Are the following proportions?

<table>
<thead>
<tr>
<th>Proportion</th>
<th>Multiplication</th>
<th>Result</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \frac{4}{9} = \frac{3}{7} )</td>
<td>( 4 \times 7 = 9 \times 3 )</td>
<td>28 = 27</td>
<td>FALSE – Not a proportion</td>
</tr>
<tr>
<td>( \frac{4}{9} = \frac{9}{20} )</td>
<td>( 4 \times 20 = 9 \times 9 )</td>
<td>80 = 81</td>
<td>FALSE – Not a proportion</td>
</tr>
<tr>
<td>( \frac{4}{9} = \frac{12}{27} )</td>
<td>( 4 \times 27 = 9 \times 12 )</td>
<td>108 = 108</td>
<td>TRUE – this is a proportion</td>
</tr>
<tr>
<td>( \frac{4}{9} = \frac{8}{18} )</td>
<td>( 4 \times 18 = 9 \times 8 )</td>
<td>72 = 72</td>
<td>TRUE – this is a proportion</td>
</tr>
</tbody>
</table>
Find the missing numbers to make the following proportions.

\[
\begin{align*}
\frac{3}{21} & = \frac{9}{\boxed{x}} \\
3 \times 21 & = x \times 9 \\
63 & = 9x \\
\frac{9}{9} & = \frac{\boxed{x}}{9} \\
7 & = x \\
\end{align*}
\]

\[
\begin{align*}
\frac{\textcolor{blue}{5}}{10} & = \frac{\boxed{x}}{4} \\
x \times 10 & = 4 \times 5 \\
10x & = 20 \\
\frac{10}{10} & = \frac{\boxed{x}}{10} \\
x & = 2 \\
1 \times x & = 4 \times 9 \\
x & = \boxed{36} \\
\textcolor{blue}{\frac{3}{12}} & = \frac{\boxed{9}}{\boxed{x}}
\end{align*}
\]
A ratio is a comparison of two numbers by division.

To write ratios, use the word to, a colon, or a fraction bar.

EXAMPLE #1: You have an image 5” wide and 7” long. Write the ratio of width to length.

Words: 5 to 7  Colon: 5:7  Fraction: 5/7

When describing images we use 5x7
RATIOS & PROPORTIONS

A proportion is a statement that two ratios are equal.

EXAMPLE#2: Is \( \frac{2}{5} = \frac{6}{15} \) a proportion?

Find the cross products. \( 2 \times 15 = 5 \times 6 \)

If TRUE, the statement is a proportion. \( 30 = 30 \) TRUE
RATIOS & PROPORTIONS

Or you can solve using equivalent fractions:

\[
\frac{\boxed{4}}{5} = \frac{4}{10} = \frac{2}{5}
\]

Equivalent Fractions are two fractions that represent the same number (they are equal)