

Bellwork: ACT PREP!!!

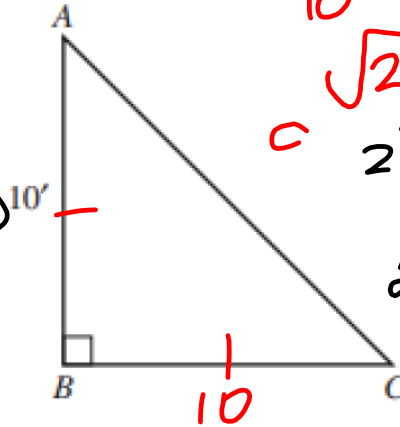
$$a^2 + b^2 = c^2$$

In the ~~isosceles right triangle~~ below, $AB = 10$ feet. What is the length, in feet, of AC ___?

A. 5

B. 10

C. 20

D. $\sqrt{20}$ E. $10\sqrt{2}$ 

$$10^2 + 10^2 = c^2$$

$$\sqrt{200} = c$$

$$\begin{array}{r} 2 \overline{) 100} \\ \underline{4} \\ 60 \\ \underline{40} \\ 20 \\ \underline{20} \\ 0 \end{array}$$

$$5 \cdot 2\sqrt{2}$$

$$10\sqrt{2} = c$$

Homework 4.4 Solutions

Homework 4.5 Solutions

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

2) $\frac{4}{r} = \frac{3}{2r^2} - \frac{2}{r}$
 $\frac{1}{4}$

3) $\frac{1}{x+3} + \frac{x+5}{x^2+3x} = \frac{x-5}{x^2+3x}$
 (-10)

4) $\frac{x-6}{x^2-5x} = \frac{1}{x-5} - \frac{1}{x}$
 (11)

5) $\frac{2x-4}{x^2-3x-10} - \frac{6}{x^2-3x-10} = \frac{x+1}{x+2}$
 (1)

6) $\frac{n-4}{n^2+5n} + \frac{n+2}{n^2+5n} = 1$
 (-2, -1)

7) $\frac{2x+10}{3x} + \frac{x+1}{3x^2} = \frac{1}{3x^2}$
 $\left(-\frac{11}{2}\right)$

8) $\frac{1}{3} = \frac{2}{n^2-4n} + \frac{1}{n}$
 (6, 1)

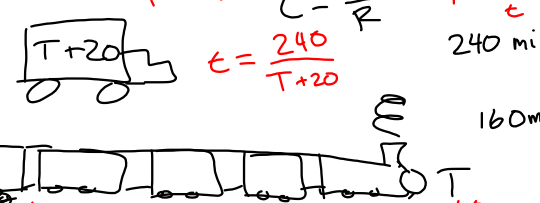
9) A loaded moving truck is traveling 20 mph faster than a freight train. In the time it takes the train to travel 160 miles, the truck travels 240 miles. Find the speed of the truck.
 60 mph

10) The average cost per unit $C(x)$ to produce x units of plywood is given by $C(x) = \frac{300}{x} + 10$,
 a) What is the cost per unit when 590 units are produced?
 b) If the cost per unit is \$1.50, how many units have been produced?
 a) \$0.50 b) 190

11) $\frac{x^2-16}{x^2+7x+12}$
 $\frac{x-4}{x+3}; [-4, -3]$

12) $\frac{-b^2+12b-20}{b-2} \div \frac{b^2-3b-70}{3b-6}$
 $\frac{-3(b-2)}{b+7}$

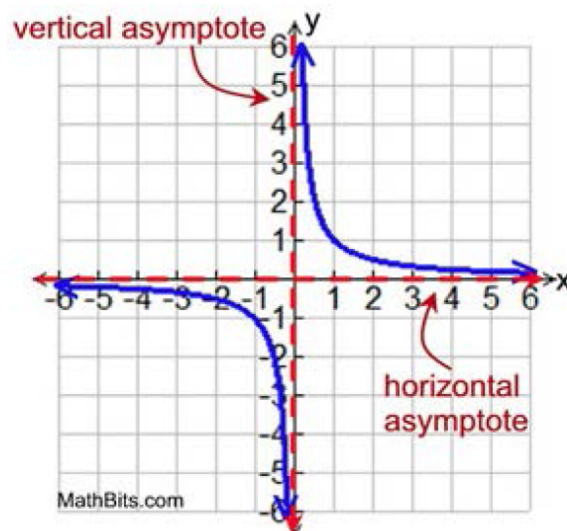
7) $\frac{2x+10}{3x} + \frac{x+1}{3x^2} = \frac{1}{3x^2}$ 1. $x \neq 0$
 2. LCD: $3x \cdot x = 3x^2$
 $x(2x+10) + x+1 = 1$
 $2x^2 + 10x + x + 1 = 1$
 $2x^2 + 11x = 0$
 $x(2x+11) = 0$
 $x = 0$ or $2x+11=0$ $x = -\frac{11}{2}$

9) $R \cdot t = D$ $t = \frac{D}{R}$ $R = \frac{D}{t}$
 240 mi

 $\frac{240}{T+20} = \frac{160}{T}$ $t = \frac{160}{T}$
 LCD: $T(T+20)$
 $240T = 160(T+20)$
 $240T = 160T + 3200$ $80T = 3200$
 $T = 40$ Truck = $40+20 = 60$ mph

Today's Objectives:

I can graph rational functions

$$f(x) = \frac{1}{x}$$



- X-intercepts: when numerator equals 0 $\leftarrow (, 0)$
- Y-intercepts: when $x = 0$ $\leftarrow (0,)$
- Vertical asymptote: when denominator equals 0

Horizontal Asymptotes

- 1. If degree of numerator $<$ degree of denominator asymptote at $y = 0$. $\frac{1}{x}$
- 2. If degree of numerator = degree of denominator asymptote at $y = \frac{\text{lead coefficient num.}}{\text{lead coefficient den.}}$ $\frac{2x}{3x}$
- 3. If degree of numerator $>$ degree of denominator asymptote is oblique. $\frac{2x^2 + 1}{x}$

$$\bullet \frac{x+1}{x^2-25} \quad 1 < 2 \quad \textcircled{1} \quad y=0$$

$$\bullet \frac{3x-2}{5x+3} \quad 1 = 1 \quad \textcircled{2} \quad y = \frac{3}{5}$$

$$\bullet \frac{x^2-5x+6}{x+2} \quad 2 > 1 \quad \textcircled{3}$$

x-int: NA
 y-int: $(0, -\frac{1}{2})$
 vert: $x=4$
 horz: $y=0$

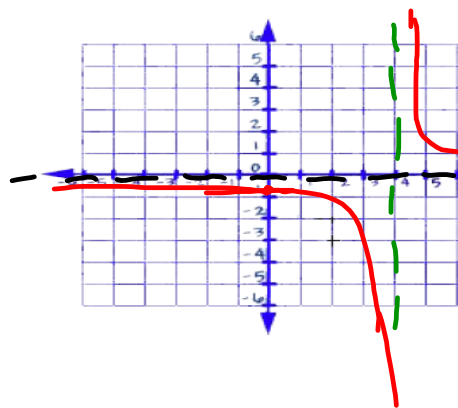
$$x-4=0$$

$$\begin{array}{r} +4 \\ +4 \end{array}$$

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

$$\frac{0}{1}$$

$$2=0$$



$$y = \frac{2}{0-4}$$

$$= \frac{2}{-4}$$

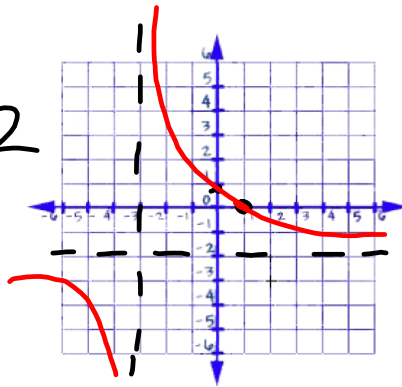
$$= -\frac{1}{2}$$

$$x\text{-int: } (1, 0)$$

$$y\text{-int: } (0, \frac{2}{3}) \quad f(x) = \frac{-2x + 2}{x + 3}$$

$$\text{vert: } x = -3$$

$$\text{horz: } y = \frac{-2}{1} = -2$$



$$-2x + \frac{2}{-2} = 0$$

$$-2x = \frac{-2}{-2}$$

$$x = 1$$

$$-x + \frac{2}{-3} = 0$$

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

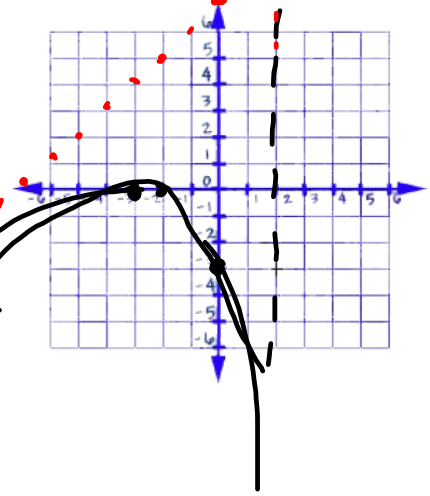
$$x\text{-int: } (-3, 0)$$

$$y\text{-int: } (0, 1)$$

x-int: $(-2, 0)(-3, 0)$
 y-int: $(0, -3)$ $f(x) = \frac{x^2 + 5x + 6}{x - 2} = \frac{(x+2)(x+3)}{x-2}$
 vert: $x = 2$

horz: $y = \frac{1}{3}x + 7$
 $mx + b$

2	1	5	6
	↓	2	14
	1	7	20

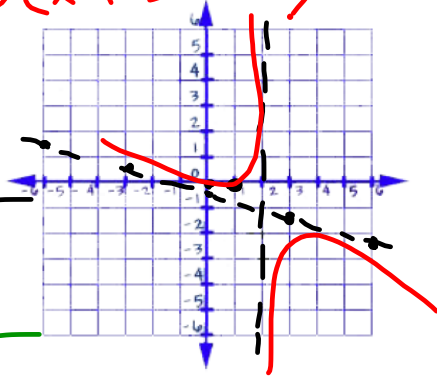


$x - 2 = 0$

x-int: $(1, 0)(0, 0)$
 y-int: $(0, 0)$ $f(x) = \frac{x(x^2 + 3x - 4)}{-3x^2 - 6x + 24} = \frac{x(x-1)(x+4)}{-3(x^2 + 2x - 8)} = \frac{x(x-1)(x+4)}{-3(x-2)(x+4)}$
 vert: $x = 2$

horz: $y = \frac{1}{3}x - \frac{1}{3}$

$-3x^2 - 6x + 24 \overline{) x^3 + 3x^2 - 4x}$
 $\underline{-x^3 - 2x^2 + 8x}$
 $x^2 + 4x$
 $\underline{-x^2 - 2x + 8}$
 $2x + 8$



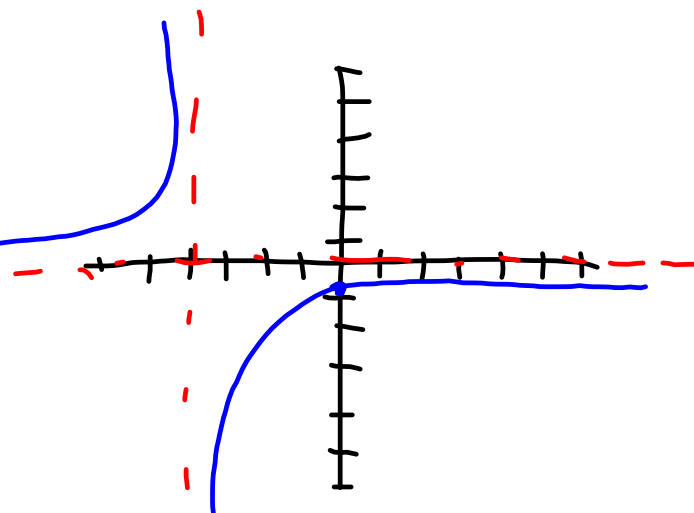
$$1) \frac{-3}{x+4} \quad \frac{0}{1} \quad -3=0$$

x-int: NA

y-int: $(0, -3/4)$

vert: $x = -4$

horz: $y = 0$



$$3) \frac{-3x-12}{x^2+x-6}$$

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

x-int: $(-4, 0)$

y-int: $(0, 2)$

vert: $x = -3$

horz: $y = 0$

