**SIMILAR TRIANGLES**

(and other similar shapes)

Two shapes are **SIMILAR** if one is an enlargement of the other.

In this case,

- all their matching pairs of angles are equal
- all their matching pairs of sides will be in the same ratio

**Examples**

1. \[ \begin{array}{c}
    \text{A} \\
    5 \text{cm} \\
    8 \text{cm} \\
    \text{B} \\
    10 \text{cm} \\
    \text{C}
\end{array} \quad \begin{array}{c}
    \text{P} \\
    7 \text{cm} \\
    \text{Q} \\
    \text{R}
\end{array} \]

(a) Find the length of PR

What side in ABC matches PR?  \( \text{Answer: AC (8cm)} \)

Which side in ABC matches 7cm?  \( \text{Answer AB (5cm)} \)

\[
\frac{\text{PR}}{8} = \frac{7}{5}
\]

\[ (\times \ 8) \quad (\times \ 8) \]

\[
\text{PR} = \frac{7 \times 8}{5} = \frac{56}{5} = 11.2 \text{ cm}
\]
(b) Find $PQ$

\[
\frac{PQ}{10} = \frac{7}{5}
\]

\[
(\times 10) \quad (\times 10)
\]

\[
PQ = \frac{7}{5} \times 10 = \frac{70}{5} = 14 \text{ cm}
\]

(2)

(a) Explain why triangles $PQR$ and $PST$ are similar.

- $\hat{PQR} = \hat{PST}$ (corresponding angles in parallel lines)
- $\hat{PQ} = \hat{PST}$ ("")
- $\hat{QPR}$ is in both triangles.

Since the angles are equal, the triangles are similar.

(b) Find $ST$

\[
\frac{ST}{8} = \frac{10}{6}
\]

\[
(\times 8) \quad (\times 8)
\]

\[
ST = \frac{10}{6} \times 8 = \frac{80}{6} = 13 \frac{1}{3} \text{ cm}
\]
(c) Find QS

Since QS is not a side of either triangle, first find PS then subtract 7

\[
\frac{PS}{7} = \frac{10}{6}
\]

\[(\times 7) \quad (\times 7)\]

\[
PS = \frac{10}{6} \times 7 = \frac{70}{6} = 11\frac{1}{3} \text{ cm}
\]

\[
QS = 11\frac{1}{3} - 7 = 4\frac{2}{3} \text{ cm}
\]

Are these rectangles similar?

Does \(\frac{12}{20} = \frac{8}{14}\)?

\(0.6 = 0.571\)?

No — so the shapes are not similar