

Simplify each expression.

1) $\frac{1}{k+8} \cdot \frac{k^2 + 17k + 72}{k+10}$

$$\frac{k+9}{k+10}$$

2) $\frac{5x^3 + 10x^2}{12x^2} \cdot \frac{x-1}{5x^3 - 5x^2}$

$$\frac{x+2}{12x^2}$$

3) $\frac{3v-6}{v-2} \div \frac{1}{v+8}$

$$3(v+8)$$

4) $\frac{7x-21}{x^2-10x+21} \div \frac{4x-12}{4x-28}$

$$\frac{7}{x-3}$$

5) $\frac{3}{5x+5} + \frac{5x}{x+5}$

$$\frac{28x+15+25x^2}{5(x+5)(x+1)}$$

6) $\frac{3v}{v+1} - \frac{6}{2v-5}$

$$\frac{6v^2 - 21v - 6}{(2v-5)(v+1)}$$

7) $\frac{2}{3r^3} + \frac{6r}{r+3}$

$$\frac{2r+6+18r^4}{3r^3(r+3)}$$

8) $\frac{\frac{3x+4}{9} + \frac{3x+4}{9}}{\frac{3x+4}{3x}}$

$$\frac{2x}{3}$$

9) $\frac{x+3}{\frac{5}{x-5} + \frac{x+3}{25}}$

$$\frac{25x^2 - 50x - 375}{110 + x^2 - 2x}$$

10) $\frac{\frac{9}{x} - \frac{25}{x^2}}{\frac{1}{5} + \frac{x-1}{x}}$

$$\frac{45x - 125}{6x^2 - 5x}$$

Solve each equation. Remember to check for extraneous solutions.

11) $\frac{2}{n} = \frac{1}{2n^2} + \frac{1}{2n}$

$$\left\{ \frac{1}{3} \right\}$$

12) $\frac{5}{3x-9} - \frac{x-5}{x-3} = \frac{1}{3}$

$$\left\{ \frac{23}{4} \right\}$$

13) $\frac{x^2 - 2x - 3}{4x} - \frac{x-6}{4} = \frac{1}{x}$

$$\left\{ \frac{7}{4} \right\}$$

14) $1 + \frac{1}{n} = \frac{4n+4}{n^2}$

$$\{4, -1\}$$

Solve each question. Round your answer to the nearest hundredth.

- 15) Working alone, Jasmine can dig a 10 ft by 10 ft hole in eight hours. Emily can dig the same hole in nine hours. If they worked together how long would it take them?

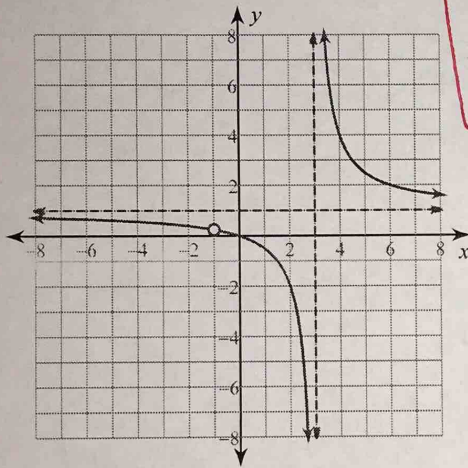
4.24 hours

- 16) Working alone, Mei can clean an attic in 11 hours. One day her friend Anjali helped her and it only took 6.35 hours. Find how long it would take Anjali to do it alone.

15.02 hours

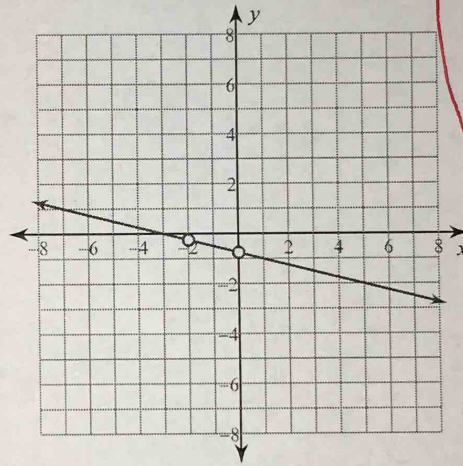
Identify the holes, vertical asymptotes, and horizontal asymptote of each. Then sketch the graph.

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



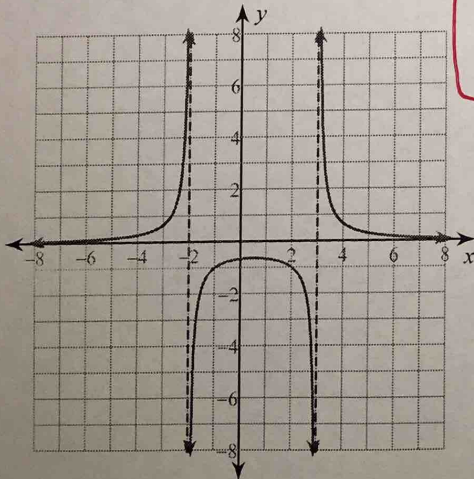
Vertical Asym.: $x = 3$
Holes: $x = -1$
Horz. Asym.: $y = 1$

18) $f(x) = \frac{x^3 + 5x^2 + 6x}{-4x^2 - 8x}$



Vertical Asym.: None
Holes: $x = 0, x = -2$
Horz. Asym.: None

19) $f(x) = \frac{4}{x^2 - x - 6}$



Vertical Asym.: $x = 3, x = -2$
Holes: None
Horz. Asym.: $y = 0$