

$$1) \frac{(a-2)(a^2+2a+4)}{(a^2+2a+4)} = \boxed{a-2}$$

$$2) \frac{(x+7)(x+2)}{(x+7)(x-4)} = \boxed{\frac{x+2}{x-4}} \quad x \neq 4, x \neq -7$$

$$3) \frac{a^2}{8b^3} \cdot \frac{3b^5}{8a^3} = \frac{3a^2b^5}{64a^3b^3} = \boxed{\frac{3b^2}{64a}} \quad a \neq 0 \quad b \neq 0$$

$$4) \frac{a}{a+3} \cdot \frac{(a-5)(a+3)}{a(a-1)} = \boxed{\frac{a(a-5)}{a-1} \text{ or } \frac{a^2-5a}{a-1}} \quad \begin{array}{l} a \neq 1 \quad a \neq 0 \\ a \neq -3 \end{array}$$

$$5) \frac{(x+2)(x-1)}{x+3} \cdot \frac{(x-10)(x+3)}{(2x+1)(x-1)} = \boxed{\frac{(x+2)(x-10)}{2x+1} \text{ or } \frac{x^2-8x-20}{2x+1}}$$

$x \neq -3, x \neq -\frac{1}{2}, x \neq 1$

$$6) \frac{w+2}{w+1} \div \frac{w-5}{(w+2)(w+1)} \rightarrow \boxed{\frac{w^2+4w+4}{w-5} \text{ or } \frac{(w+2)(w+2)}{w-5}}$$

$\boxed{w \neq -1} \quad \boxed{w \neq -2} \quad \boxed{w \neq -1}$

$$7. \frac{(w-3)(w+3)}{(w+2)(w+3)} \cdot \frac{(w+5)(w-4)}{(w+5)(w-3)} = \boxed{\frac{w-4}{w+2}} \quad \begin{array}{l} w \neq -2 \\ w \neq -3 \\ w \neq -5 \\ w \neq 4 \end{array}$$

$$8. \frac{7(c-4)}{c-4} + \frac{1}{(c-4)(c+4)} = \frac{7c-28}{(c+4)(c-4)} + \frac{1}{(c+4)(c-4)} = \boxed{\frac{7c-27}{(c+4)(c-4)}} \quad \begin{array}{l} c \neq -4, c \neq 4 \end{array}$$

$$9. \frac{(c-5)(c-2)}{(c-7)(c-2)} + \frac{(c-5)(c-7)}{(c-5)(c-1)}$$

$$\frac{(c-2)}{(c-2)} \frac{c-5}{c-7} + \frac{c-7}{c-1} \frac{(c-7)}{(c-7)} = \frac{c^2 - 6c + 5}{(c-1)(c-7)} + \frac{c^2 - 14c + 49}{(c-1)(c-7)}$$

$$= \frac{2c^2 - 20c + 54}{(c-1)(c-7)} = \boxed{\frac{2(c^2 - 10c + 27)}{(c-1)(c-7)}}$$

$c \neq 7, c \neq 2,$   
 $c \neq 5, c \neq 1$

$$10. \frac{(w-8)(w-3)}{(w-4)(w-3)} - \frac{3}{w-4} = \boxed{\frac{w-11}{w-4}} \quad w \neq 4, w \neq 3$$



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

$$\begin{array}{r} -2x - 10 = 2x - 10 \\ -2x + 6 \quad -2x + 6 \\ \hline -4x = -4 \end{array}$$

$$-4x = -4$$

$$\boxed{x = 1}$$

12.  $\frac{1}{2d} + \frac{6}{5d} = -3$

$$\frac{5}{10d} + \frac{12}{10d} = -3$$

$$\frac{17}{10d} = -3$$

$$17 = -30d$$

$$\boxed{d = -17/30}$$

13.  $\frac{x}{x^2 - 25} + \frac{4(x+5)}{x-5(x+5)} = \frac{1(x-5)}{x+5(x-5)}$

$$\frac{x}{x^2 - 25} + \frac{4x+20}{(x-5)(x+5)} = \frac{x-5}{(x+5)(x-5)}$$

$$x + 4x + 20 = x - 5$$

$$5x + 20 = x - 5$$

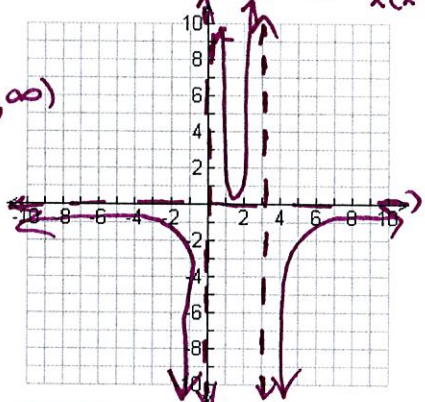
$$4x = -25$$

$$\boxed{x = -25/4}$$

$$x \neq 5, x \neq -5$$

For each graph below, state all that apply: Point of Discontinuity/Holes, Vertical Asymptotes, Horizontal Asymptotes, Domain and Range.

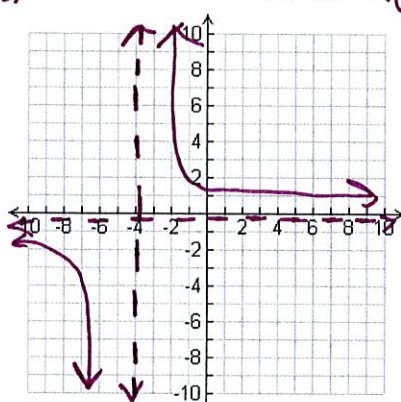
14.)  $f(x) = -\frac{4}{x^2-3x} = \frac{-4}{x(x-3)}$



Domain:  $(-\infty, 0) \cup (0, 3) \cup (3, \infty)$   
 Range:  $(-\infty, 0) \cup (0, \infty)$

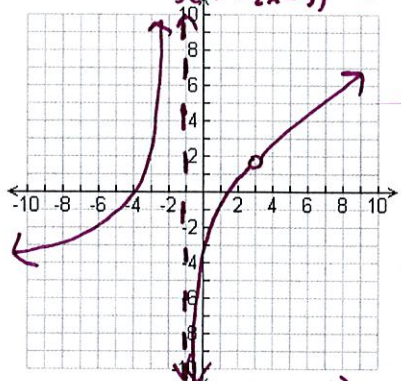
Hole: none  
 V.A.:  $x=0, x=3$   
 H.A.:  $y=0$

15.)  $g(x) = \frac{x-4}{-4x-16} = \frac{x-4}{-4(x+4)}$



Hole: none  
 V.A.:  $x=-4$   
 H.A.:  $y=-1/4$   
 Domain:  $(-\infty, -4) \cup (-4, \infty)$   
 Range:  $(-\infty, 0) \cup (0, \infty)$

16.)  $h(x) = \frac{x^3-9x}{3x^2-6x-9} = \frac{x(x-3)(x+3)}{3(x-3)(x+1)}$



Hole:  $(3, 1.5)$   
 V.A.:  $x=-1$   
 H.A.: none  
 Domain:  $(-\infty, -1) \cup (-1, 3) \cup (3, \infty)$   
 Range:  $(-\infty, \infty)$

Simplify the complex fraction.

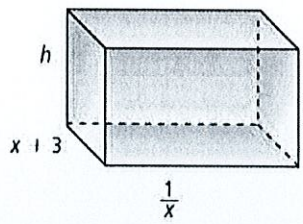
17.)  $\frac{\frac{3}{y} - \frac{2}{2y}}{\frac{4}{y} + \frac{4}{4y}}$

18.)  $\frac{\frac{1}{x+2}}{\frac{2}{x-5}}$

19.)  $\frac{\frac{d+5}{d^2+11d+24}}{\frac{d+2}{d+3}}$

20.)  $\frac{x + \frac{4x}{y}}{\frac{7}{3x}}$

21.) Given the volume is  $V = \frac{x^2+x-6}{x}$ , write an expression that represents the height of the prism below:



$\frac{x+3}{1} \cdot \frac{1}{x} = \frac{x+3}{x}$

$\frac{x^2+x-6}{x} \div \frac{x+3}{x}$

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

22.) Chad can paint a room in 6 h. Cassie can paint the room in 9 h. How long would it take them to paint the room working together?

$\frac{x}{6} + \frac{x}{9} = 1$

$\frac{5x}{18} = 1$

$5x = 18$

$x = 3.6 \text{ hours}$

$\frac{3x}{18} + \frac{2x}{18} = 1$