11

	30°	45°	60°	0°	90°
sin	$\frac{1}{2}$	$\sqrt{2}$	$\frac{\sqrt{3}}{2}$	0	1
cos	$\frac{\sqrt{3}}{2}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{2}$	1	0
tan	$\sqrt{3}$	1	$\sqrt{3}$	0	

5 Extend

1 30°

2 Angles in a pentagon sum to 540°
Each angle in a regular pentagon = $\frac{540}{5} = 108°$
$\angle BCD = 108°$
$\angle FCD = 180 - 108 = 72°$ (angles on a straight line sum to 180°)
$\angle FCD = \angle CDF$ (triangle CDF is isosceles)
$\angle CFD = 180° - 2 \times 72 = 36°$ (angles in a triangle sum to 180°)

3 $2x - 20 + x + 5 = 2x + 35$ so $x = 50°$ (the exterior angle of a triangle is equal to the sum of the two interior angles at the other vertices)
$\angle QSR = 2x + 35 = 135°$
$\angle QSP = 180 - 135 = 45°$ (angles on a straight line)

4 12.0 cm

5 122.02 m

6 36°, 72°, 108°, 144°, 180°

7 6 sides

8 32.5°

9 48 700 feet

10 a i AB = 1.50 cm ii AC = 2.60 cm b 7.1 cm

11 $(4\sqrt{3} + 12)$ cm

12 7.1 cm

13 a 3.4 cm b 22.3°

5 Unit test

1 a $(9 - 2) \times 180°$ **[1]** $= 1260°$ **[1]** b $180 - \left(\frac{1260}{9}\right) = 40°$ **[1]**

2 $PQ^2 = 12.3^2 - 6.4^2$ **[1]**
$PQ = \sqrt{110.33}$ **[1]**
PQ = 10.50 cm (2 d.p.) **[1]**

3 Angle EBC = 180° – 132° = 48° (angles on a straight line add up to 180°) **[1]**
Angle ECB = angle EBC = 48° (base angles of isosceles triangle are equal) **[1]**
$x = 48°$ (alternate angles are equal) **[1]**

4 $p + y + q = 180°$ (angles on a straight line add up to 180°) **[1]**
$p = x$ (alternate angles are equal) **[1]**
$q = z$ (alternate angles are equal) **[1]**
$p + y + q = x + y + z = 180°$ **[1]**

5 a 0 **[1]** b 1 **[1]** c 1 **[1]** d $\frac{\sqrt{2}}{2}$ **[1]** e $\frac{\sqrt{3}}{2}$ **[1]**

6 $\sin a = \frac{5.4}{7.6}$ **[1]**
$a = \sin^{-1}\frac{5.4}{7.6}$ **[1]**
$a = 45.3°$ (1 d.p.) **[1]**

7 $\sin x = \frac{1}{2}$ **[1]**
$x = 30°$ **[1]**
The angle of elevation needs to be 30°. **[1]**

8 $\cos 45° = \frac{x}{4}$ **[1]**
$x = 4 \cos 45°$ **[1]**
$x = 2.83$ miles (2 d.p.) **[1]**

9 $x^2 = 15^2 + 10^2$ **[1]**
$x = \sqrt{325}$ **[1]**
$x = 5\sqrt{13}$ m **[1]**

Sample student answers
Student C gives the best answer. Student A rounded too early and Student B's algebra was incorrect.