

I. Find the domain.

1. $f(x) = \frac{x}{x^2 + 3x - 4}$

$$D: (-\infty, -4) \cup (-4, 1) \cup (1, \infty)$$

2. $f(x) = \frac{5x+1}{x^2+25}$

$$D: (-\infty, \infty)$$

II. Simplify Expressions AND Solve Equations. Follow the steps in your notes!!!

3. $\frac{x^2+4x+3}{x^2+6x+9} \cdot \frac{2x+6}{x+1}$

$$2$$

4. $\frac{x^2-4}{x^2-7x+10} \div \frac{x^2+6x+5}{x^2-25}$

$$\frac{x+2}{x+1}$$

5. $\frac{y}{9y^2-9} + \frac{4}{y^2+2y+1}$

$$\frac{y^2 + 37y - 36}{9(y+1)^2(y-1)}$$

6. $\frac{1 + \frac{3}{x}}{1 + \frac{4}{x} + \frac{3}{x^2}}$

$$\frac{x}{x+1}$$

7. $\frac{2n}{4+n} - \frac{2}{5} = 4$

$$n = -7.3$$

8. $\frac{k}{k-4} + k = \frac{12-4k}{k-4}$

$$k = -4, 3$$

9. Given $P(x) = \frac{3-x^2}{x^3-2x^2+4}$, find $P(-1)$.

$$2$$

10. $\frac{-7a^5 - 14a^4 + 21a^3}{-7a^3}$

$$(a+3)(a-1)$$

$$11. \frac{3x^2 + 6x}{4x^2 - 16} \cdot \frac{2x + 8}{x^2 + 2x} \div \frac{3x - 9}{5x - 20}$$

$$\frac{5(x+4)(x-4)}{2(x+2)(x-2)(x-3)}$$

$$12. \frac{x-2}{5} = \frac{1}{x+2}$$

$$x = \pm 3$$

$$13. \frac{3x}{x-2} - 2 + \frac{4}{x+2} = 2$$

$$x = 5 \pm \sqrt{33}$$

17. To balance a seesaw, the distance, d (in feet), a person is from the fulcrum is inversely proportional to his or her weight, w (in pounds). Roger, who weighs 120 pounds, is sitting 6 feet away from the fulcrum. Ellen weighs 108 pounds. How far from the fulcrum must she sit to balance the seesaw?

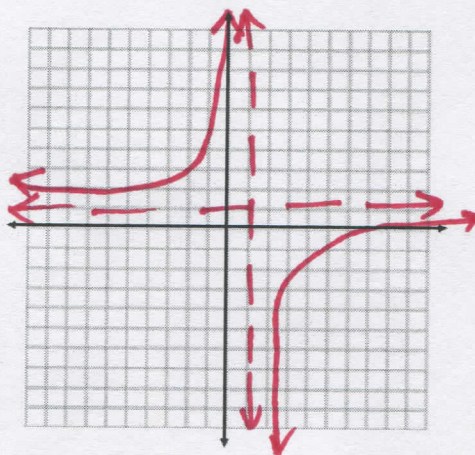
$$d = \frac{720}{w}$$

$$k = 720$$

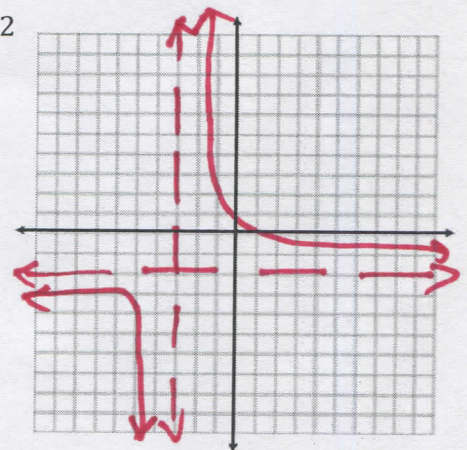
$$6.667 \text{ ft}$$

Graph a sketch of the following polynomial

$$19. y = 1 - \frac{3}{x-1}$$



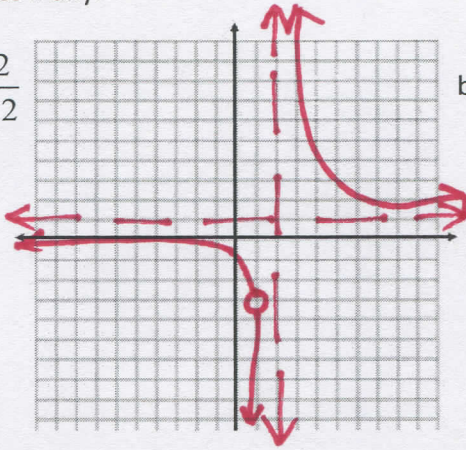
$$20. y = \frac{1}{x+3} - 2$$



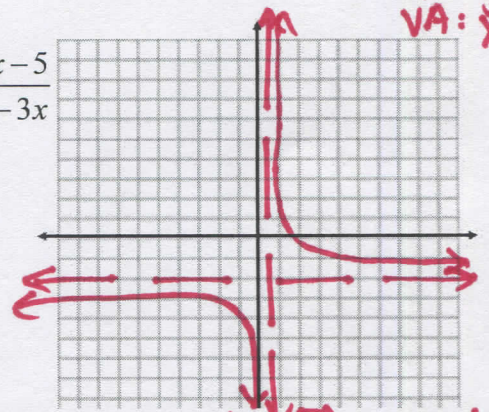
25. Graph the following on graph paper labeling x & y intercepts, vertical asymptotes, horizontal asymptotes, and holes if any.

Hole: none
 HA: $y = -2$
 VA: $x = \frac{2}{3}$

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

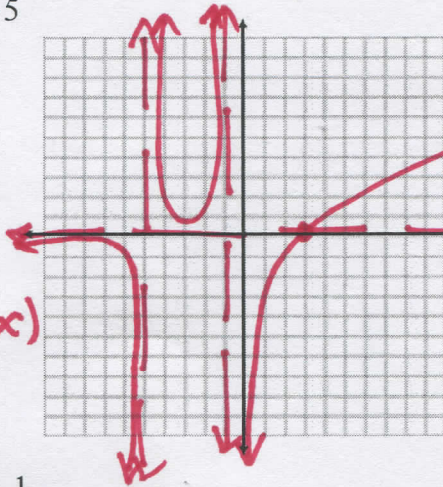


b) $g(x) = \frac{6x - 5}{2 - 3x}$

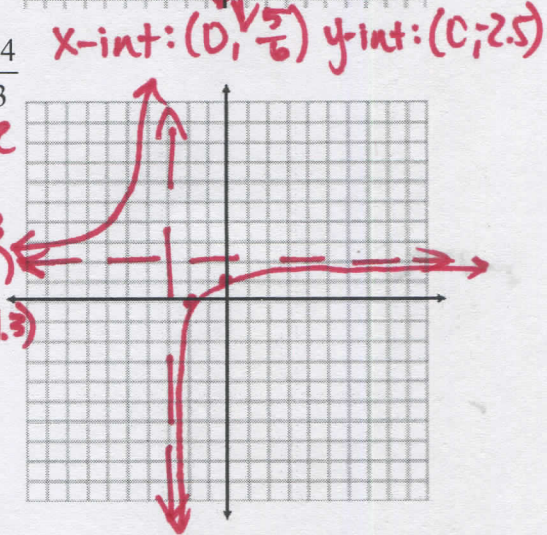


Holes: $(1, -3)$
 VA: $x = 2$
 HA: $y = 1$
 X-int: $(-2, 0)$
 y-int: $(0, -1)$
 D: $(-\infty, 1) \cup (1, 2) \cup (2, \infty)$

c) $f(x) = \frac{x - 3}{x^2 + 6x + 5}$



d) $g(x) = \frac{2x - 4}{x + 3}$



Hole: none
 HA: $y = 0$
 VA: $x = -1, -5$
 X-int: $(3, 0)$
 y-int: $(0, -0.6)$
 D: $(-\infty, -5) \cup (-5, -1) \cup (-1, \infty)$
 R: $(-\infty, 0) \cup (0, \infty)$

Hole: none
 HA: $y = 2$
 VA: $x = -3$
 X-int: $(2, 0)$
 y-int: $(0, -1.3)$

26. Simplify.

a) $\frac{1}{x^2 z^3} + \frac{2}{4xyz} - \frac{1}{24xy^2}$

$$\frac{24y^2 + 12xyz^2 - z^3}{24x^2 y^2 z^3}$$

b) $\frac{2}{12a^2 b} + \frac{1}{20ab^2}$

$$\frac{10b + 3a}{60a^2 b^2}$$

27. What affects your domain and range?

Hole $(x, y) \hat{=}$ VA \rightarrow hole $(x, y) \hat{=}$ HA