Warm-Up...

Simplify the following expression: $\dfrac{\frac{5}{x+4}}{\frac{1}{x-4}-\frac{2}{x^2-16}}$

$$\frac{\left(\frac{5}{x+4}\right)}{\frac{1}{x-4}-\frac{2}{(x-4)(x+4)}} \cdot \frac{(x+4)(x-4)}{(x+4)(x-4)}$$

$$= \frac{5(x-4)}{(x+4)-2}$$

$$= \frac{5(x-4)}{x+2}$$

$$\frac{\left(\frac{5}{x+4}\right)}{\frac{(x+4)-2}{(x-4)(x+4)}} \div$$

$$= \left(\frac{5}{x+4}\right) \cdot \frac{(x-4)(x+4)}{x+2}$$

$$= \frac{5(x-4)}{x+2}$$

Solve each of the following:

$x = \frac{-1}{11}$

$$\frac{2x}{x+3} - \frac{x}{x+7} = \frac{x^2-1}{x^2+10x+21}$$

$$\frac{2x}{x+3} - \frac{x}{x+7} = \frac{(x-1)(x+1)}{(x+7)(x+3)}$$

$$2x^2+14x-x^2-3x = x^2-1$$

$$2x^2-x^2-x^2+14x-3x+1=0$$

$$\frac{11x}{11} = \frac{-1}{11}$$

$x = \frac{-1}{11}$

$x = 2$

$$\frac{10}{x+3} - \frac{3}{5} = \frac{10x+1}{3x+9}$$

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

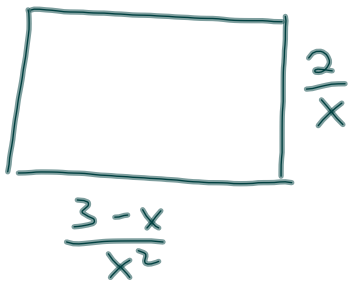
$$150-9x-27 = 50x+5$$

$$-59x = 5+27-150$$

$$\frac{-59x}{-59} = \frac{-118}{-59}$$

$x = 2$

5. c)



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

$\frac{3-x-2x}{x^2}$

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

b) $A = \left(\frac{3-x}{x^2}\right)\left(\frac{2}{x}\right)$

$A = \frac{6-2x}{x^3}$

c) $P = 2l + 2w$

$28 = 2\left(\frac{3-x}{x^2}\right) + 2\left(\frac{2}{x}\right)$

$(x^2)\ 28 = \frac{6-2x}{x^2}(x^2) + \frac{4}{x}(x^2)x$

$28x^2 = 6 - 2x + 4x$

$\frac{28x^2}{2} - \frac{2x}{2} - \frac{6}{2} = \frac{0}{2}$

$14x^2 - x - 3 = 0$ (-42)

$14x^2 - 7x + 6x - 3 = 0$

$7x(2x-1) + 3(2x-1) = 0$

$(2x-1)(7x+3) = 0$

$x = \frac{1}{2}$ or $x = -\frac{3}{7}$ ← Inadmiss. bc... generate negative length & width

Poor Tyler could use your help...

Tyler has begun to solve a rational equation. His work is shown below.

Check his work...make corrections... and then finish the problem

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

$$2(x+1) - 3(x+1)(x-1) = 5x(x-1)$$

$$2x + 2 - 3x^2 + 1 = 5x^2 - 5x$$

$$0 = 8x^2 - 7x - 3 \qquad -5$$

$$8x^2 - 7x - 5 = 0$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{7 \pm \sqrt{49 - 4(8)(-5)}}{16}$$

$$x = \frac{7 \pm \sqrt{209}}{16}$$

$$x = \frac{7+\sqrt{209}}{16} \text{ or } x = \frac{7-\sqrt{209}}{16}$$

Time to start applying some of our number sense!!

8. The sum of two numbers is 25. The sum of their reciprocals is $\frac{1}{4}$. Determine the two numbers.

Let x Rep. 1st #
Let y " 2nd #

① $x+y=25$

② $\frac{1}{x}+\frac{1}{y}=\frac{1}{4}$

$x=25-y$

$\frac{1}{25-y}+\frac{1}{y}=\frac{1}{4}$ $4y(25-y)$ Substitute

Let x Rep longer #
other # is $25-x$

$4y+100-4y=25y-y^2$

$y^2-25y+100=0$

$(y-20)(y-5)=0$

$y=20$ or $y=5$

$x=25-20$ $x=25-5$

$x=5$ $x=20$

The numbers are 20 & 5

Erin and Andrea set off at the same time on a 30-km walk for charity. Erin, who has trained all year for this event, walks 1 km/h faster than Andrea. Erin finishes the walk 1 h ahead of Andrea. How fast was each sister walking, and how long did it take for each sister to finish the walk?

$d = rt$

Would something like this chart help organize things?

$\frac{d}{r}$

	Distance (km)	Rate (km/h)	Time (h)
Erin	30	(6) x	$30/x$ (5)
Andrea	30	(5) y	$30/y$ (6)

① $x - 1 = y$

$x = y + 1$

② $\frac{30}{x} + 1 = \frac{30}{y}$

$y(y+1)\left(\frac{30}{y+1} + 1\right) = \frac{30}{y} \times y(y+1)$

$30y + y^2 + y = 30y + 30$

$y^2 + y - 30 = 0$

$(y+6)(y-5) = 0$

$y = -6$ ~~$y = -6$~~ $y = 5$

Negative speed

$x = 6$ $\frac{30}{6} = 5$

$x = y + 1$

$x = 6$

Erin walking 6 km/h for 5 hours

Andrea 5 km/h for 6 hours