Name: _____ Algebra 2 Date: _____ Chapter 8 Practice Test

Rational Expressions and Equations

1. The price per person of renting a banquet room varies inversely with the number of people renting the room. It costs $20 per person if 27 people rent the room. About how much will it cost per person if 34 people rent the room?

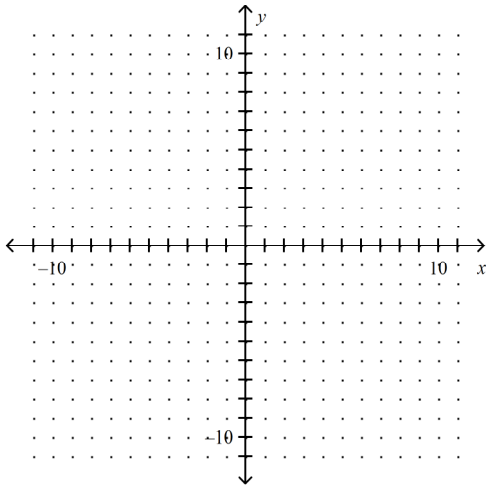
2. **The variables *x* and *y* vary inversely. Use the given values to write an equation relating *x* and *y*.**

   $x = -6, y = 3$

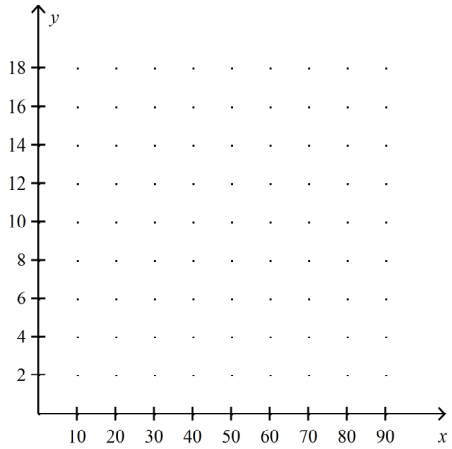
3. **Identify the vertical asymptote(s) of the graph of the function.** $f(x) = \dfrac{x^2 + 9}{x^2 - x - 20}$

4. **Simplify the rational expression, if possible.** $\dfrac{n^2 - 8n + 16}{n^2 + 2n - 24}$

5. **Graph the function.** $f(x) = \dfrac{2}{x^2 - 16}$



6. You are selling hats for a fundraiser. The cost of making the designs and buying blank hats is $425. In addition to these one time charges, the cost of printing each hat is $1.75. Let x represent the number of hats that are printed. Write a model that represents the average cost per hat. Then graph the model.



a. State the domain and range:

b. What is the average cost if 40 hats are produced?

c. If 80 hats are produced?

7. **Multiply the expressions. Simplify the result.** $\frac{4y^2}{9} \cdot \frac{18x}{13y}$

8. **Multiply the expressions. Simplify the result.** $\frac{(x-1)^2}{x+5} \cdot \frac{x^2+5x}{x^2-1}$

9. **Divide the expressions. Simplify the result.** $\frac{3k^2}{9z^3} \div \frac{k^6}{z^7}$

10. **Divide the expressions. Simplify the result.** $\dfrac{x^2+10x+21}{x^2-9} \div \dfrac{x+7}{x-7}$

11. **Perform the indicated operation(s) and simplify.** $\dfrac{-3x-3}{45x} + \dfrac{-2x+3}{45x}$

12. **Perform the indicated operation(s) and simplify.** $\dfrac{9}{x+2} + \dfrac{8}{x-2}$

13. **Perform the indicated operation(s) and simplify.** $\dfrac{3x}{x^2-16} + \dfrac{3}{x+4} - \dfrac{5}{x-4}$

14. **Solve the equation. Check for extraneous solutions.** $\dfrac{x+2}{2x} - \dfrac{1}{4x} = \dfrac{1}{8}$

15. **Solve the equation. Check for extraneous solutions.** $\dfrac{-4}{x+3} = \dfrac{5}{x-3}$

16. **Solve the equation. Check for extraneous solutions.** $\dfrac{2}{3x} + \dfrac{1}{6} = \dfrac{4}{3x}$

17. **Solve the equation. Check for extraneous solutions.** $\dfrac{k}{k+4}+\dfrac{4}{k-4}=\dfrac{2k+15}{(k+4)(k-4)}$

Sketch the graph of the function. Include any vertical or horizontal asymptotes.

18.

$y=\dfrac{1}{x-3}$