Algebra 2 Rational Functions Study Guide Name _____

**1. Describe the vertical asymptote(s) and hole(s) of the function:**

$$f(x) = \frac{(x-2)(x+6)}{(x+6)(x-3)}$$

**2. State x-intercepts of the rational function**

$$f(x) = \frac{(x-2)(x+6)}{(x+6)(x-3)}$$

**3. Determine the horizontal asymptote of the function:**

$a)\ f(x) = \dfrac{6x^2 - 8x + 15}{2x^2 + 2x - 24}$

$b)\ f(x) = \dfrac{x - 3}{x^2 + 2x - 24}$

$c)\ f(x) = \dfrac{x^2 + 2x - 24}{x - 3}$

**4. Find the y-intercept of the rational function:**

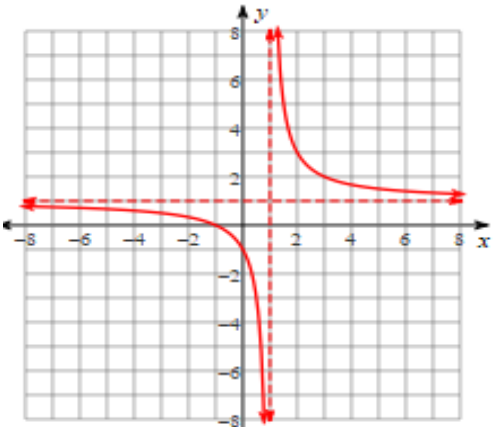
$a)\ f(x) = \dfrac{6x^2 - 8x + 24}{2x^2 + 2x - 12}$

$b)\ f(x) = \dfrac{x - 5}{x + 4}$

**5. What is the function best represents the graph?**

$a)\ f(x) = \dfrac{x-1}{x-1}$ $b)\ f(x) = \dfrac{x+1}{x+1}$

$c)\ f(x) = \frac{x-1}{x+1}$ $d)\ f(x) = \frac{x+1}{x-1}$




**6. Simplify:** $\frac{x^2-7x+12}{x^2-16}$

**7. Simplify:** $\frac{5x^2-25x}{10x^2-20x}$

**8. Multiply & Simplify when possible.**

$$\frac{x-4}{x^2-6x+9} \cdot \frac{x^2-8x+15}{x^2+2x-24}$$

**9. Multiply & Simplify when possible.**

$$\frac{5x-30}{2x+4} \cdot \frac{x^2-4}{x^2-11x+30}$$

**10. Divide & Simplify when possible.**

$$\frac{x-5}{x+5} \div \frac{x^2-7x+10}{2x+10}$$

**11. Divide & Simplify when possible.**

$$\frac{9x^2-45x}{x^2-3x-10} \div \frac{x+4}{x-2}$$

**12. Add & Simplify when possible.**

$$\frac{3x-8}{x^2-8x+12} + \frac{x-16}{x^2-8x+12}$$

**13. Add & Simplify when possible.**

$$\frac{9}{x+3} + \frac{9}{x-3}$$

**14. Subtract & Simplify when possible.**

$$\frac{6x-8}{7x+9} - \frac{6x+4}{7x+9}$$

**15. Subtract & Simplify when possible.**

$$\frac{4}{x+6} - \frac{2}{x+4}$$

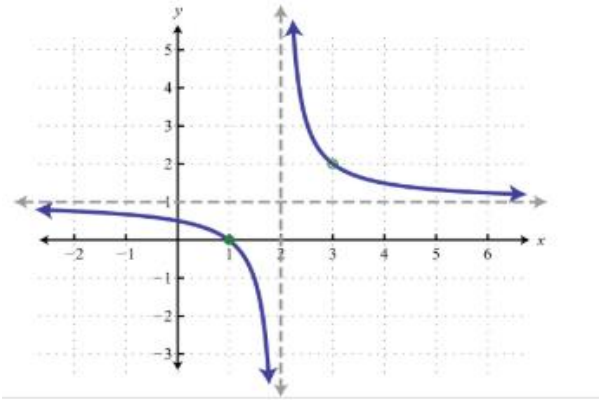
**16. Solve:**

$$\frac{4}{x+2} = \frac{x}{6}$$

**17. Solve:**

$$\frac{8x-2}{2x^2+4x} = \frac{3x}{2x^2+4x} + \frac{x-14}{2x^2+4x}$$

**18. Given the graph below, Identify the following:**




Hole: _____

x-intercept(s): _____

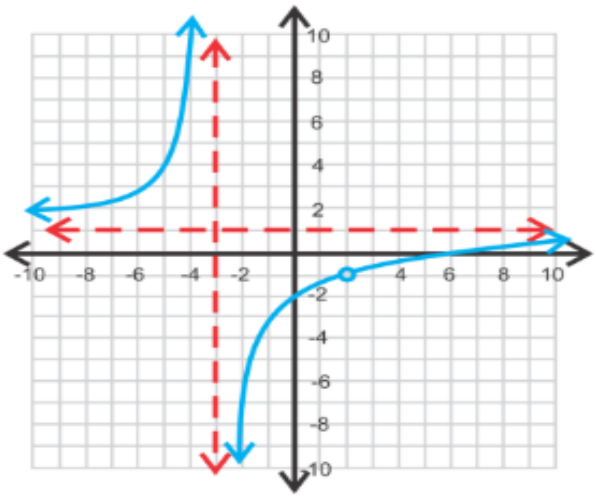
y-intercept: _____

Vertical Asymptote: _____

Horizontal Asymptote: _____

Algebra 2 Rational Functions Study Guide Name _____

**19. Given the graph below, Identify the following:**




Hole: _____

x-intercept(s): _____

y-intercept: _____

Vertical Asymptote: _____

Horizontal Asymptote: _____

**20. Fill out the following and then graph.**

$$f(x) = \frac{x^2 - x - 6}{x^2 + x - 2}$$

Factored Form:

Hole: _____

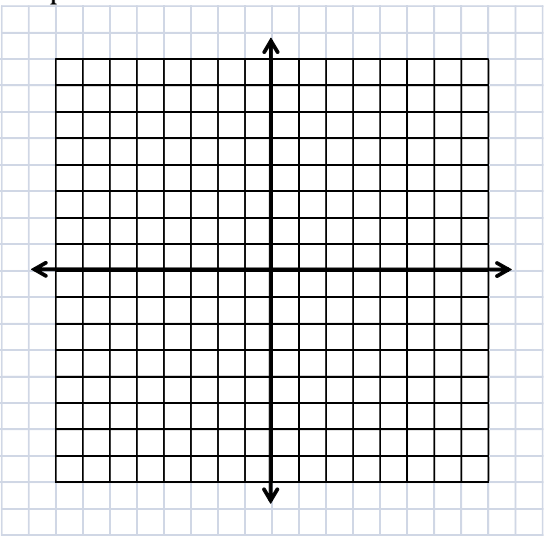
x-intercept(s): _____

VA: _____

HA _____

y-int: _____

Graph:



**21. Fill out the following and then graph.**

$$f(x) = \frac{x^2 + 5x + 4}{x^2 + 3x + 2}$$

Factored Form:

Hole: _____

x-intercept(s): _____

VA: _____

HA _____

y-int: _____

Graph: