Homework 5.5: Graphing Rational Functions

Name: _____

Math 3

Directions: Answer each of the following multiple choice questions to the best of your ability. Show all necessary work.

1. Which value of x will make the fraction $\frac{x-3}{x+6}$ undefined?

   A. 6 (B.) −6 C. 3 D. −3

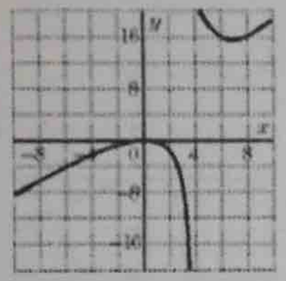
2. Which of the following is the equation of an asymptote for the function graphed?

   A. $x = -4$

   B. $y = 0$

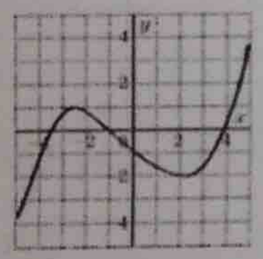
   (C.) $x = 4$

   D. $y = 16$

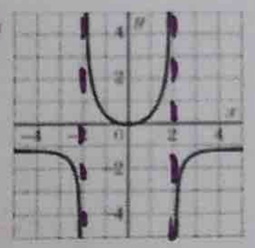


3. Which of the following could be the graph of a rational function that is *not* a polynomial function?

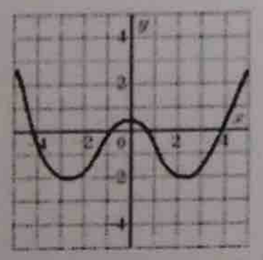
   A.



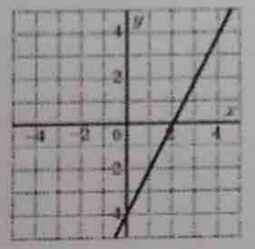
   (C.)



   B.



   D.



4. The graph of the function $y = \frac{8}{x}$ lies in what quadrant(s)?

   (A.) the first and third quadrants

   B. the second and fourth quadrants

   C. the second quadrant only

   D. the third quadrant only

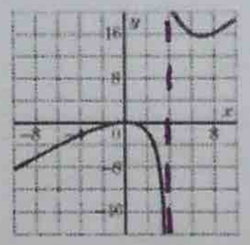
5. What is the value of the hole for the graph of $y = \frac{x^2 - 25}{x - 5}$?

   A. -5 (B.) 5

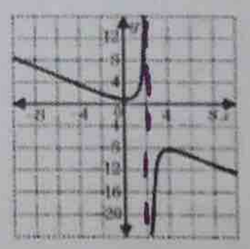
   C. 25 D. There is no hole

6. Which of the following represents the graph of $y = \frac{x^2}{x-2}$?

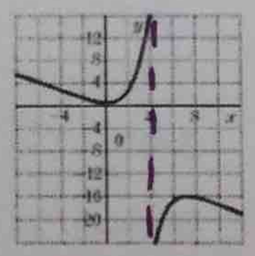
   A.



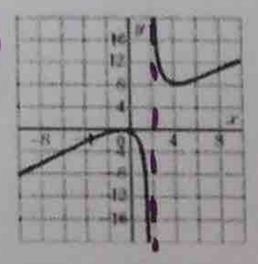
   C.



   B.



   (D.)



7. What is the domain of the function?

$$f(x) = \frac{8}{x+3} - 2$$

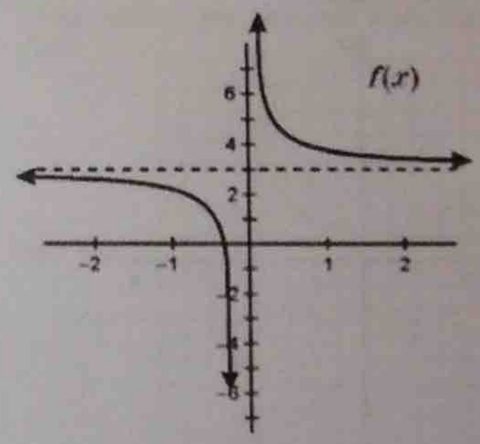
   A. all real numbers except 2

   B. all real numbers

   C. all real numbers except 3

   (D.) all real numbers except −3

8. What value(s) are restricted from the range of $f(x)$?



   A. 1 B. 0 (C.) 3

   D. there are no restricted values

9. A value of x that makes the expression $\frac{x^2 + 4x - 12}{x^2 - 2x - 15}$ undefined is

   A. −6 B. −2 C. 3 (D.) 5

Directions: Identify points of discontinuity, vertical asymptotes, horizontal asymptotes, and x-intercepts. Do not graph the functions.

9. $f(x)=\dfrac{1}{3x^2+3x-18}$

$3(x^2+x-6)$

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

POD: None

VA: $x=-3$ $x=2$

HA: $y=0$

x-int: None

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

POD: None

VA: $x=4$

HA: $y=1$

x-int: $(2,0)$

11. $f(x)=\dfrac{x^3-x^2-6x}{-3x^2-3x+18}$

$\dfrac{x(x^2-x-6)}{-3(x^2+x-6)}=\dfrac{x(x-3)(x+2)}{-3(x+3)(x-2)}$

POD: None

VA: $x=-3$ $x=2$

HA: None

x-int: $(0,0)$ $(3,0)$ $(-2,0)$

12. $f(x)=\dfrac{x^2+x-6}{-4x^2-16x-12}$

$\dfrac{(x+3)(x-2)}{-4(x^2+4x+3)}=\dfrac{(x+3)(x-2)}{-4(x+3)(x+1)}$

POD: $x=-3$

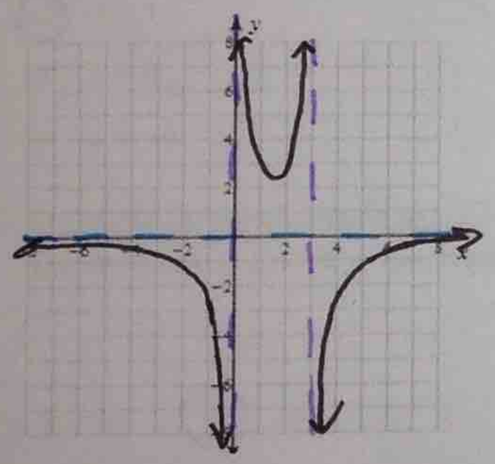
VA: $x=-1$

HA: $y=-1/4$

x-int: $(2,0)$

Directions: Identify points of discontinuity, vertical asymptotes, horizontal asymptotes, and x-intercepts. Then, sketch the graph and state the domain.

13. $f(x)=\dfrac{-4}{x^2-3x}=\dfrac{-4}{x(x-3)}$



POD: None

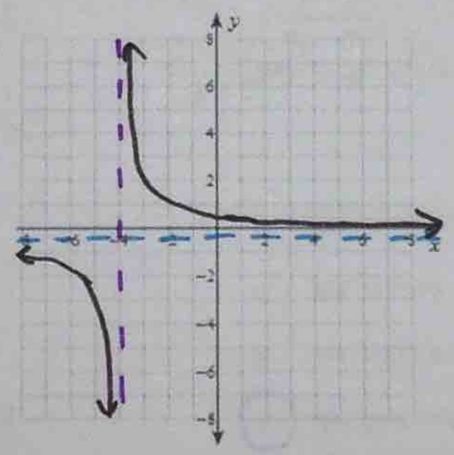
VA: $x=0$ $x=3$

HA: $y=0$

x-int: None

Domain: $(-\infty,0)\cup(0,3)\cup(3,\infty)$

14. $f(x)=\dfrac{x-4}{-4x-16}=\dfrac{x-4}{-4(x+4)}$



POD: None

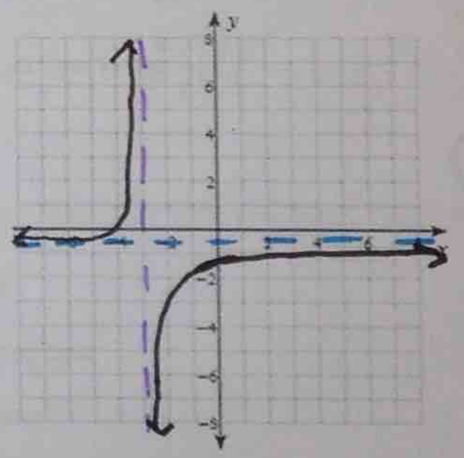
VA: $x=-4$

HA: $y=-1/4$

x-int: $(4,0)$

Domain: $(-\infty,-4)\cup(-4,\infty)$

15. $f(x)=\dfrac{x+4}{-2x-6}=\dfrac{x+4}{-2(x+3)}$



POD: None

VA: $x=-3$

HA: $y=-1/2$

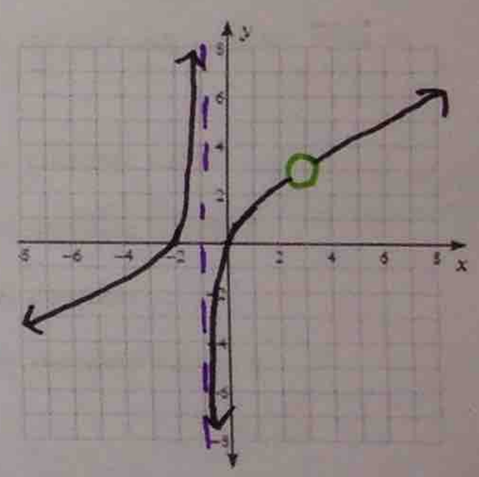
x-int: $(-4,0)$

Domain: $(-\infty,-3)\cup(-3,\infty)$

16. $f(x)=\dfrac{x^3-9x}{3x^2-6x-9}=\dfrac{x(x-3)(x+3)}{3(x-3)(x+1)}$

$x(x^2-9)=x(x-3)(x+3)$

$3(x^2-2x-3)=3(x-3)(x+1)$



POD: $x=3$

VA: $x=-1$

HA: None

x-int: $(-3,0)$ $(0,0)$

Domain:

$(-\infty,-1)\cup(-1,3)\cup(3,\infty)$