

ASSIGNMENT #6
SOLUTIONS
943-DW
FALL 2010

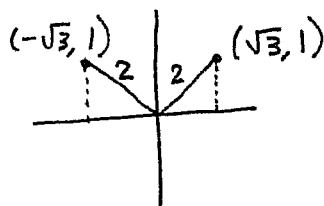
1

P. 117

18 GIVEN $\sin \theta = 1/2$

$y = 1 \quad r = 2$

$x = \pm \sqrt{3}$



$\cos \theta = x/r = \boxed{\pm \sqrt{3}/2}$

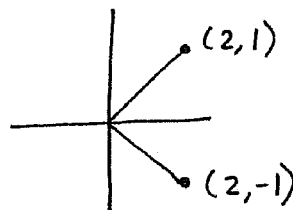
$\csc \theta = r/y = \boxed{2}$

#20 $\sec \theta = \sqrt{5}/2 = r/x$

$r^2 = x^2 + y^2$

$5 = 4 + y^2$

$y = \pm 1$



$\tan \theta = y/x = \boxed{\pm 1/2}$

$\cos \theta = \boxed{2/\sqrt{5}}$

#22 $\cos \theta = 0.326 = x/r$

$r^2 = x^2 + y^2$

$1 = (0.326)^2 + y^2$

$y^2 = 0.893724$

$y = \pm 0.945$

$\sin \theta = \boxed{\pm 0.945}$

$\tan \theta = \pm \frac{0.945}{0.326} = \boxed{\pm 2.90}$

#24 $\csc \theta = 1.20 = r/y$

$r = 1.20$

$y = 1$

$r^2 = x^2 + y^2$

$(1.2)^2 = x^2 + 1^2$

$x = \pm 0.66$

$\sec \theta = r/x = \frac{1.2}{\pm 0.66} = \boxed{\pm 1.818}$

$\cos \theta = x/r = \pm \frac{0.66}{1.2} = \boxed{\pm 0.55}$

#26 TERMINAL Sides
(5,12) (15,36) & (7.5,18)

(5,12) $x=5$ $r^2 = x^2 + y^2$
 $y=12$ $r = 13$

$\cos\theta = x/r = 5/13$

$\cot\theta = x/y = 5/12$

(15,36) $x=15$ $r^2 = x^2 + y^2$
 $y=36$ $r = 39$

$\cos\theta = x/r = 15/39 = 5/13$

$\cot\theta = x/y = 15/36 = 5/12$

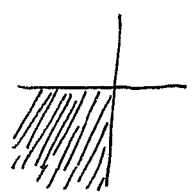
(7.5, 18) $x=7.5$ $r^2 = x^2 + y^2$
 $y=18$ $= (7.5)^2 + (18)^2$
 $r = 19.5$

$\cos\theta = x/r = 7.5/19.5 = 5/13$

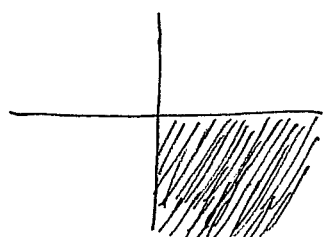
$\cot\theta = x/y = 7.5/18 = 5/12$

P. 238 # 30, 32, 34, 36

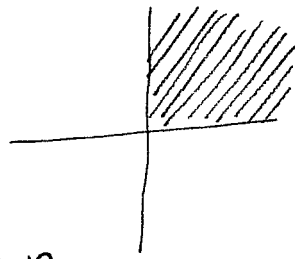
30 $\tan\theta > 0$ BOTH x, y POSITIVE OR BOTH x, y NEGATIVE
 $\cos\theta < 0$ x NEGATIVE



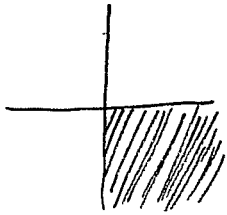
#32 $\cos\theta > 0$ x POSITIVE
 $\csc\theta < 0$ y NEGATIVE



#34 $\sec\theta > 0$ x positive
 $\csc\theta > 0$ y positive



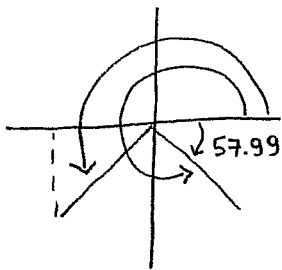
#36 $\cot\theta < 0$ x, y opposite signs
 $\sin\theta < 0$ y negative



p. 243

#27 $\sin\theta = -0.8480$

$\sin^{-1}(-0.8480) = -57.99$

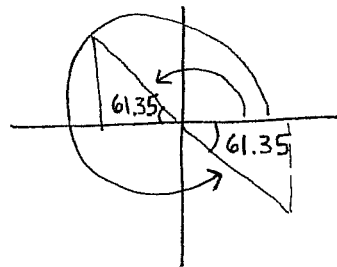


$\theta_1 = 360^\circ - 57.99^\circ$
 $= 302^\circ$

$\theta_2 = 180^\circ + 57.99^\circ$
 $= 237.99^\circ$

#28 $\tan\theta = -1.830$

$\theta = \tan^{-1}(-1.830)$
 $= -61.35^\circ$

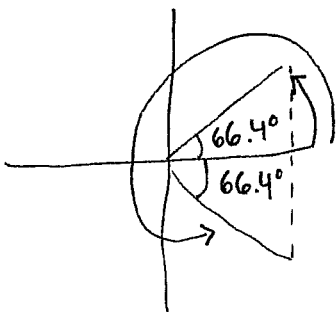


$\theta_1 = 360^\circ - 61.35^\circ$
 $= 298.65^\circ$

$\theta_2 = 180^\circ - 61.35^\circ$
 $= 118.65^\circ$

#29 $\cos\theta = 0.4003$

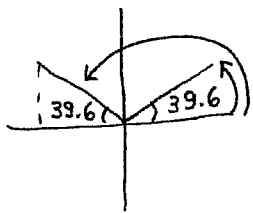
$\theta = \cos^{-1}(0.4003)$
 $= 66.4^\circ$



$\theta_1 = 66.4^\circ$

$\theta_2 = 360^\circ - 66.4^\circ$
 $= 293.6^\circ$

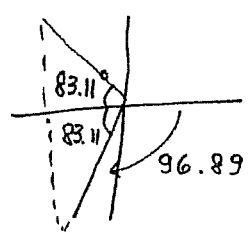
30 $\sin \theta = 0.6374$
 $\theta = \sin^{-1}(0.6374)$
 $= 39.6^\circ$



$\theta_1 = 39.6^\circ$
 $\theta_2 = 180^\circ - 39.6^\circ = 140.4^\circ$

35 $\cos \theta = -0.12$ $\tan \theta > 0$

$\theta = \cos^{-1}(0.12)$
 $= 96.89^\circ$

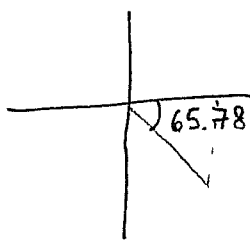


$\theta_1 = 96.89^\circ$
 $\theta_2 = 263.11^\circ$

BUT $\tan > 0$ MEANS
 ONLY $\theta_2 = 263.11^\circ$
 IS A SOLUTION

36 $\sin \theta = -0.912$ $\tan \theta < 0$

$\theta = \sin^{-1}(-0.912)$
 $= -65.78^\circ$



$\theta = 360^\circ - 65.78^\circ$
 $= 294.22^\circ$

p. 252 # 5, 6, 8, 9, 20, 22

5 $r = 3.3 \text{ cm}$
 $\theta = \pi/3$

$s = r\theta$ $s = (3.3)\pi/3$
 $= 1.1\pi$ OR 3.456

6 $r = 21.2 \text{ cm}$
 $\theta = 2.65$
 $s = ?$

$$s = \theta \cdot r$$

$$= (2.65)(21.2)$$

$$= \boxed{56.18 \text{ cm}}$$

8 $s = 0.3456 \text{ m}$
 $\theta = 73.61^\circ$

$$\theta \text{ in rad} = 73.61^\circ \cdot \frac{\pi}{180^\circ}$$

$$= 1.285$$

$$\frac{s}{r} = \theta$$

$$r = \frac{0.3456 \text{ m}}{1.285} = \boxed{0.2689 \text{ m}}$$

9 $s = 0.3913 \text{ km}$
 $r = 0.9449 \text{ km}$

$$\theta = \frac{s}{r} = \frac{0.3913}{0.9449} = \boxed{0.4141}$$

$$A = \frac{1}{2} r^2 \theta = \frac{1}{2} (0.2689)^2 (1.285)$$

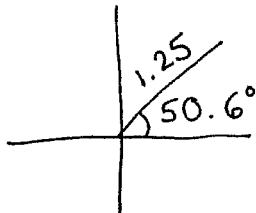
$$= \boxed{0.0465 \text{ m}^2}$$

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

$$= \frac{1}{2} (0.9449)^2 (0.4141)$$

$$= \boxed{0.185 \text{ km}^2}$$

20



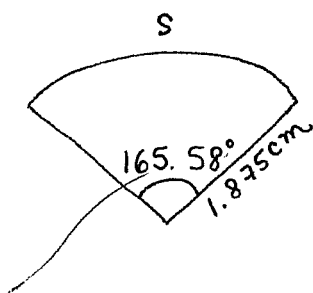
$$\theta = 50.6^\circ \frac{\pi}{180^\circ}$$

$$= 0.883$$

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

$$= \frac{1}{2} (1.25)^2 (0.883) = \boxed{0.68995}$$

22



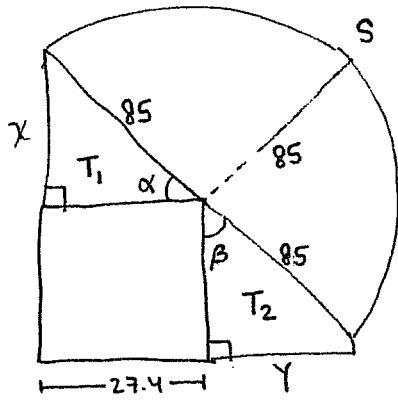
$$\theta = 165.58^\circ \frac{\pi}{180^\circ} = 2.8899$$

$$\theta = \frac{s}{r} \quad s = 2.8899 (1.875) = 5.419 \text{ cm}$$

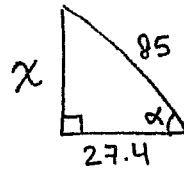
$$P = 5.419 + 2(1.875) = \boxed{9.169 \text{ cm}}$$

52

6



TRIANGLE T_1 :



$$\cos \alpha = \frac{27.4}{85}$$

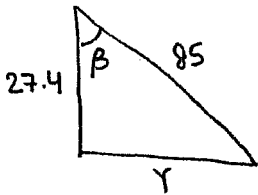
$$\alpha = \cos^{-1}\left(\frac{27.4}{85}\right) = 71.195^\circ$$

$$\chi^2 + 27.4^2 = 85^2$$

$$\chi = 80.463$$

$$\text{AREA } T_1 = \frac{(27.4)(80.463)}{2} = 1102.34$$

TRIANGLE T_2 :



$$\cos \beta = \frac{27.4}{85}$$

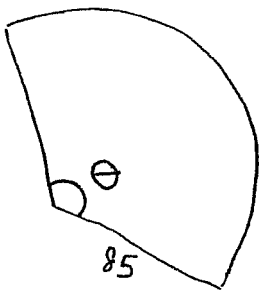
$$\beta = 71.195^\circ$$

$$\text{AREA } T_2 = 1102.34$$

SQUARE:

$$\text{AREA} = (27.4)^2 = 750.76$$

SECTOR OF CIRCLE



$$\theta = 360^\circ - 90^\circ - 71.195^\circ - 71.195^\circ = 127.61^\circ$$

$$\theta \text{ in rad} = 127.61^\circ \frac{\pi}{180^\circ} = 2.227$$

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

$$= \frac{1}{2} (85)^2 (2.227) = 8045.04$$

$$\text{TOTAL} = 1102.34 + 1102.34 + 750.76 + 8045.04$$

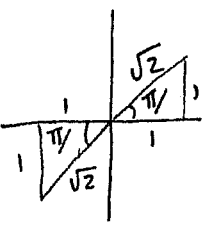
$$= \boxed{11000.48 \text{ m}^2}$$

P. 548 # 5, 8, 9, 11, 25, 28, 40

5 $\sin x - 1 = 0$
 $\sin x = 1$

$x = \pi/2$

8 $4 \tan x + 2 = 3(1 + \tan x)$
 $4 \tan x + 2 = 3 + 3 \tan x$
 $\tan x = 1$

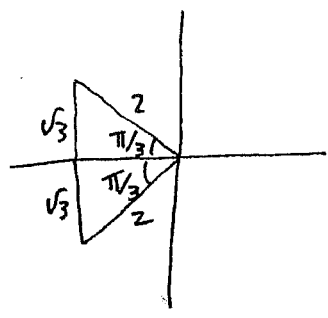
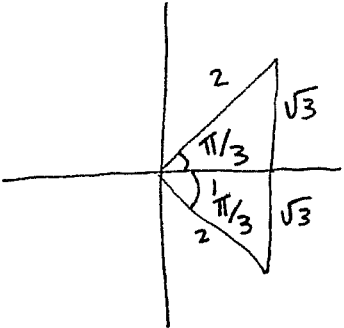


$x = \pi/4, 5\pi/4$

9 $4 \cos^2 x - 1 = 0$
 $\cos^2 x = 1/4$
 $\cos x = \pm 1/2$

$\cos x = 1/2$

$\cos x = -1/2$



$x = \pi/3, 5\pi/3$

$x = 2\pi/3, 4\pi/3$

SOLUTIONS

$\pi/3, 2\pi/3, 4\pi/3, 5\pi/3$

11 $2 \sin^2 x - \sin x = 0$

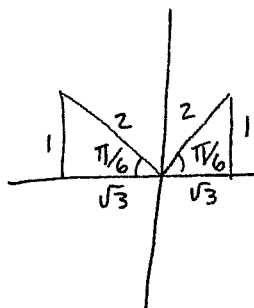
$\sin x (2 \sin x - 1) = 0$

$\sin x = 0$ OR $\sin x = 1/2$

$x = 0, \pi$

$x = \pi/6, 5\pi/6$

SOLUTIONS $0, \pi/6, 5\pi/6, \pi$

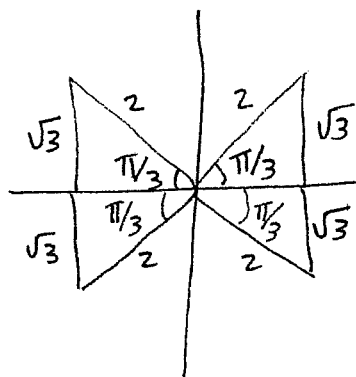


25 $4 \sin^2 x - 3 = 0$

$\sin^2 x = 3/4$

$\sin x = \pm \sqrt{3}/2$

$x = \pi/3, 2\pi/3, 4\pi/3, 5\pi/3$



28 $3 \cos x - 4 \cos^2 x = 0$

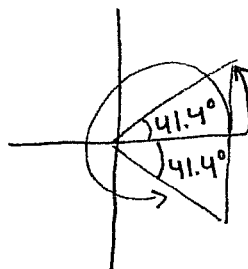
$\cos x (3 - 4 \cos x) = 0$

$\cos x = 0$ OR $\cos x = 3/4$

$x = \pi/2, 3\pi/2$

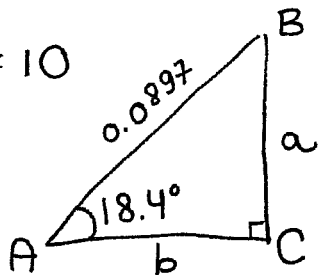
$x = 41.4^\circ, 318.6^\circ$

$x = 41.4^\circ, 90^\circ, 270^\circ, 318.6^\circ$



P. 123

10



$$\cos 18.4^\circ = \frac{b}{0.0897}$$

$$\sin 18.4^\circ = \frac{a}{0.0897}$$

$$b = 0.0851$$

$$a = 0.0283$$

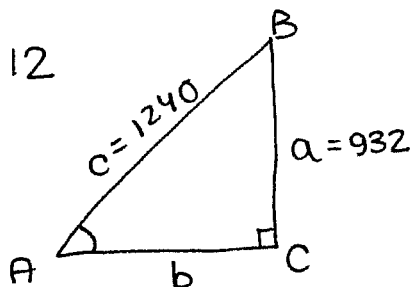
$$c = 0.0897$$

$$A = 18.4^\circ$$

$$B = 71.6^\circ$$

$$C = 90^\circ$$

12



$$\sin A = \frac{932}{1240}$$

$$A = 48.73^\circ$$

$$B = 90^\circ - 48.73^\circ = 41.26^\circ$$

$$C = 90^\circ$$

$$a = 932$$

$$b^2 + 932^2 = 1240^2$$

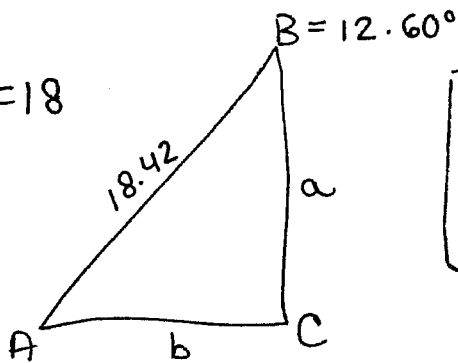
$$b = 817.9$$

$$a = 932$$

$$b = 817.9$$

$$c = 1240$$

18



$$A = 77.4^\circ$$

$$B = 12.6^\circ$$

$$C = 90^\circ$$

$$\cos 12.60^\circ = \frac{a}{18.42}$$

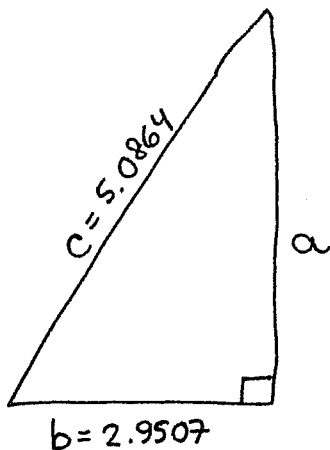
$$a = 17.98$$

$$\sin 12.60^\circ = \frac{b}{18.42}$$

$$b = 4.02$$

$$c = 18.42$$

26



$$A = 54.54^\circ$$

$$B = 35.46^\circ$$

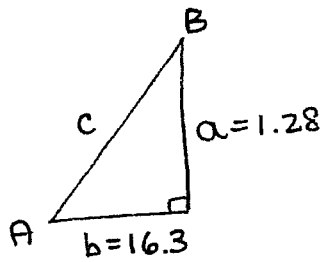
$$C = 90^\circ$$

$$a = 4.14$$

$$b = 2.9507$$

$$c = 5.0864$$

30

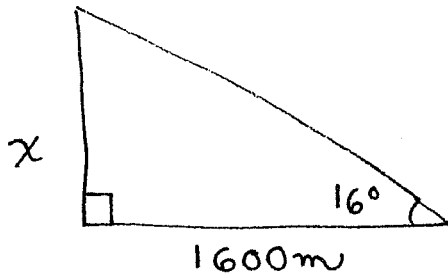


$$\begin{aligned} A &= 4.49^\circ \\ B &= 85.51^\circ \\ C &= 90^\circ \end{aligned}$$

$$\begin{aligned} a &= 1.28 \\ b &= 16.3 \\ c &= 16.35 \end{aligned}$$

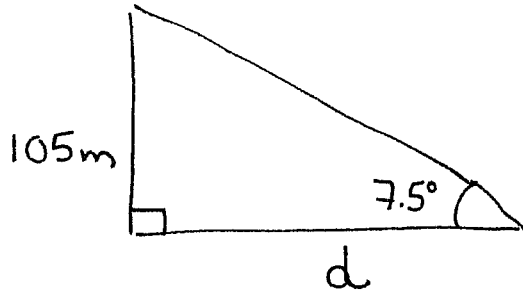
P. 126

10



$$\begin{aligned} x &= \tan 16^\circ (1600) \\ &= \boxed{458.79\text{m}} \end{aligned}$$

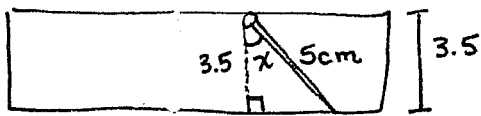
12



$$\tan 7.5^\circ = \frac{105}{d}$$

$$\boxed{d = 797.554\text{m}}$$

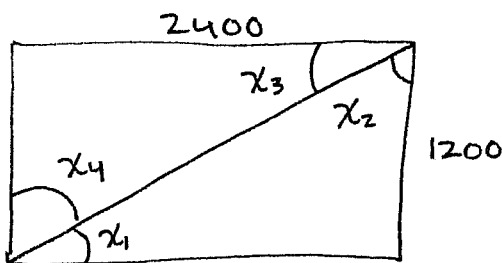
14



$$\begin{aligned} \cos x &= 3.5/5 \\ x &= \cos^{-1}(3.5/5) \end{aligned}$$

$$\boxed{x = 45.57^\circ}$$

15



$$\begin{aligned} \tan x_1 &= 1/2 \quad x_1 = \tan^{-1}(1/2) \\ &= 26.2^\circ \end{aligned}$$

$$\begin{aligned} x_1 &= x_3 = 26.2^\circ \\ x_2 &= x_4 = 63.8^\circ \end{aligned}$$