

Simplify the following expressions. Include domain restrictions.

$$1. \frac{4y-16}{5y+15} \cdot \frac{2y+6}{4-y}$$

$$2. \frac{x^2-64}{x} \div \frac{x^3-8x^2}{x^2+x}$$

$$3. \frac{3}{x-2} + \frac{5}{2-x}$$

$$4. \frac{1}{x^2-x-2} - \frac{x}{x^2-5x+6}$$

$$5. \frac{\frac{2x^2-x-15}{2x^2+7x+5}}{\frac{x^2+2x-8}{3x^2+15x+12}}$$

Nonlinear Inequalities : Solve the inequality

$$6. 6x^2 + 5x < 4$$

$$7. \frac{x^2 + 7x + 12}{x} \geq 0$$

$$8. \frac{2}{x+1} \leq \frac{3}{x-1}$$

State the domain, holes, all asymptotes, and intercepts of the following functions and then graph them. Does the graph cross its horizontal/slant asymptote? If so, where?

9. 
$$p(x) = \frac{x+1}{x-3}$$

Domain: \_\_\_\_\_

RD: \_\_\_\_\_

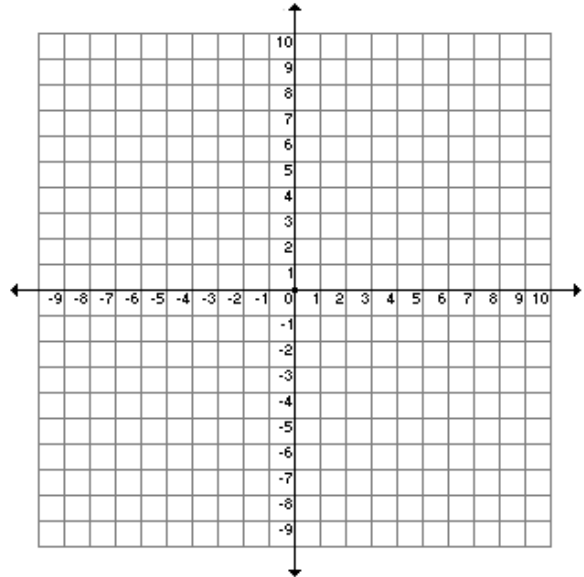
HA: \_\_\_\_\_

VA: \_\_\_\_\_

SA: \_\_\_\_\_

x-intercept(s) \_\_\_\_\_

y-intercept \_\_\_\_\_



Does the function cross the HA? \_\_\_\_\_

If yes, where: \_\_\_\_\_

10. 
$$m(x) = \frac{6x^2 - 11x + 3}{3x^2 - x}$$

Domain: \_\_\_\_\_

RD: \_\_\_\_\_

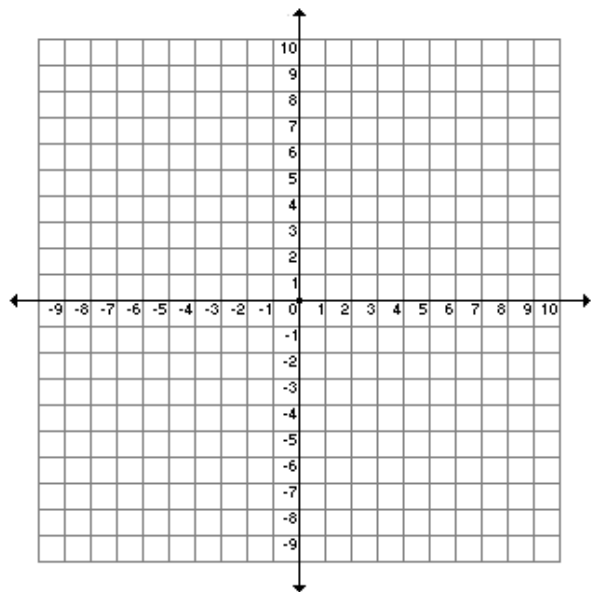
HA: \_\_\_\_\_

VA: \_\_\_\_\_

SA: \_\_\_\_\_

x-intercept(s) \_\_\_\_\_

y-intercept \_\_\_\_\_



Does the function cross the HA? \_\_\_\_\_

If yes, where: \_\_\_\_\_

11. 
$$a(x) = \frac{3x^3 - 4x^2 - 12x + 16}{3x^2 + 5x - 2}$$

Domain: \_\_\_\_\_

RD: \_\_\_\_\_

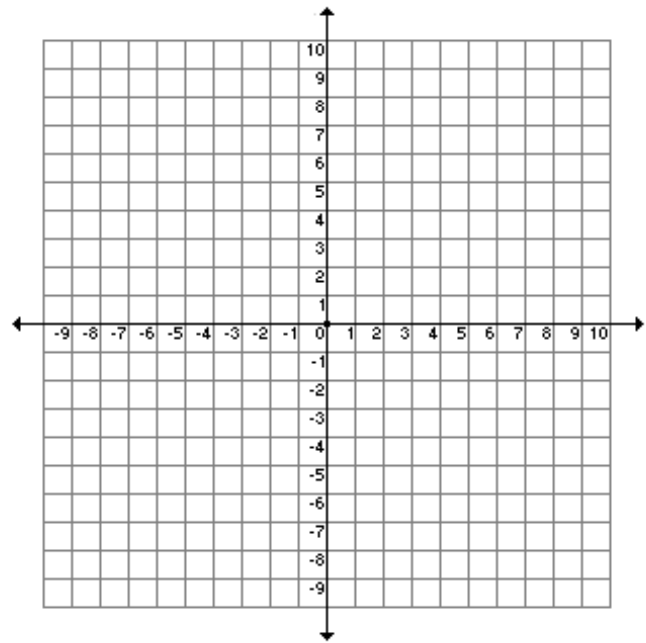
HA: \_\_\_\_\_

VA: \_\_\_\_\_

SA: \_\_\_\_\_

x-intercept(s) \_\_\_\_\_

y-intercept \_\_\_\_\_



Does the function cross the HA? \_\_\_\_\_

If yes, where: \_\_\_\_\_

12. 
$$r(x) = \frac{6x^2 - 7x - 3}{2x^2 - 7x + 6}$$

Domain: \_\_\_\_\_

RD: \_\_\_\_\_

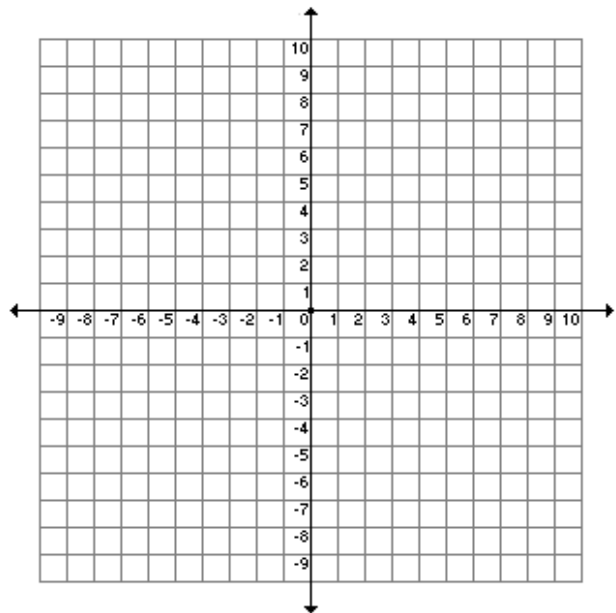
HA: \_\_\_\_\_

VA: \_\_\_\_\_

SA: \_\_\_\_\_

x-intercept(s) \_\_\_\_\_

y-intercept \_\_\_\_\_



Does the function cross the HA? \_\_\_\_\_

If yes, where: \_\_\_\_\_

13.  $f(x) = \frac{(x-3)^2}{x^2 - 5x}$

Domain: \_\_\_\_\_

RD: \_\_\_\_\_

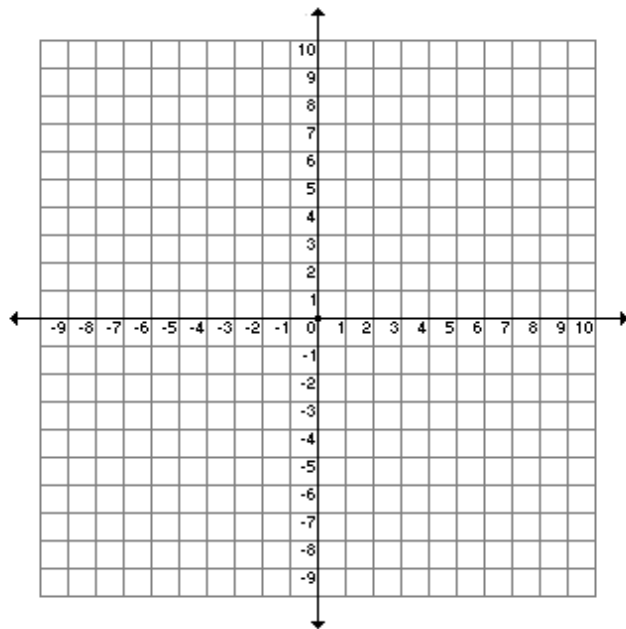
HA: \_\_\_\_\_

VA: \_\_\_\_\_

SA: \_\_\_\_\_

x-intercept(s) \_\_\_\_\_

y-intercept \_\_\_\_\_



Does the function cross the HA? \_\_\_\_\_

If yes, where: \_\_\_\_\_