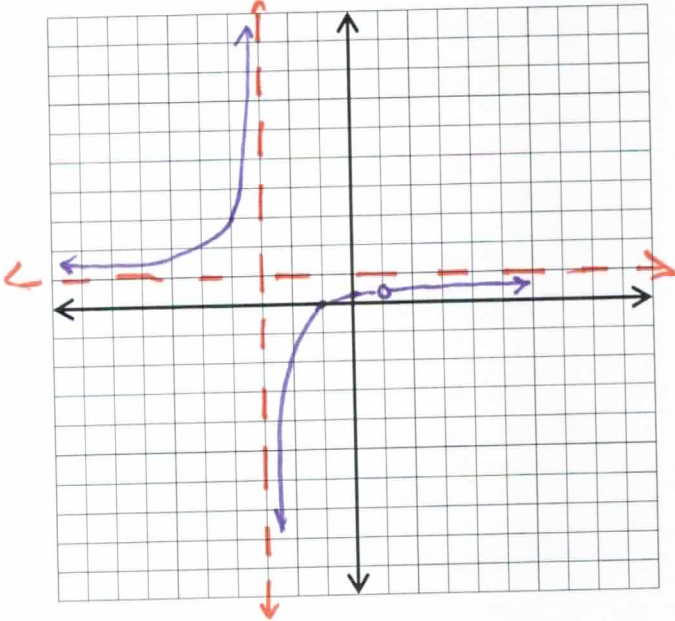


Graph each function and list the domain, equations of asymptotes, coordinates of removable discontinuities, and intercepts.

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

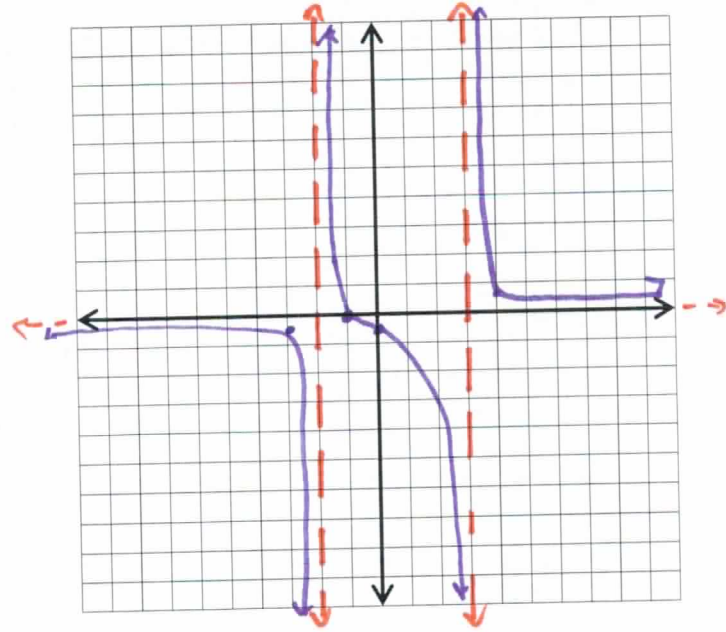
RD $(-1, \frac{1}{2})$ x.int $(-1, 0)$
 VASY $x = -3$ y.int $(0, \frac{1}{3})$
 HASY $y = 1$



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

VASY $x = 3, -2$ y.int $(0, -1/6)$
 HASY $y = 0$
 x.int $(-1, 0)$

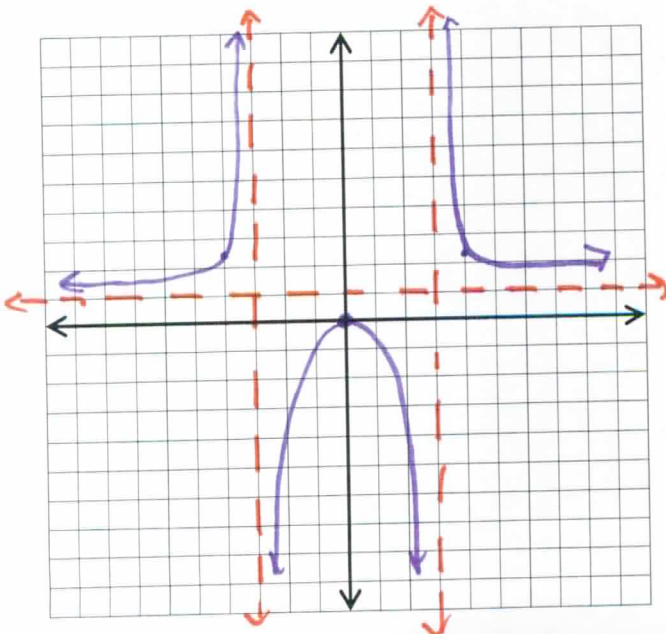
x	y
-3	-2/6
4	5/6



3. $f(x) = \frac{x^2}{x^2 - 9} = \frac{x^2}{(x+3)(x-3)}$

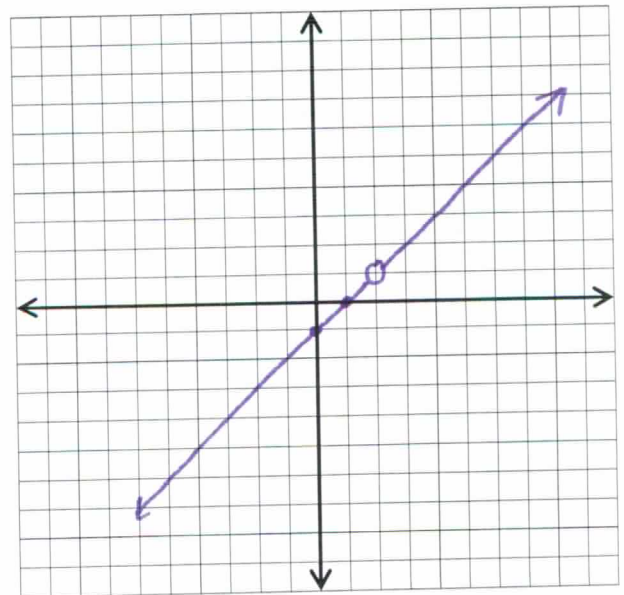
VASY $x = -3, 3$ x.int $(0, 0)$
 HASY $y = 1$

x	y
4	16/7
-4	16/7



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

RD $(2, 1)$



Simplify.

$$5. \frac{x^2 - 2x + 1}{x^3 + x} \cdot \frac{4x^2 + 4}{x^2 + x - 2}$$

$$\frac{(x-1)(x-1)}{x(x^2+1)} \cdot \frac{4(x^2+1)}{(x+2)(x-1)}$$

$$\boxed{\frac{4(x-1)}{x(x+2)}}$$

$$7. \frac{(x+1)x-2}{(x+1)x-1} - \frac{x-3}{x^2-1}$$

$$\frac{x^2 - x - 2 - (x-3)}{(x+1)(x-1)}$$

$$\frac{x^2 - 2x + 1}{(x+1)(x-1)}$$

$$\frac{(x-1)(x-1)}{(x+1)(x-1)}$$

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

$$6. \frac{2 - \frac{x+1}{(x+1)(x)}}{\frac{x}{3 + \frac{x-7}{x+1}}}$$

$$\frac{2(x^2+x) - (x+1)(x+1)}{3(x^2+x) + x(x-7)} = \frac{2x^2+2x-x^2-2x-1}{3x^2+3x+x^2-7x}$$

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

$$8. \frac{-x+11}{x^2+8x+7} + \frac{x-1}{x+1} \cdot \frac{(x+7)}{(x+7)}$$

$$\frac{-x+11 + x^2+6x-7}{(x+1)(x+7)}$$

$$\frac{x^2+5x+4}{(x+1)(x+7)} = \frac{(x+1)(x+4)}{(x+1)(x+7)}$$

$$\boxed{\frac{x+4}{x+7}}$$

Solve each equation. Identify any extraneous solutions.

$$9. \left(\frac{3}{x-2} = \frac{1}{x-1} + \frac{7}{x^2-3x+2} \right) (x-2)(x-1)$$

$$3(x-1) = (x-2) + 7$$

$$3x-3 = x+5$$

$$2x = 8$$

$$\boxed{x = 4}$$

$$10. \left(\frac{5}{x+4} = 4 + \frac{3}{x-2} \right) (x+4)(x-2)$$

$$5(x-2) = 4(x^2+2x-8) + 3(x+4)$$

$$5x-10 = 4x^2+8x-32+3x+12$$

$$0 = 4x^2+6x-10$$

$$0 = 2(2x^2+3x-5)$$

$$0 = (2x+5)(x-1)$$

$$\boxed{x = -5/2, 1}$$