Algebra 2 & Trigonometry Test Review **Name** _____
Unit 4: Rational Functions & Relations **Date** _____ **Block** _____

SHOW ALL WORK AND COME PREPARED TO ACE THE TEST! *May the FORCE be with you!*

State whether x and y show *direct variation, inverse variation* or *neither*.

1. $xy = 20$ **2.** $y - 3 = x$ **3.** $\frac{y}{6} = x$ **4.**

x	y
-4	-1.6
-2	-0.8
1	0.4
2	0.8

1. _____ **2.** _____ **3.** _____ **4.** _____

For each variation problem, do the following: a) Find the constant of variation k, b) Write an equation that relates the variables, and c) Answer the question. Show all work used to derive your answer.

5. If *y* varies directly as z and inversely as x, and $y = -18$ and $z = 3$ when $x = 6$, find y when $x = 5$ and $z = -5$.

a. _____ **b.**_____ **c.**_____

6. *M* varies jointly as the values of *p* and *q*. If $M = 88$ when $p = 4$ and $q = .4$, find *M* when $p = 8$ and $q = 1.2$.

a. _____ **b.**_____ **c.**_____

7. A company has found that the monthly demand *d* for one of its products varies inversely with the price *p* of the product. When the price is $12.50, the demand is 12,000 units. What will the demand be if the price is reduced to $12.00?

a. _____ **b.**_____ **c.**_____

8. In a factory, the profit, *P*, varies directly with the inventory, *I*. If the Profit was $100 when the inventory was $20, find the Profit when the inventory is $50.

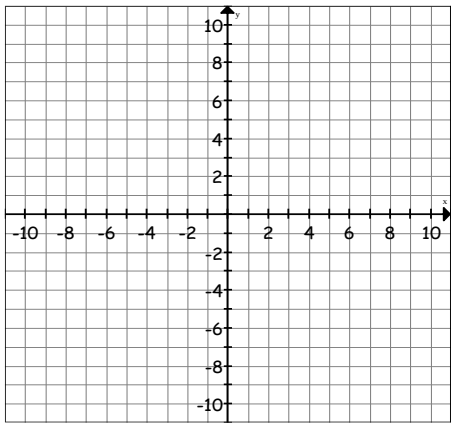
a. _____ **b.**_____ **c.**_____

9. The volume, *V*, of a gas varies inversely as the pressure, *p*, in a container. If the volume of a gas is 200cc when the pressure is 1.6 liters per square centimeter, find the volume (to the *nearest tenth*) when the pressure is 2.8 liters per sq centimeter.

a. _____ **b.**_____ **c.**_____

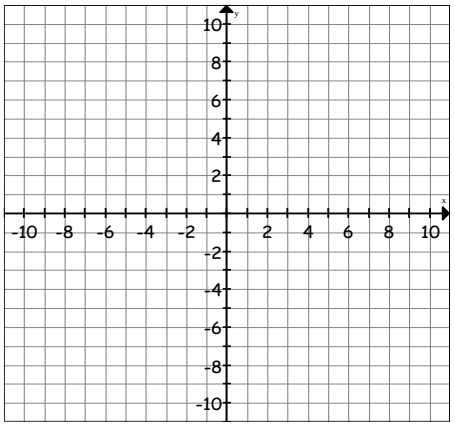
Graph each of the following functions and provide the indicated information below. Plot at least two points on each branch of the graph. Use appropriate notation for equations and points, and use interval notation for the domain and range.

10. $y = \frac{4}{x-2} + 1$



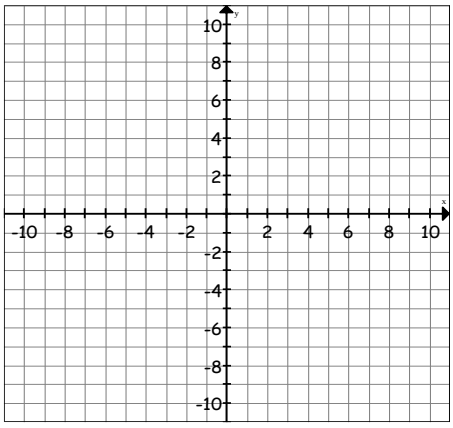
V asymptote(s):	**H asymptote:**
SLANT asymptote:	**Hole(s):**
Zero(s)/x-intercept(s):	**y-intercept:**
domain:	**range:**

11. $y = \frac{x+5}{x+4}$



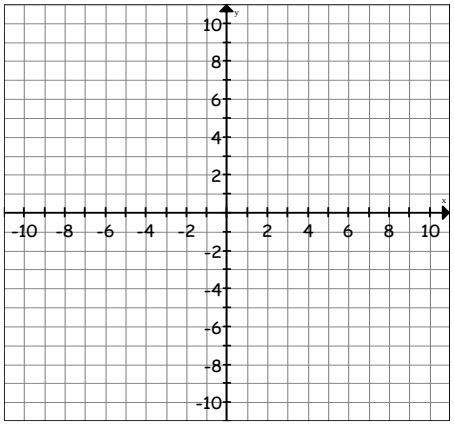
V asymptote(s):	**H asymptote:**
SLANT asymptote:	**Hole(s):**
Zero(s)/x-intercept(s):	**y-intercept:**
domain:	**range:**

12. $y = \frac{x^2-2}{x+1}$



V asymptote(s):	**H asymptote:**
SLANT asymptote:	**Hole(s):**
Zero(s)/x-intercept(s):	**y-intercept:**
domain:	**range:**

13. $y = \frac{x^2-4}{x^2-3x-10}$

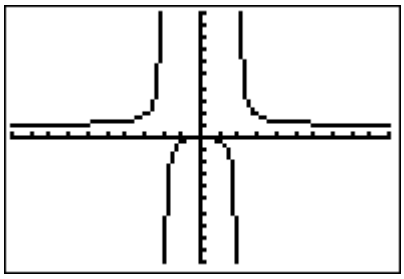


V asymptote(s):	**H asymptote:**
SLANT asymptote:	**Hole(s):**
Zero(s)/x-intercept(s)	**y-intercept:**
domain:	**range:**

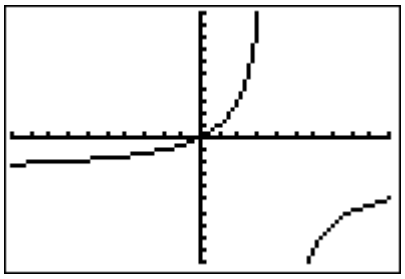
In #14-16, match the function with its graph.

14. $y = \dfrac{-3x^2+6x}{x^2-6x+8}$ _____ **15.** $y = 1-\dfrac{x}{x+2}$ _____ **16.** $y = \dfrac{x^2}{x^2-4}$ _____

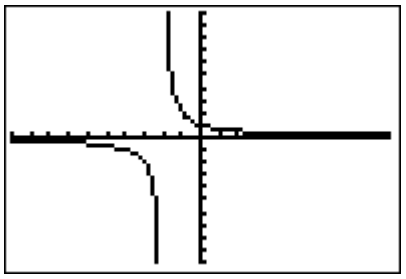
A.



B.



C.



Given the function f(x) = $\dfrac{5}{x}$, write the equation that would represent the translation that:

17. has a horizontal asymptote y = 5 and a vertical asymptote x = 3. _____

18. has a horizontal asymptote y = -8 and a vertical asymptote x = 0 _____

19. has a horizontal asymptote y = 0 and a vertical asymptote x = -6 _____

20. shifts the function up 2 and left 7. _____

Perform the indicated operation and simplify.

21. $\dfrac{a^2-b^2}{a^4(a+2)} \bullet \dfrac{a^2}{a+b}$	**22.** $\dfrac{x^2-4}{2x^2+7x+3} \div \dfrac{x^2+5x-14}{2x^2-9x-5}$
23. $\dfrac{2x-1}{x^2-x-2} - \dfrac{1}{x-2}$	**24.** $\dfrac{x+7}{2-x} - \dfrac{x-5}{x-2}$

25. $\dfrac{1}{x^3+10x^2} \div \dfrac{x^2-9}{x+3} \bullet \dfrac{x+10}{x^2+7x+12}$

26. $\dfrac{2a}{a-3} - \dfrac{2a}{a+3} + \dfrac{36}{a^2-9}$

27. $\dfrac{\dfrac{3x}{x-3} + \dfrac{6}{x+2}}{\dfrac{3}{x^2-x-6}}$

28. $\dfrac{\dfrac{x^2-9x-22}{x^2+5x-24}}{\dfrac{x+2}{x-3}}$

Solve each equation. Round any decimals to the nearest hundredth and check your answers.

29. $\dfrac{2}{x} + \dfrac{x}{2} = 8$

30. $\dfrac{x}{x^2-8} = \dfrac{2}{x}$

31. $\dfrac{2x-4}{x-2} = \dfrac{4}{x-4}$

32. $\dfrac{1}{x-2} + \dfrac{1}{x+3} = \dfrac{5}{x^2+x-6}$

33. $\dfrac{5x}{x-1} - 2 = \dfrac{14}{x^2-1}$

34. $\dfrac{r}{r+4} + \dfrac{r}{r-4} = \dfrac{r^2+16}{r^2-16}$