

Minds On

Simplify

$$\frac{2}{3} + \frac{1}{4} - \frac{1}{5}$$

$$= \frac{\cancel{(3)}(\cancel{4})(5)}{(\cancel{3})(\cancel{4})(5)} \frac{2}{\cancel{3}} + \frac{(\cancel{3})(\cancel{4})(5)}{(\cancel{3})(\cancel{4})(5)} \frac{1}{\cancel{4}} - \frac{(\cancel{3})(\cancel{4})(5)}{(\cancel{3})(\cancel{4})(5)} \frac{1}{\cancel{5}}$$

$$= \frac{40}{60} + \frac{15}{60} - \frac{12}{60}$$

$$= \frac{43}{60}$$

Minds On

Solving Rational Equations

Minds On: Solve each rational equation. How could you verify your solutions?

$$\text{a) } \frac{x-2}{x-3} = 0$$

$$x-2=0$$

$$\boxed{x=2}$$

$$\text{b) } \frac{(x+2)(x+3)}{(x-4)(x+2)} = \frac{(x-1)(x-4)(x+2)}{(x+2)}$$

$$(x+2)(x+3) = (x-1)(x-4)$$

$$x^2 + 5x + 6 = x^2 - 5x + 4$$

$$-x^2 + 5x - 4 \quad -x^2 + 5x - 4$$

$$10x + 2 = 0$$

$$10x = -2$$

$$x = -\frac{1}{5}$$

Action

Example 1: Saltwater is flowing into a large tank that contains pure water. The concentration of salt, c , in the tank at t minutes is given by $c(t) = \frac{10t}{25+t}$, where c is measured in grams/litre. When does the salt concentration in the tank reach 3.75g/L?

$$\cancel{(25+t)} \frac{10t}{\cancel{25+t}} = 3.75(25+t)$$

$$10t = 93.75 + 3.75t$$
$$\begin{array}{r} 10t \\ -3.75t \\ \hline 6.25t = 93.75 \end{array}$$

$$6.25t = 93.75$$

$$t = 15 \text{ min}$$

Action

Example 2: Alex bought a case of math t-shirts for \$450. She kept 2 tees for herself and sold the rest for \$560, making a profit of \$10 on each tee.

How many t-shirts were in the case?

Let t represent number of t-shirts.

Paid \$450, what was price per shirt?

$$\text{cost per shirt is } \frac{450}{t} \quad \Bigg| \quad \begin{array}{l} \text{money made} \\ \text{per shirt} \end{array} \quad \frac{560}{t-2}$$

money brought in

money paid

profit per shirt

$$\frac{560}{t-2} - \frac{450}{t} = 10$$

$$\frac{(+)\cancel{560}\cancel{(t-2)}}{\cancel{t-2}} - \frac{450\cancel{(t-2)}}{\cancel{t}} = 10 \frac{(+)}{(t-2)}$$

$$560(t) - 450(t-2) = \overbrace{10(t)(t-2)}^{10t}$$

$$\underbrace{560t - 450t}_{110t} + 900 = 10t^2 - 20t$$

$$10t^2 - 20t - 110t - 900 = 0$$

$$10t^2 - 130t - 900 = 0$$

$$10(t^2 - 13t - 90) = 0$$

$$10(t^2 - 14t + 5t - 90) = 0$$

$$10(t-14)(t+5) = 0$$

\therefore 14 shirts were in the case

Action

Example 3: When they work together, Steven and Laura can deliver flyers to all the homes in their neighbourhood in 42 minutes. When Laura works alone, she can finish the deliveries in 13 minutes less time than Steven can when he works alone. When Steven works alone, how long does he take to deliver the flyers?

Let s represent the time it takes Steven to deliver the flyers.

$s-13$ represents time it takes Laura to deliver

Consider the fraction of deliveries made per minute.

If it takes 42 minutes for all, they deliver $\frac{1}{42}$ of the flyers each minute.

Steven delivers $\frac{1}{s}$ of the flyers each minute.

Laura delivers $\frac{1}{s-13}$ of the flyers each minute.

$$\frac{1}{s} + \frac{1}{s-13} = \frac{1}{42}$$

$$\frac{1}{s} + \frac{1}{s-13} = \frac{1}{42}$$

$$\frac{\cancel{42}s(s-13)}{s} + \frac{\cancel{42}s\cancel{(s-13)}}{\cancel{(s-13)}} = \frac{\cancel{42}s(s-13)}{\cancel{42}}$$

$$42(s-13) + 42s = s(s-13)$$

$$42s - 546 + 42s = s^2 - 13s$$

$$s^2 - 97s + 546 = 0$$

$$(s-6)(s-91) = 0$$

Steven can deliver in 91 minutes.

Consolidation

Pg. 285

1, 4, 6, 11, 13