

# Section 6-1

1) arc, 1

b)  $\frac{\pi}{180^\circ}$

c)  $\frac{180^\circ}{\pi}$

2) a)  $s = r\theta$

b)  $A = \frac{1}{2} r^2 \theta$

3)  $2 \cdot 72^\circ \cdot \frac{\pi}{180^\circ} = \frac{2\pi}{5}$

5)  $45^\circ \cdot \frac{\pi}{180^\circ} = \frac{\pi}{4}$

7)  $75^\circ \cdot \frac{\pi}{180^\circ} = \frac{5\pi}{12}$

9)  $1080^\circ \cdot \frac{\pi}{180^\circ} = 6\pi$

12)  $15^\circ \cdot \frac{\pi}{180^\circ} = \frac{\pi}{12}$

15)  $\frac{7\pi}{6} \cdot \frac{180^\circ}{\pi} = 210^\circ$

17)  $-\frac{5\pi}{4} \cdot \frac{180^\circ}{\pi} = -225^\circ$

18)  $-\frac{3\pi}{2} \cdot \frac{180^\circ}{\pi} = -270^\circ$

19)  $3 \cdot \frac{180^\circ}{\pi} = \frac{540^\circ}{\pi} \approx 171.9^\circ$

24)  $\frac{5\pi}{18} \cdot \frac{180^\circ}{\pi} = 50^\circ$

27)  $360^\circ + 50^\circ = 410^\circ$   
 $720^\circ + 50^\circ = 770^\circ$

$50^\circ - 360^\circ = -310^\circ$   
 $50^\circ - 720^\circ = -670^\circ$

29)  $\frac{3\pi}{4} + 2\pi = \frac{11\pi}{4}$

$\frac{3\pi}{4} + 4\pi = \frac{19\pi}{4}$

$\frac{3\pi}{4} - 2\pi = -\frac{5\pi}{4}$

$\frac{3\pi}{4} - 4\pi = -\frac{13\pi}{4}$

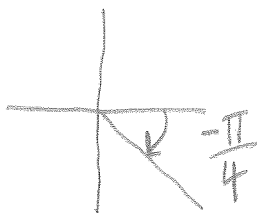
30)  $\frac{11\pi}{6} + 2\pi = \frac{23\pi}{6}$

$4\pi + \frac{11\pi}{6} = \frac{35\pi}{6}$

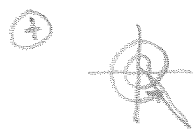
$\frac{11\pi}{6} - 2\pi = -\frac{\pi}{6}$

$\frac{11\pi}{6} - 4\pi = -\frac{13\pi}{6}$

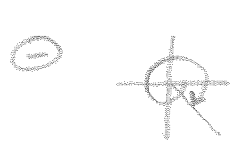
31)



$$2\pi + \left(-\frac{\pi}{4}\right) = \frac{7\pi}{4}$$



$$4\pi + \left(-\frac{\pi}{4}\right) = \frac{15\pi}{4}$$

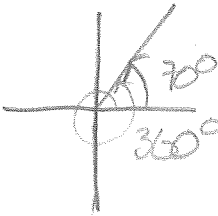


$$\left(-\frac{\pi}{4}\right) - 2\pi = -\frac{9\pi}{4}$$



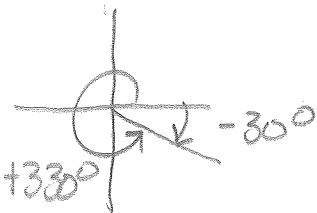
$$\left(-\frac{\pi}{4}\right) - 4\pi = -\frac{17\pi}{4}$$

33)



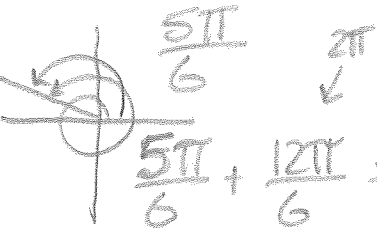
$$360^\circ + 70^\circ = 430^\circ \quad \underline{\text{yes}}$$

34)

yes

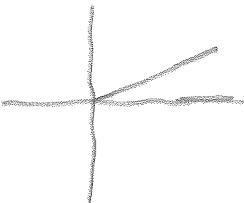
$$360^\circ - 30^\circ = 330^\circ$$

35)



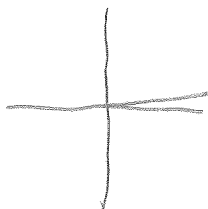
$$\frac{5\pi}{6} + \frac{12\pi}{6} = \frac{17\pi}{6} \quad \underline{\text{yes}}$$

39)



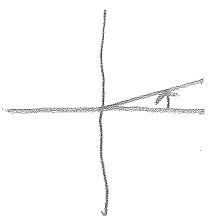
$$733^\circ - 360^\circ = 373^\circ - 360^\circ = 13^\circ$$

40)

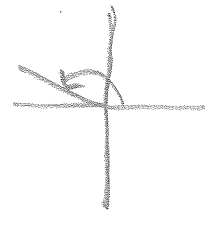


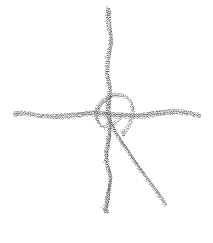
$$361^\circ - 360^\circ = 1^\circ$$

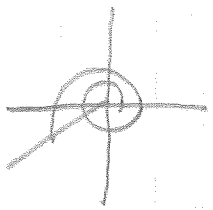
41)



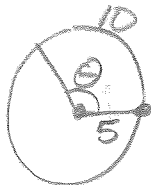
$$1110^\circ - 720^\circ = 390^\circ - 360^\circ = 30^\circ$$

45)   $\frac{17\pi}{6} - \frac{12\pi}{6} = \frac{5\pi}{6}$   
 $\uparrow$   
 $2\pi$

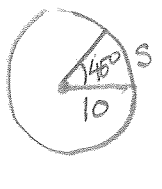
46)   $-\frac{7\pi}{3} + \frac{6\pi}{3} = -\frac{\pi}{3} + \frac{6\pi}{3} = \frac{5\pi}{3}$   
 $\uparrow$   
 $2\pi$

48)   $10 - 6.28 \approx 3.72$   
 $\uparrow$   
 $2\pi$

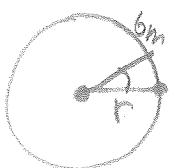
51)  $s = r\theta = 5 \cdot \frac{11\pi}{9} = \frac{55\pi}{9}$   $\theta = 220^\circ = \frac{11\pi}{9} \text{ rad}$   
 $\frac{\pi}{9} = 20^\circ$




52)  $\theta = \frac{s}{r} = \frac{10}{5} = 2 = 114.6^\circ$


54)   $s = 10 \cdot \frac{\pi}{4} = \frac{5\pi}{2}$   $\theta = 45^\circ = \frac{\pi}{4}$

56)   $\theta = \frac{s}{r} = \frac{6}{5} \text{ rad} \cdot \frac{180^\circ}{\pi} \approx 68.75^\circ$

59)   $r = \frac{s}{\theta} = \frac{6\text{m}}{\pi/6} \cdot \frac{6}{6} = \frac{36}{\pi} \text{ m} = 11.46\text{m}$

60)   $r = \frac{s}{\theta} = \frac{4\text{ft}}{3\pi/4} \cdot \frac{4}{4}$   $\theta = 135^\circ = \frac{3\pi}{4}$   
 $= \frac{16\text{ft}}{3\pi} \approx 1.7\text{ft}$

63)  $A = \frac{1}{2} r^2 \theta$

  $A = \frac{1}{2} (10)^2 \cdot 1 = 50\text{m}^2$

65)  $16\text{m}^2 = \frac{1}{2} r^2 \cdot 2$   
 $\sqrt{16\text{m}^2} = \sqrt{r^2} \quad r = 4\text{m}$

66)  $288\text{mi}^2 = \frac{1}{2} \cdot (24\text{mi})^2 \cdot \theta$

$576\text{mi}^2 = (24\text{mi})^2 \cdot \theta$

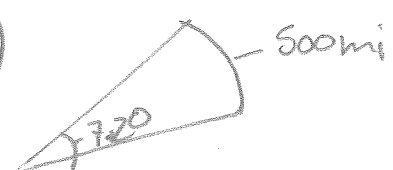
$576\text{mi}^2 = 576\text{mi}^2 \cdot \theta \quad \theta = 1 \text{ radian} = 57.3^\circ$

69)   $r = 14\text{in} \quad C = 28\pi\text{in}$

$10,000C = 10,000(28\pi) = 28,000\pi\text{in.}$   
 $\div 5280 \text{ ft/mile}$   
 $\div 12 \text{ in/ft}$   
 $\approx 13.9 \text{ mi}$

70)   $r = 15\text{in} \quad C = 30\pi\text{in}$

$1\text{mi} = 63,360\text{in} \div 30\pi\text{in} = 672.3 \text{ revolutions}$

74)   $\frac{7.2^\circ}{360^\circ} = \frac{1}{50} = \frac{500\text{mi}}{x} = 25,000\text{mi}$

$$82) r = 11 \text{ in}$$

$$s = r\theta = 11 \cdot 2\pi \cdot 600_{\text{rev}} = 13,200 \pi \text{ inches/min}$$

$$39.3 \text{ m/hr}$$

$$v = 13,200 \pi \text{ in./min} \cdot 60 \text{ min/hr} \cdot \frac{1 \text{ mi}}{5280 \text{ ft}} \cdot \frac{1 \text{ ft}}{12 \text{ in}} = 39.3 \text{ m/hr}$$

$$83) v = \frac{s}{t} = \frac{s = r\theta = 3960 \text{ mi} \cdot 2\pi}{23 + \frac{56}{60} + \frac{4}{3000} \text{ hr}} = \frac{7920\pi}{23 + \frac{56}{60} + \frac{4}{3000} \text{ hr}}$$

$$1039.6 \text{ mi/hr}$$