Shape and Space Revision 1 (Answers)

1) O is the centre of the circle, ST is a tangent, and AD = AC

(a) DOC = 38 times 2 = 76°
(Angle at centre is twice angle at circumference)

(b) ADC = (180 – 38) ÷ 2 = 71° (Isosceles triangle)
ABC = 180 – 71 = 109° (Opposite angles of cyclic quad)

(c) ACD = (180 – 38) ÷ 2 = 71° (Isosceles triangle)
ADS = ACD = 71° (Alternate segment theorem)

2) (a) 38.66° (b) 102.7° (c) 96.05cm
(d) 442 cm (e) 12766 cm^2

3) (a) $288\pi\ cm^3$, $144\pi\ cm^2$ (b) $90\pi\ cm^3$
(c) 10cm (d) $60\pi\ cm^2$

4) (a) 5030 cm^3 (b) 35000 cm^2

Shape and Space Revision 2 (Answers)

1) (a) Ratio of the lengths = 40 : 24 = 5 : 3
Height of the large house = $15\times\frac{3}{5}=9\,\text{cm}$.

(b) Ratio of the surface areas = $5^2 : 3^2 = 25 : 9$
Surface area of the large house = $2400\times\frac{25}{9}=6666.7\,\text{cm}^2$

(c) Ratio of volumes = $5^3 : 3^3 = 125 : 27$
Volume of the small house = $1800\times\frac{27}{125}=388.8\,\text{cm}^3$

2) The one on the right, because $20^2 + 21^2 = 29^2$

3) 6.2 cm

4) QR = 6.35cm AC = 7.2cm

5) (a) 7.5cm (b) 4.2cm

6) 13.05cm

Shape and Space Revision 3 (Answers)

1) (a) 16.97cm (b) 5.29cm (c) 31.9°

2) ABC = (180 − 155) + 40 = 65°
Cosine Rule: AC = 87.6km
Sine Rule: angle ACB = 68.6°
So bearing of A from C = 180 + 40 + 68.6 = 288.6°

3) $\frac{1}{2}\times 6\times 8\times \sin BAC = 20$
BAC = 56.4°

4) (a) ADC = 74° (isosceles triangle)
ABC = 106° (opp angles of cyclic quadrilateral add to 180°)
(b) ACD = 74° (isosceles triangle)
ASD = 74° (alternate segment theorem)

5) (a) DAC = 24° (angles in same segment)
(b) DOC = 48° (angle at centre is double angle at circumference)
(c) OCD = 66° (isosceles triangle)
ACB = 16° (angle in same segment)
BCD = 90° (angle in semicircle)
ACO = 90 − 66 − 16 = 8°

Volume of a prism

5) Area of triangle= ½× 8 × 8× sin 60 = 27.71...cm^2
Volume of prism = 27.71× 20 = 554 cm^3 (3sf)

6) Volume= π× 6 ^{2} × 100 = 11309.7...cm^3
= 11.3litres(3sf)

Shape and Space Revision 4 (Answers)

Areas

1) Triangle area= ½×8 × 14 × sin 32 = 29.7cm^2

Trapezium area= ½× (12 + 7)× 5 = 47.5cm^2

2) Diameter of circle= $\frac{500}{\pi}$ = 159.15...cm, so radius = 79.57...cm

Area= πr^2 = 19894 m^2

Sectors,arcs and chords

3) (a)arc AB= $\frac{100}{360}\times\pi\times 16$ = 14.0cm(3sf)

(b) $\frac{AM}{8}$ = sin 50
AM = 8 ×sin 50 = 6.128...cm
Chord AB = AM × 2 = 12.3cm(3sf)

(c) sector OAB = $\frac{100}{360}\times\pi\times 8^2$ = 55.9cm^2 (3sf)

(d) area of triangle OAB = ½×8 ×8 ×sin 100 = 31.5 cm^2

4) (a) $\frac{\theta}{360}\times\pi\times 12 = 8$
$\theta\times\pi\times 12 = 8\times 360$
$\theta = \frac{8\times 360}{\pi\times 12} = 76.4^\circ$

(b) sin AOB = $\frac{4}{6}$
AOB= $\sin^{-1}\left(\frac{4}{6}\right)$ = 41.8°
θ= 41.8×2 = 83.6°

(c) $\frac{\theta}{360}\times\pi\times 6^2 = 50$
$\theta\times\pi\times 36 = 50\times 360$
$\theta = \frac{50\times 360}{\pi\times 36} = 159^\circ$