4)}{(x-5)(x+5)}$

VA @ $x = 5, -5$

A. $f(x)$ has two values of x at which point discontinuities exist.

B. $f(x)$ has one point discontinuity and one infinite discontinuity.

C. $f(x)$ has one value of x at which a jump discontinuity exists.

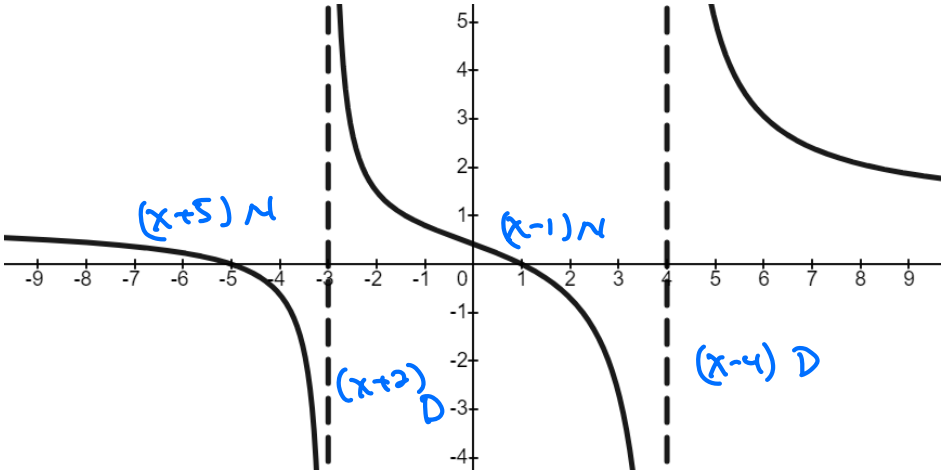
D. $f(x)$ has two values of x at which infinite discontinuities exist.

E. $f(x)$ is continuous for all values of x.

7. Which of the following factors is/are in the numerator of the equation of $f(x)$?

I. $(x-1)$ ✓ II. $(x+5)$ ✓ III. $(x-4)$ IV. $(x+2)$

A. I only
B. II only
C. I and II only
D. III only
E. III and IV only



8. Solve the rational inequality $\frac{4}{x-3} \leq \frac{2}{x-5}$.

$\frac{(x-5)}{(x-5)}\frac{4}{x-3} - \frac{2}{x-5}\frac{(x-3)}{(x-3)} \leq 0$

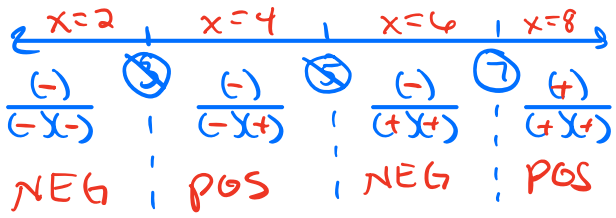
$\frac{4x-20}{(x-5)(x-3)} - \frac{2x-6}{(x-5)(x-3)} \leq 0$

$\frac{4x-20-2x+6}{(x-5)(x-3)} \leq 0$

$\frac{2x-14}{(x-5)(x-3)} \leq 0$

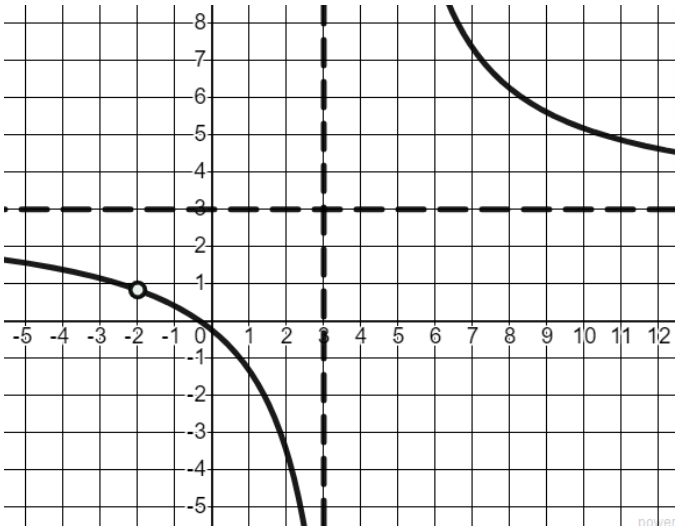
$\frac{2(x-7)}{(x-5)(x-3)} \leq 0$

A. $(-\infty, 3) \cup (5, 7)$
B. $(-\infty, 3) \cup (5, 7]$
C. $(3, 5] \cup (3, \infty)$
D. $(-\infty, 3) \cup (3, 7)$
E. $(3, 5) \cup (7, \infty)$



$(-\infty, 3)$ $(5, 7]$

I. The graph of a rational function, $H(x)$ is pictured to the right such that $H\left(-\frac{1}{3}\right) = 0$. Use the graph to answer the following questions.



a. What factor is in the denominator that is not also in the numerator? Explain your reasoning.

$H(x)$ has a vertical asymptote at $x = 3$. +1

$\therefore$ $H(x)$ has a factor of $(x-3)$ in the denominator but it's not in the numerator. +1

b. What factor is in the denominator that is also in the numerator? Explain your reasoning.

$H(x)$ has a hole at $x = -2$. +1

$\therefore$ $H(x)$ has a factor of $(x+2)$ in both the denominator and the numerator. +1

c. What factor is in the numerator that is NOT in the denominator? Explain your reasoning.

$H(x)$ has a root at $x = -\frac{1}{3}$. +1

$\therefore$ $H(x)$ has a factor of $(3x+1)$ in the numerator but it's not in the denominator. +1

d. Construct the equation of $H(x)$ in standard form to find the coordinates of the y – intercept of the graph. Show your work.

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

$$H(x) = \frac{3x^2+7x+2}{x^2-x-6}$$ +1

$$y\text{-int} = \frac{2}{-6} = -\frac{1}{3}$$ +1