What's the Score?

- If you have any difficulty with these solutions, please contact your teacher before continuing.

1. a.

$$\frac{4}{2x-1} = \frac{1}{x-2}$$

$$\left(\frac{4}{2x-1}\right)(2x-1)(x-2) = \left(\frac{1}{x-2}\right)(2x-1)(x-2)$$

$$\left(\frac{4}{\cancel{2x-1}}\right)(\cancel{2x-1})(x-2) = \left(\frac{1}{\cancel{x-2}}\right)(2x-1)(\cancel{x-2})$$

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

$$4x-8 = 2x-1$$

$$2x-8 = -1$$

$$2x = 7$$

$$x = \frac{7}{2}, \quad x \neq \frac{1}{2}, 2$$

Verify $x = \frac{7}{2}$.

Left Side	Right Side
$\frac{4}{2x-1}$	$\frac{1}{x-2}$
$\frac{4}{2\left(\frac{7}{2}\right)-1}$	$\frac{1}{\left(\frac{7}{2}\right)-2}$
$\frac{4}{7-1}$	$\frac{1}{\left(\frac{7}{2}\right)-\left(\frac{4}{2}\right)}$
$\frac{4}{6}$	$\frac{1}{\left(\frac{3}{2}\right)}$
$\frac{2}{3}$	$\frac{2}{3}$

What's the Score?

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1. b.

$$\frac{12}{10+y}+\frac{12}{10-y}=\frac{5}{2}$$

$$\left[\left(\frac{12}{10+y}\right)(2)(10+y)(10-y)\right]+\left[\left(\frac{12}{10-y}\right)(2)(10+y)(10-y)\right]=\left[\left(\frac{5}{2}\right)(2)(10+y)(10-y)\right]$$

$$\left[\left(\frac{12}{\cancel{10+y}}\right)(2)(\cancel{10+y})(10-y)\right]+\left[\left(\frac{12}{\cancel{10-y}}\right)(2)(10+y)(\cancel{10-y})\right]=\left[\left(\frac{5}{\cancel{2}}\right)(\cancel{2})(10+y)(10-y)\right]$$

$$\left[12(2)(10-y)\right]+\left[(12)(2)(10+y)\right]=\left[(5)(10+y)(10-y)\right]$$

$$240-24y+240+24y=500-50y+50y-5y^2$$

$$480=500-5y^2$$

$$5y^2-20=0$$

$$5(y^2-4)=0$$

$$5(y-2)(y+2)=0$$

$$y-2=0 \quad y+2=0$$

$$y=2 \quad y=-2, \quad y\neq 10, -10$$

You must verify both solutions. (See next page.)

What's the Score?

- If you have any difficulty with these solutions, please contact your teacher before continuing.

Verify $y = 2$.

Left Side	Right Side
$\frac{12}{10+y}+\frac{12}{10-y}$	$\frac{5}{2}$
$\frac{12}{10+2}+\frac{12}{10-2}$	
$\frac{12}{12}+\frac{12}{8}$	
$\frac{2}{2}+\frac{3}{2}$	
$\frac{5}{2}$	

Verify $y = -2$.

Left Side	Right Side
$\frac{12}{10+y}+\frac{12}{10-y}$	$\frac{5}{2}$
$\frac{12}{10+(-2)}+\frac{12}{10-(-2)}$	
$\frac{12}{8}+\frac{12}{12}$	
$\frac{3}{2}+\frac{2}{2}$	
$\frac{5}{2}$	

What's the Score?

- If you have any difficulty with these solutions, please contact your teacher before continuing.

2. Let t = time Sheena and Jeff take to deliver the papers together

Susan completes $\frac{1 \text{ route}}{40 \text{ minutes}} = \frac{1}{40}$ route per minute

Jeff completes $\frac{1 \text{ route}}{50 \text{ minutes}} = \frac{1}{50}$ routes per minute

Together, they complete $\frac{1 \text{ route}}{t \text{ minutes}} = \frac{1}{t}$ routes per minute

$$\frac{1}{40} + \frac{1}{50} = \frac{1}{t}$$

$$\left[\left(\frac{1}{40}\right)(40)(50)(t)\right] + \left[\left(\frac{1}{50}\right)(40)(50)(t)\right] = \left[\left(\frac{1}{t}\right)(40)(50)(t)\right]$$

$$\left[\left(\frac{1}{\cancel{40}}\right)(\cancel{40})(50)(t)\right] + \left[\left(\frac{1}{\cancel{50}}\right)(40)(\cancel{50})(t)\right] = \left[\left(\frac{1}{\cancel{t}}\right)(40)(50)(\cancel{t})\right]$$

$$[(1)(50)(t)] + [(1)(40)(t)] = [(1)(40)(50)]$$

$$50t + 40t = 2000$$

$$90t = 2000$$

$$t = \frac{200}{9}$$

$$t = 22.\overline{2} \qquad t > 0$$

The non-permissible value is $t \neq 0$. However, the value for time must be a positive value; therefore, the restriction on the variable t is written as $t > 0$.

You must verify your solution. (See next page.)

What's the Score?

- If you have any difficulty with these solutions, please contact your teacher before continuing.

Verify the solution $t = \frac{200}{9}$.

Left Side	Right Side
$\frac{1}{40} + \frac{1}{50}$	$\frac{1}{t}$
$\frac{5}{200} + \frac{4}{200}$	$\frac{1}{\left(\frac{200}{9}\right)}$
$\frac{9}{200}$	$\frac{9}{200}$

When the solution $t = \frac{200}{9}$ is substituted into the original equation, the left side of the equation equals the right side of the equation. This means the solution $t = \frac{200}{9} = 22.\overline{2}$ is verified to be correct.

Sheena and Jeff would take approximately 22 minutes to deliver the papers if they worked together.