

Clearly show all work.

1. Solve each equation.

a) $\frac{a+5}{4a} + \frac{11}{12} = \frac{2}{3a}$ $a \neq 0$

$$3/2a \left(\frac{a+5}{4a} \right) + 12a \left(\frac{11}{12} \right) = 12a \left(\frac{2}{3a} \right)$$

$$3a+15+11a=8$$

$$14a = -7$$

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

b) $\frac{x+5}{\cancel{x^2-x}} - \frac{3}{x} = \frac{1}{x-1}$ $x \neq 0, 1$

$$\frac{x(x+1)}{x(x-1)} - \frac{3}{x} = \frac{x(x-1)}{x(x-1)} \cdot \frac{1}{x-1}$$

$$x+5 - 3x + 3 = x$$

$$-3x = -8$$

$$x = \frac{8}{3}$$

2. Solve.

c) $\frac{1}{d-7} + \frac{d}{d-2} = \frac{5}{\cancel{d^2-9d+14}}$ $d \neq 2, 7$

$$\frac{(d-2)(\cancel{d-7})}{d-7} + \frac{(d-2)(\cancel{d-7})d}{d-2} = \frac{(d-2)(\cancel{d-7})}{(d-2)(d-7)} \cdot \frac{5}{\cancel{d-7}}$$

$$d-2 + d^2 - 7d = 5$$

$$d^2 - 6d - 7 = 0$$

$$(d-7)(d+1) = 0$$

$$\cancel{d=7} \quad d = -1$$

extraneous

3. Ted is a long-distance driver. It took him $\frac{1}{2}$ hour longer to drive 275 km on the Trans-Canada Highway west of Swift Current, Saskatchewan, than it took him to drive 300 km east of Swift Current. He averaged 10 km/h less while travelling west of Swift Current due to more severe snow conditions. What was Ted's average speed for each part of the trip? [Solve using a rational equation]

	Distance	Speed	Time
West of SC	275	$x-10$	$\frac{275}{x-10}$
East of SC	300	x	$\frac{300}{x}$

$$\frac{275}{x-10} = \frac{300}{x} + \frac{1}{2} \quad x \neq 0, 10$$

$$\frac{2x(x-10) \cdot 275}{x-10} = \frac{2x(x-10) \cdot 300}{x} + \frac{2x(x-10) \cdot 1}{2}$$

$$550x = 600x - 6000 + x^2 - 10x$$

$$0 = x^2 + 40x - 6000$$

$$0 = (x+100)(x-60)$$

$$x = -100 \quad x = 60$$

no negative speed

$\therefore$ Speed west of SC 50 km/h
Speed east of SC 60 km/h

OR

	Distance	Speed	Time
West of SC	275	$\frac{275}{t+0.5}$	$t+0.5$
East of SC	300	$\frac{300}{t}$	t

$$\frac{300}{t} - 10 = \frac{275}{t+0.5}$$

...

$$t = 5 \text{ h}$$