1. The following diagram shows ΔABC. Diagram not to scale.
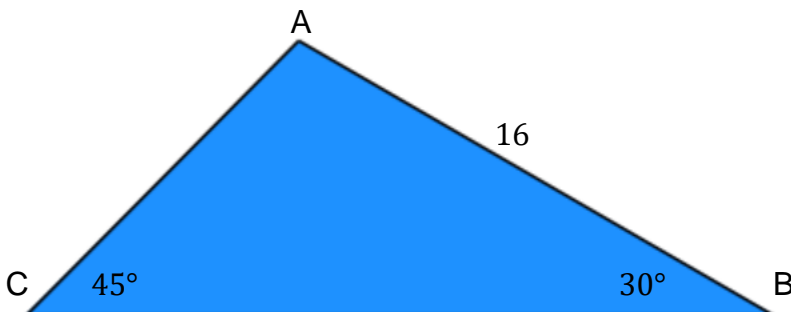
$A\hat{B}C = 30°$
$B\hat{C}A = 45°$
$AB = 16$

Find AC.

(6 marks)

Mark scheme:

Method 1

Valid approach to find the height of ΔABC.   (M1)
E.g. $\sin 30 = \frac{x}{16}$ and $\cos 60 = \frac{x}{13}$

$\sin 30 = \frac{1}{2}$ or $\cos 60 = \frac{1}{2}$ (A1)

Height = 8   (A1)

Correct working   (A1)

$\sin 45 = \frac{8}{AC}, \sqrt{8^2 + 8^2}$

Correct working

          (A1)

$\sin 45 = \cos 45 = \frac{1}{\sqrt{2}}$

Correct answer   (A1)

$$PR = 8\sqrt{2}$$

Method 2

Correct substitution in the Law of Sines

$$\frac{x}{\sin 30°} = \frac{16}{\sin 45°}$$ (M1)(A1)

$\sin 30° = \frac{1}{2}$ and $\sin 45° = \frac{1}{\sqrt{2}}$ (A1)(A1)

$x \sin 45° = 16 \sin 30°$ (A1)

$x = 8\sqrt{2}$ (A1)