

Solve each inequality.

$$1) \frac{x-4}{x-8} < 0$$
$$(4, 8)$$

$$2) \frac{x-7}{x+8} \leq 0$$
$$(-8, 7]$$

$$3) \frac{x-5}{x+7} > 0$$
$$(-\infty, -7) \cup (5, \infty)$$

$$4) \frac{x-8}{x+8} \geq 0$$
$$(-\infty, -8) \cup [8, \infty)$$

$$5) \frac{x+2}{x-1} > 0$$
$$(-\infty, -2) \cup (1, \infty)$$

$$6) \frac{x+2}{x-5} > 0$$
$$(-\infty, -2) \cup (5, \infty)$$

$$7) \frac{x+4}{(x+6)(x+2)} \geq 0$$
$$(-6, -4] \cup (-2, \infty)$$

$$8) \frac{(x+3)(x-2)}{x-5} > 0$$
$$(-3, 2) \cup (5, \infty)$$

$$9) \frac{x-8}{(x+5)(x-7)} < 0$$
$$(-\infty, -5) \cup (7, 8)$$

$$10) \frac{(x-6)(x-5)}{x-7} > 0$$
$$(5, 6) \cup (7, \infty)$$

Review - Unit 3

Name _____

Simplify each expression.

1) $\frac{5}{9n+24} \div \frac{5}{15n+40} = \frac{5}{3}$

2) $\frac{8n-48}{8n-40} \cdot \frac{n-5}{n+8} = \frac{n-6}{n+8}$

3) $\frac{n^2-6n+9}{2} \cdot \frac{5n}{n^2-6n+9} = \frac{5n}{2}$

4) $\frac{7}{21x+56} \div \frac{4}{21x+56} = \frac{7}{4}$

5) $\frac{2n-6n^2}{6n^2-2n} \div \frac{7}{5n} = \frac{5n}{7}$

6) $\frac{1}{a+8} \cdot \frac{a^2+a-20}{a+5} = \frac{a-4}{a+8}$

7) $\frac{1}{n-1} \cdot \frac{n^2+4n-5}{7n^3-35n^2} = \frac{n+5}{7n^2(n-5)}$

8) $\frac{k^2+15k+56}{k+7} \cdot \frac{1}{k-1} = \frac{k+8}{k-1}$

9) $\frac{x+1}{x^2-5x-6} \div \frac{x+8}{8x-48} = \frac{8}{x+8}$

10) $\frac{4}{4x-8} \cdot \frac{x^2-x-2}{7} = \frac{x+1}{7}$

11) $\frac{x+4}{x-5} \div \left(\frac{x}{x} + \frac{x}{x+4} \right) = \frac{x^3+8x^2+16x}{2x^2-x-20}$

12) $\frac{9}{\frac{x}{3} + \frac{5}{3x}} = \frac{27x}{x^2+5}$

$$15) \frac{5}{m-8} + \frac{8}{8m^3} = \frac{5m^3 + m - 8}{m^3(m-8)}$$

$$16) \frac{5v}{2v} - \frac{v-2}{6v+2} = \frac{14v+7}{2(3v+1)}$$

$$17) \frac{r-1}{r+1} + \frac{6}{r+3} = \frac{r^2 + 8r + 3}{(r+3)(r+1)}$$

$$18) \frac{3}{7} + \frac{5k-7}{k-2} = \frac{38k-55}{7(k-2)}$$

$$19) \frac{7}{n-8} - \frac{5n}{n+4} = \frac{47n+28-5n^2}{(n-8)(n+4)}$$

$$20) \frac{8}{k+4} + \frac{4}{7k-3} = \frac{60k-8}{(7k-3)(k+4)}$$

-1-

$$21) \frac{a+2}{2a^2+14a} + \frac{3a}{3} = \frac{2a^3 + 14a^2 + a + 2}{2a(a+7)}$$

$$22) \frac{2n}{5n-3} - \frac{4}{7} = \frac{-6n+12}{7(5n-3)}$$

$$23) \frac{2n}{5n-2} + \frac{2n}{n-8} = \frac{12n^2 - 20n}{(n-8)(5n-2)}$$

$$24) \frac{6v}{7} - \frac{v-6}{5v^2-34v+24} = \frac{30v^2 - 24v - 7}{7(5v-4)}$$

Solve each equation. Remember to check for extraneous solutions.

Show all

$$23) \frac{2n}{5n-2} + \frac{2n}{n-8}$$

$$\frac{2a(a+7)}{(n-8)(5n-2)}$$

$$24) \frac{6v}{7} - \frac{v-6}{5v^2-34v+24}$$

$$\frac{30v^2-24v-7}{7(5v-4)}$$

Solve each equation. Remember to check for extraneous solutions.

$$25) \frac{1}{x} - \frac{1}{2x^2} = \frac{1}{2x}$$

$$\{1\}$$

$$26) \frac{1}{b^2} = \frac{1}{5b^2} - \frac{1}{5b}$$

$$\{-4\}$$

$$27) \frac{v+2}{4v+1} = 1 - \frac{v+8}{4v+1}$$

$$\left\{ \begin{array}{l} 9 \\ 2 \end{array} \right\}$$

$$28) \frac{8}{m^2-m-6} + \frac{7}{m-3} = \frac{1}{m+2}$$

$$\left\{ \begin{array}{l} 25 \\ -6 \end{array} \right\}$$

$$29) \frac{m-7}{m^2+3m} - \frac{1}{m^2+3m} = \frac{6}{m+3}$$

$$\left\{ \begin{array}{l} -8 \\ -5 \end{array} \right\}$$

$$30) \frac{3}{x^2+4x-12} = \frac{1}{x^2+4x-12} - \frac{1}{x}$$

$$\{-8\}$$

$$31) \frac{b-6}{b^2+b} = \frac{b-1}{b^3+b^2} + \frac{1}{b^3+b^2}$$

$$\{7\}$$

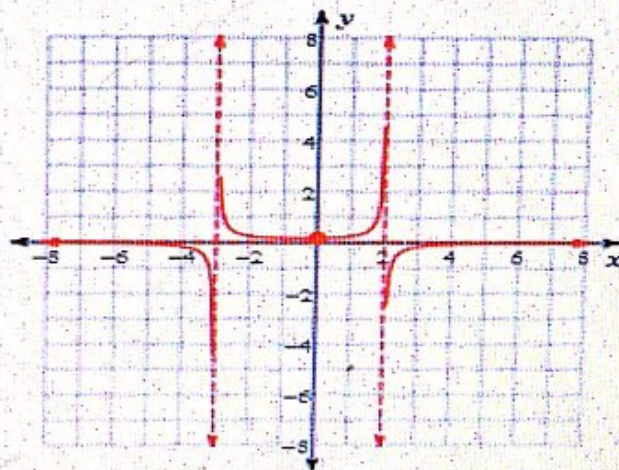
$$32) \frac{3}{r^2-8r} = \frac{4r}{r-8} + \frac{2}{r^2-8r}$$

$$\left\{ \begin{array}{l} 1 \\ 2 \end{array} \right\}$$

Identify the holes, vertical asymptotes, x-intercepts, horizontal asymptote, and domain of the function. Then sketch the graph.

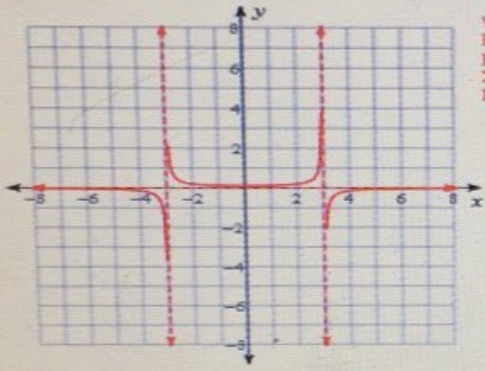
Identify the holes, vertical asymptotes, x-intercepts, horizontal asymptote.
Then sketch the graph.

$$33) f(x) = -\frac{x}{x^3 + x^2 - 6x}$$



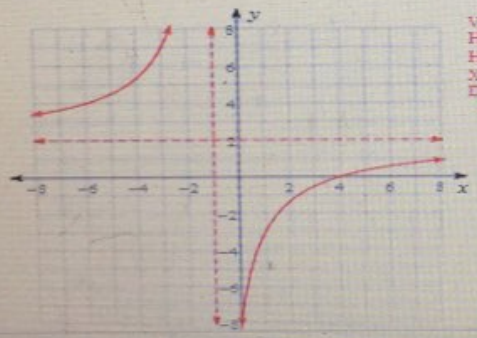
Vertical Asym.: $x = 2, x = -3$
 Holes: $x = 0$
 Horz. Asym.: $y = 0$
 X-intercepts: None
 Den. sin.:
 All reals except $-3, 0, 2$

34) $f(x) = \frac{1}{-x^2 + 9}$



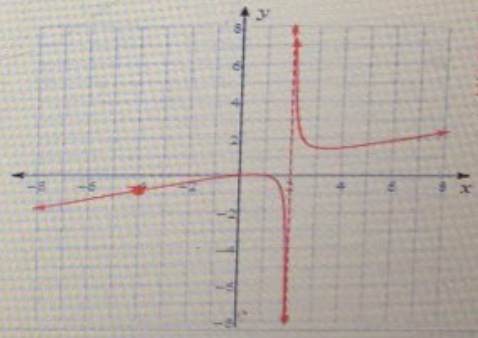
Vertical Asym: $x = 3, x = -3$
 Holes: None
 Horz. Asym: $y = 0$
 X-intercepts: None
 Domain: All reals except $-3, 3$

35) $f(x) = \frac{2x - 8}{x + 1}$

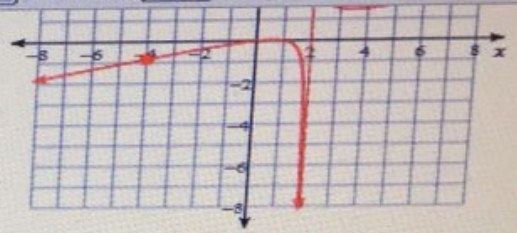
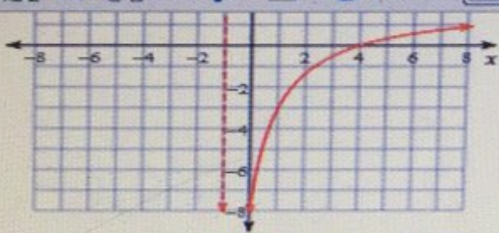


Vertical Asym: $x = -1$
 Holes: None
 Horz. Asym: $y = 2$
 X-intercepts: 4
 Domain: All reals except -1

36) $f(x) = \frac{x^3 + 3x^2 - 4x}{4x^2 + 8x - 32}$

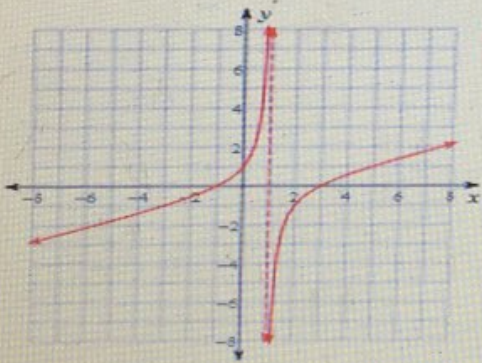


Vertical Asym: $x = 2$
 Holes: $x = -4$
 Horz. Asym: None
 X-intercepts: 0, 1
 Domain: All reals except $-4, 2$



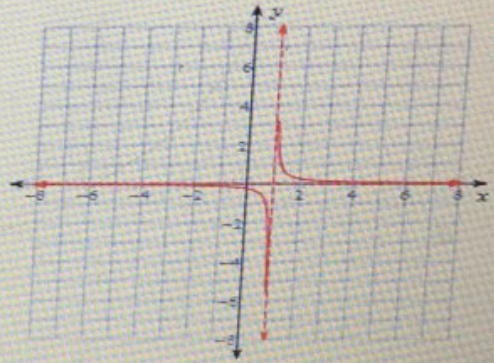
Identify the holes, vertical asymptotes, and horizontal asymptote of each. Then sketch the graph.

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



Vertical Asym: $x = 1$
 Holes: None
 Horiz Asym: None

38) $f(x) = \frac{1}{4x - 4}$



Vertical Asym: $x = 1$
 Holes: None
 Horiz Asym: $y = 0$