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1. a)  $\frac{\pi}{6}$  rad      b)  $\frac{\pi}{4}$  rad      c)  $\frac{\pi}{3}$  rad      d)  $\frac{\pi}{2}$  rad  
e)  $\frac{2\pi}{3}$  rad      f)  $\frac{3\pi}{4}$  rad      g)  $\frac{5\pi}{3}$       h)  $\frac{13\pi}{6}$  rad
2. a)  $114.6^\circ$       b)  $60^\circ$       c)  $210^\circ$       d)  $240^\circ$   
e)  $286.48^\circ$       f)  $72^\circ$       g)  $330^\circ$       h)  $450^\circ$

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3. a)  $\pi$       b)  $\frac{1}{6}$       c)  $150^\circ$   
d)  $\frac{3}{4}$       e)  $\frac{5\pi}{6}$       f)  $\frac{1}{3}$   
g)  $720^\circ$       h)  $\frac{4\pi}{3}$       i)  $\frac{9\pi}{4}$
4. a)  $\frac{\pi}{4}$  rad      b)  $\frac{\pi}{2}$  rad      c)  $\frac{3\pi}{4}$  rad      d)  $\pi$  rad  
e)  $\frac{5\pi}{4}$  rad      f)  $\frac{3\pi}{2}$  rad      g)  $\frac{7\pi}{4}$  rad      h)  $2\pi$  rad
5. a)  $30^\circ$       b)  $150^\circ$       c)  $210^\circ$       d)  $330^\circ$
6. a)  $60^\circ$       b)  $120^\circ$       c)  $240^\circ$       d)  $300^\circ$

7. a)  $\frac{4\pi}{3}$  cm      b)  $2\pi$  cm      c)  $3\pi$  cm

8.

$r$	$\theta$	$s$
2 cm	$\frac{2\pi}{3}$ rad	$\frac{4\pi}{3}$ cm
6 cm	$\frac{5\pi}{6}$ rad	$5\pi$ cm
12 cm	$\frac{5\pi}{6}$ rad	$10\pi$ cm

9. 3 rad

10. a) 11.31 cm      b) 120.6 cm      c) 44 032.6 cm

11. a)  $5\pi$  rad/sec  
 b) 11 309.7 m

12. a) Area of A = Area of sector AOB – Area of triangle AOB

Recall:  $\frac{\text{area of sector}}{\text{area of circle}} = \frac{\text{central angle}}{360^\circ}$

$$\frac{\text{area of sector}}{\pi r^2} = \frac{\theta}{2\pi}$$

$$\text{area of sector} = \frac{\theta \pi r^2}{2\pi}$$

$$\text{area of sector} = \frac{\theta r^2}{2}$$

$$\text{Area of a triangle (trig formula)} = \frac{r^2 \sin \theta}{2}$$

$$\text{Area of A} = \frac{\theta r^2}{2} - \frac{r^2 \sin \theta}{2} = \frac{r^2}{2}(1 - \sin \theta)$$

- b) Approximately  $1.18 \text{ cm}^2$