

TT 4. *Foundations and Pre-calculus Mathematics 10* (Pearson), questions 6, 7, and 11 on pages 101 and 102 **Possible Solutions**

6. The ladder can reach a height of 29.7 m up the wall.

The ladder is the hypotenuse with length of 30.5 m and the angle of elevation is 77° . To determine the vertical height, which is opposite of the angle, sine must be used.

$$\begin{aligned}\sin 77^\circ &= \frac{x}{30.5 \text{ m}} \\ (30.5 \text{ m})(\sin 77^\circ) &= \left(\frac{x}{30.5 \text{ m}}\right)(30.5 \text{ m}) \\ (30.5 \text{ m})\sin 77^\circ &= x \\ x &= 28.7 \text{ m}\end{aligned}$$

7. a) Angle E is given and side ED is adjacent to angle E. Since side CE is to be calculated (hypotenuse), cosine must be used.

$$\begin{aligned}\cos 58.5^\circ &= \frac{25.23 \text{ m}}{CE} \\ CE &= \frac{25.23 \text{ m}}{\cos 58.5^\circ} \\ CE &= 48.29 \text{ m}\end{aligned}$$

- b) The surveyor could calculate CD by using $\tan 58.5^\circ = \frac{CD}{25.23^\circ}$ and rearranging for CD; e.g., $CD = (25.32 \text{ m}) \tan 58.8^\circ$.

11. a) Length AB (hypotenuse) is to be determined by using angle A (40°) and the adjacent side AC (3.24 m).

$$\begin{aligned}\cos 40^\circ &= \frac{3.24 \text{ m}}{AB} \\ AB &= \frac{3.24 \text{ m}}{\cos 40^\circ} \\ AB &= 4.23 \text{ m}\end{aligned}$$

- b) To determine the vertical height (opposite), tangent can be used since the adjacent side is given.

$$\begin{aligned}\tan 40^\circ &= \frac{BC}{3.24 \text{ m}} \\ (3.24 \text{ m})(\tan 40^\circ) &= \left(\frac{BC}{3.24 \text{ m}}\right)(3.24 \text{ m}) \\ BC &= 2.72 \text{ m}\end{aligned}$$