KEY

Math 20-1

L08 – FQ – 6.4 Rational Equations

Q1: Determine the solution to $\frac{x+1}{x+2} = \frac{x+5}{x+7}$ and record your answer, to the nearest whole number, in the Numerical Response boxes below.

$x \neq -2, -7$

3			

$$\frac{x+1}{x+2}\left(\frac{x+7}{x+7}\right) = \frac{x+5}{x+7}\left(\frac{x+2}{x+2}\right)$$

$$\frac{x^2+8x+7}{(x+2)(x+7)} = \frac{x^2+7x+10}{(x+2)(x+7)}$$

$$x^2+8x+7 = x^2+7x+10$$

$$x = 3$$

Q2: The solution to the equation $\frac{1}{x-2} + \frac{1}{x^2-7x+10} = \frac{6}{x-2}$ can be written as $x = \frac{ab}{c}$, where ***a, b,*** and ***c*** are ___, ___, and ___.

*(Record your **three-digit** answer in the Numerical Response boxes below)*

2	6	5	

$$\frac{1}{(x-2)} + \frac{1}{(x-2)(x-5)} = \frac{6}{(x-2)} \quad \rightarrow x \neq 2, 5$$

$$\frac{1}{(x-2)}\left(\frac{x-5}{x-5}\right) + \frac{1}{(x-2)(x-5)} = \frac{6}{(x-2)}\left(\frac{x-5}{x-5}\right)$$

$$\frac{x-5}{(x-2)(x-5)} + \frac{1}{(x-2)(x-5)} = \frac{6x-30}{(x-2)(x-5)}$$

$$(x-5) + (1) = 6x-30$$

$$x - 4 = 6x - 30$$

$$26 = 5x$$

$$x = \frac{26}{5} \qquad a = 2 \quad b = 6 \quad c = 5$$

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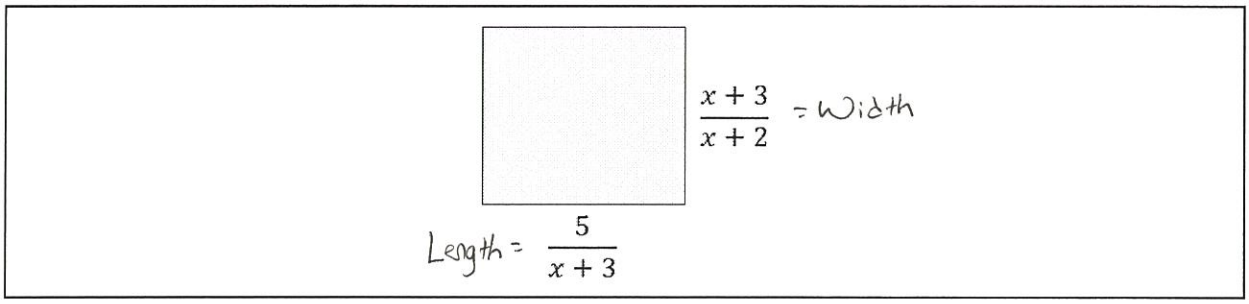
Use the following information to answer Q3:



Q3: *(Long Answer)* If the perimeter of the object is $\frac{11}{x+2}$, then determine the length of each side. *(4 marks)*

$P = 2[\text{length}] + 2[\text{width}]$

$\frac{11}{x+2} = 2\left[\frac{5}{x+3}\right] + 2\left[\frac{x+3}{x+2}\right]$

$\frac{11}{x+2} = \frac{10}{x+3} + \frac{2x+6}{x+2}$ → $x \neq -2, -3$

$\frac{11}{x+2}\left(\frac{x+3}{x+3}\right) = \frac{10}{x+3}\left(\frac{x+2}{x+2}\right) + \frac{2x+6}{x+2}\left(\frac{x+3}{x+3}\right)$

$\frac{11x+33}{(x+2)(x+3)} = \frac{10x+20}{(x+2)(x+3)} + \frac{2x^2+12x+18}{(x+2)(x+3)}$

$11x+33 = (10x+20) + (2x^2+12x+18)$

$11x+33 = 2x^2+22x+38$

$0 = 2x^2+11x+5$

$0 = (2x+1)(x+5)$

$x = -\frac{1}{2}$ or $x = -5$

So $x = -\frac{1}{2}$ or -5.

If $x = -5$ then

Length = $\frac{5}{-5+3}$ or $\frac{5}{-2}$

Width = $\frac{-5+3}{-5+2}$ or $\frac{-2}{-3}$ or $\frac{2}{3}$

Length cannot be negative, so throw this value away.

If $x = -\frac{1}{2}$ then

Length = $\frac{5}{-\frac{1}{2}+3}$ or $\frac{5}{2.5}$ or 2

Width = $\frac{-\frac{1}{2}+3}{-\frac{1}{2}+2}$ or $\frac{2.5}{1.5}$ or $1\frac{2}{3}$

These values do make sense.

So Length = 2
Width = $1.6\overline{}$ or $1\frac{2}{3}$ or $\frac{5}{3}$

MARKING:

Beginning	0.0 – 2.5
Progressing	3.0 – 4.0
Competent	4.5 – 5.5
Exemplary	6.0