6.6 #44

Fills in $1\text{hr} + (30\text{ min})\left(\frac{1\text{ hr}}{60\text{ min}}\right)$

$= 1\text{ hr} + \frac{1}{2}\text{ hr} = \frac{3}{2}\text{ hr}$ to fill it

Empties in 1 hr.

Let x = amt of time it takes to empty the tank if both pipes are open (in hrs)

Rate of emptying = $\frac{1}{1}$ tank per hour

" " filling = $\frac{1}{\frac{3}{2}} = \frac{2}{3}$ tank per hr.

$1x - \frac{2}{3}x = 1$ tank emptied

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

$x = 3$ hrs

Check: In 3 hrs, we've filled the tank twice

In 3 hrs, we've emptied the tank thrice.

OK.

6.5 # 15

Recall Adding fractions

$$\frac{1}{48} + \frac{7}{60}$$

LCD:

$48 = 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3$

$60 = 2 \cdot 2 \cdot 3 \cdot 5$

LCD $= 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5$

$$\left(\frac{1}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3}\right)\left(\frac{5}{5}\right) + \left(\frac{7}{2 \cdot 2 \cdot 3 \cdot 5}\right)\left(\frac{2 \cdot 2}{2 \cdot 2}\right)$$

$$= \frac{(5)(1) + (7)(4)}{\text{LCD}}$$

$$= \frac{5 + 28}{\text{LCD}} = \frac{33}{\text{LCD}} = \frac{3 \cdot 11}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 5}$$

$33 = 3 \cdot 11$

$$= \frac{11}{2 \cdot 2 \cdot 2 \cdot 2 \cdot 5} = \frac{11}{80}$$

6.5 #15

$$\frac{x^2-23}{2x^2-5x-3}+\frac{2}{x-3}=\frac{-1}{2x+1}$$

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

$$\frac{x^2-23}{(2x+1)(x-3)}+\left(\frac{2}{x-3}\right)\left(\frac{2x+1}{2x+1}\right)=\left(\frac{-1}{2x+1}\right)\left(\frac{x-3}{x-3}\right)$$

$$\frac{x^2-23+2(2x+1)}{LCD}=\frac{-1(x-3)}{LCD}$$

1. LCD
2. write fracs with LCD
3. Ditch the LCD.

$$x^2-23+4x+2=-x+3$$

etc.

This amounts to clearing fractions, but it's more in keeping with adding fractions skills

Solve for x.

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

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

$\frac{A}{B} = \frac{C}{B} \Rightarrow A = C$

$3x(x+4)$ = LCD $3x^2+12x$

$$\frac{12}{3x(x+4)} = \frac{3x(x+4)}{3x(x+4)} - \left(\frac{1}{x+4}\right)\left(\frac{3x}{3x}\right)$$

ALL are over LCD, now

Ditch the LCD

$$12 = 3x^2+12x-1(3x)$$

$$12 = 3x^2+12x-3x = 12$$

$$3x^2+9x = 12$$

$$3x^2+9x-12 = 0$$

$$3(x^2+3x-4) = 0$$

$$x^2+3x-4 = 0$$

$$(x+4)(x-1) = 0$$

$x = -4$ OR $\boxed{x = 1}$ → Final Answer.

Check domain:

$\{x \mid x \neq 0 \text{ and } x \neq -4\}$

$3x$ in denom. $x+4$ in denom.

$x = -4 \notin D$

§6.7 #s 1, 5, 9, 13, 15, 21, 23, 37, 39

Revenue is directly proportional to quantity sold.

Direct Variation.

$R = Kx$

R = Revenue
x = # sold
K = constant of proportionality

$K = \$6/\text{hat}$

$x = 10$ hats sold

$R = 6 \cdot 10$

Oct 29-11:57 AM