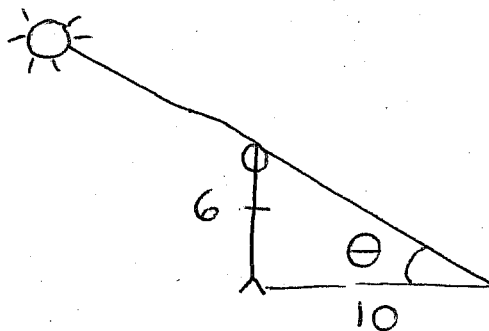


SOLUTIONS ASS # 9 MATH 171

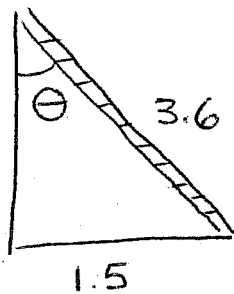
1



$$\tan \theta = \frac{6}{10}$$

$$\theta = \tan^{-1}\left(\frac{6}{10}\right) = \boxed{31^\circ}$$

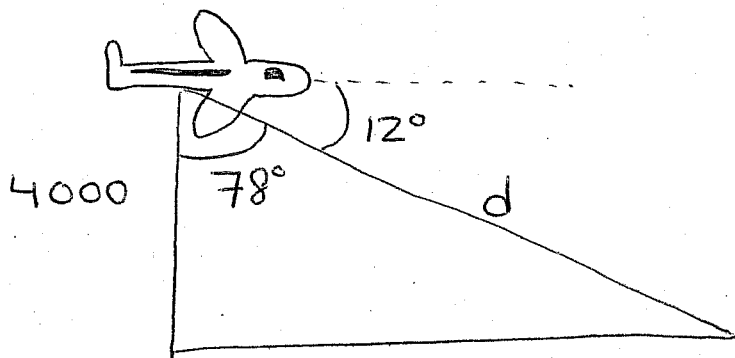
2



$$\sin \theta = \frac{1.5}{3.6}$$

$$\theta = \sin^{-1}\left(\frac{1.5}{3.6}\right) = \boxed{25^\circ}$$

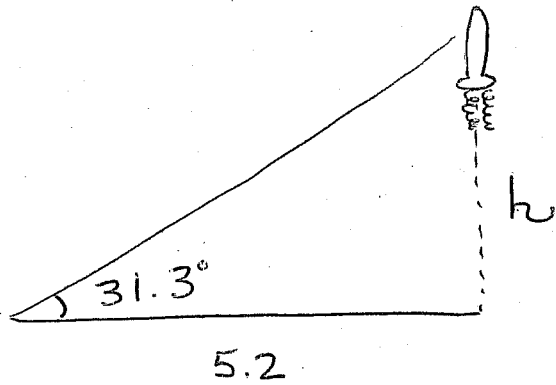
3



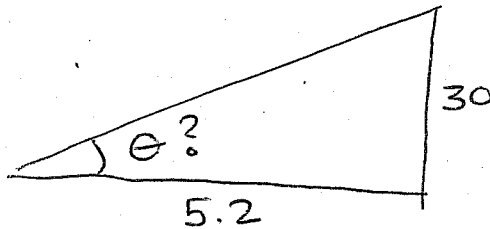
$$\cos(78^\circ) = \frac{4000}{d}$$

$$d = \frac{4000}{\cos 78^\circ} = \boxed{19239}$$

4

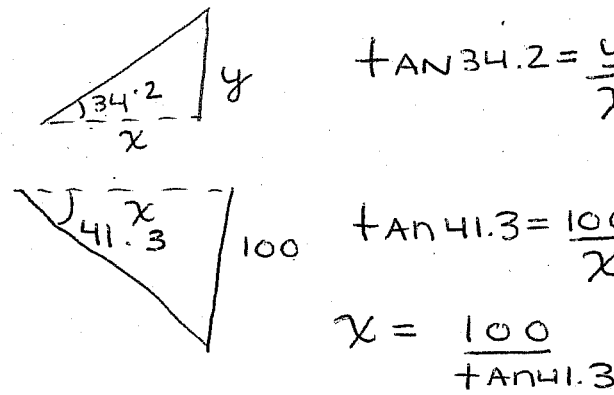
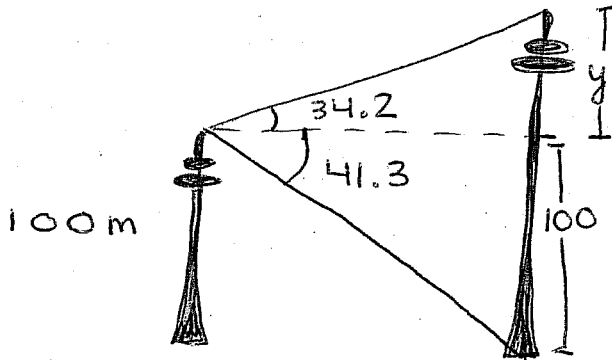


(a) $\tan(31.3^\circ) = \frac{h}{5.2}$
 $h = 5.2 \tan(31.3^\circ)$
 $= 3.16$



(b) $\tan \theta = \frac{30}{5.2}$
 $\theta = \tan^{-1}\left(\frac{30}{5.2}\right)$
 $= 80.2^\circ$

5

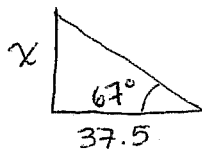
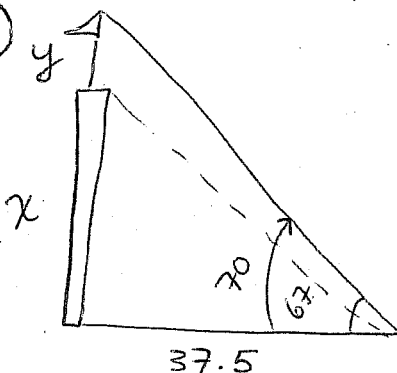


$\tan 34.2 = \frac{y}{x}$
 $\tan 41.3 = \frac{100}{x}$
 $x = \frac{100}{\tan 41.3}$
 $y = x \tan 34.2$
 $= \frac{100}{\tan 41.3} (\tan 34.2)$
 $= 77.4$

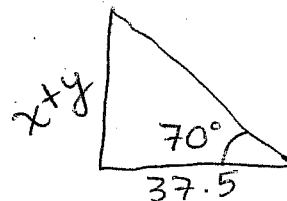
(b) Height is $100 + y = 177.4$

(a) distance is $x = 114$

6



$\tan 67^\circ = \frac{x}{37.5}$
 $x = 88.3$

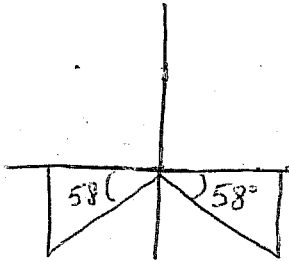


$\tan 70^\circ = \frac{x+y}{37.5}$
 $x+y = 103$

$11 = 14.7$

8.2 p. 243 #27-36

27 $\sin \theta = -0.8480$



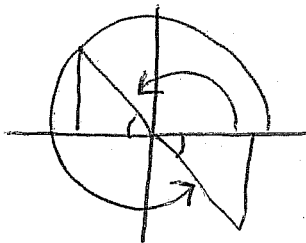
reference
Angle $\sin^{-1}(0.8480) = 58^\circ$

$$\theta = 180^\circ + 58^\circ = 238^\circ$$

$$\theta = 360^\circ - 58^\circ = 302^\circ$$

SOLUTIONS $238^\circ, 302^\circ$

28 $\tan \theta = -1.830$



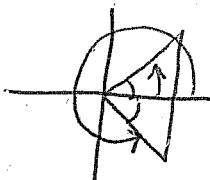
ref. angle $\tan^{-1}(1.830) = 61.3^\circ$

$$\theta = 180^\circ - 61.3^\circ = 118.7^\circ$$

$$\theta = 360^\circ - 61.3^\circ = 298.7^\circ$$

SOLUTIONS $118.7^\circ, 298.7^\circ$

29 $\cos \theta = 0.4003$



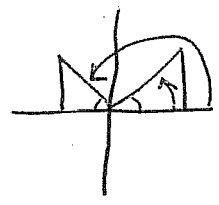
ref. angle $\cos^{-1}(0.4003) = 66.4^\circ$

$$\theta = 66.4^\circ$$

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

SOLUTIONS $66.4^\circ, 293.6^\circ$

30 $\sin \theta = 0.6374$

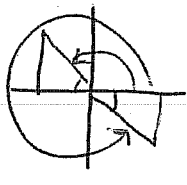


$\sin^{-1}(0.6374) = 39.6^\circ$

Solutions Are $39.6^\circ, 140.4^\circ$

31 $\cot \theta = -0.212$

$\tan \theta = -4.7$

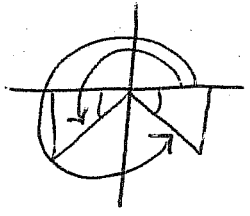


$\tan^{-1}(4.7) = 78^\circ$

Solutions Are $102^\circ, 282^\circ$

32 $\csc \theta = -1.09$

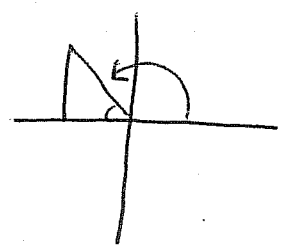
$\sin \theta = -0.92$



$\sin^{-1}(0.92) = 67^\circ$

Solutions Are $247^\circ, 293^\circ$

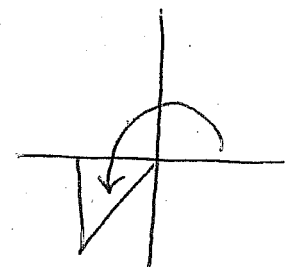
33 $\sin \theta = 0.870$ $\cos \theta < 0$



$\sin^{-1}(0.870) = 60.5^\circ$

Solution is 119.5°

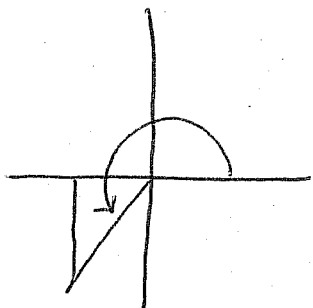
34 $\tan \theta = 0.932$ $\sin \theta < 0$



$\tan^{-1}(0.932) = 43^\circ$

Solution is 223°

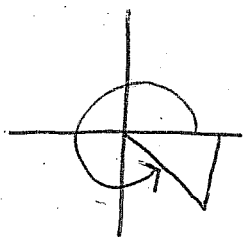
$$\#35 \quad \cos \theta = -0.12 \quad \tan \theta > 0$$



$$\cos^{-1}(0.12) = 83^\circ$$

solution is 263°

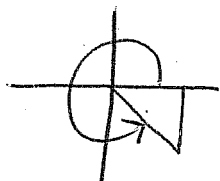
$$\#36 \quad \sin \theta = -0.192 \quad \tan \theta < 0$$



$$\sin^{-1}(0.192) = 11^\circ$$

solution is 349°

$$\#37 \quad \tan \theta = -1.366 \quad \cos \theta > 0$$



$$\tan^{-1}(1.366) = 53.8^\circ$$

solution is 306.2°

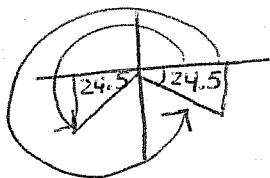
ADDITIONAL TRIG EQUATIONS SOLUTIONS

$$\textcircled{A} \quad \sin^2 x - 2 \sin x - 1 = 0$$

YOU CANNOT FACTOR, SO YOU MUST USE THE QUADRATIC FORMULA

$$\sin x = \frac{2 \pm \sqrt{(-2)^2 - 4(1)(-1)}}{2(1)} = \frac{2 \pm \sqrt{8}}{2} = 1 \pm \sqrt{2}; \quad \begin{matrix} 2.414 \\ -0.414 \end{matrix}$$

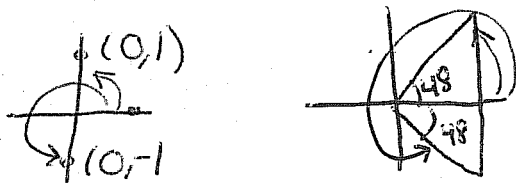
reference angles: $\sin^{-1}(1 + \sqrt{2}) = \text{error}$
 $\sin^{-1}(-0.414) = 24.5^\circ$



Solutions Are
 204.5° & 335.5°

(B) $6\cos^2 x - 4\cos x = 0$
 $2\cos x (3\cos x - 2) = 0$
 $\cos x = 0$ $\cos x = 2/3$

reference Angles $\cos^{-1}(0) = 90^\circ$
 $\cos^{-1}(2/3) = 48^\circ$

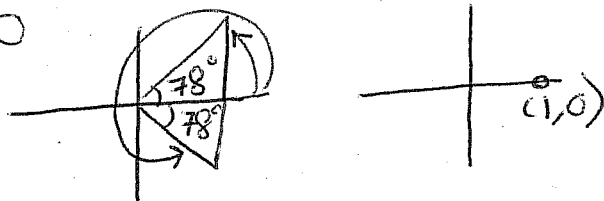


Solutions are
 $90^\circ, 270^\circ, 48^\circ, 312^\circ$

(C) $5\cos x - 6 = -\sec x$
 $5\cos x - 6 = \frac{-1}{\cos x}$ multiply by $\cos x$

$5\cos^2 x - 6\cos x = -1$
 $5\cos^2 x - 6\cos x + 1 = 0$
 $5\cos^2 x - 5\cos x - \cos x + 1 = 0$
 $5\cos x (\cos x - 1) - 1(\cos x - 1) = 0$
 $(5\cos x - 1)(\cos x - 1) = 0$
 $\cos x = 1/5$ $\cos x = 1$

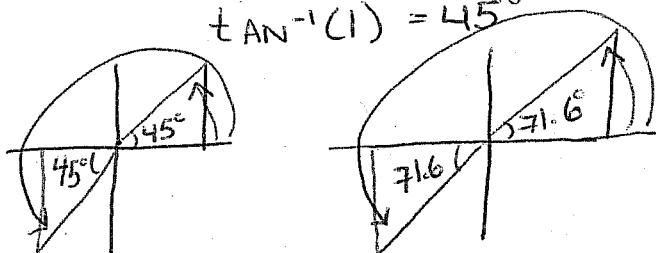
ref angles $\cos^{-1}(1/5) = 78.5^\circ$
 $\cos^{-1}(1) = 0^\circ$



Solutions Are
 $78.5^\circ, 281.5^\circ, 0^\circ$

(D) $\frac{\tan x + 3}{\tan x} = 4$
 $\tan^2 x + 3 = 4\tan x$
 $\tan^2 x - 4\tan x + 3 = 0 \Rightarrow (\tan x - 3)(\tan x - 1) = 0$
 $\tan x = 3$ $\tan x = 1$

ref Angles
 $\tan^{-1}(3) = 71.6^\circ$
 $\tan^{-1}(1) = 45^\circ$



Solutions ARE
 $45^\circ, 225^\circ, 71.6^\circ, 251.6^\circ$

(E)

$$\csc^4 x - 7\csc^2 x + 10 = 0$$

$$\csc^4 x - 5\csc^2 x - 2\csc^2 x + 10 = 0$$

$$\csc^2 x (\csc^2 x - 5) - 2(\csc^2 x - 5) = 0$$

$$(\csc^2 x - 5)(\csc^2 x - 2) = 0$$

$$\text{so } \csc^2 x - 5 = 0$$

$$\csc^2 x = 5$$

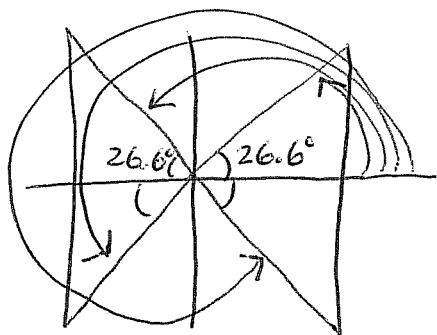
$$\csc x = \pm\sqrt{5}$$

$$\frac{1}{\sin x} = \pm\sqrt{5}$$

$$\sin x = \pm\frac{1}{\sqrt{5}}$$

ref. angle

$$\sin^{-1}\left(\frac{1}{\sqrt{5}}\right) = 26.6^\circ$$



$$\csc^2 x - 2 = 0$$

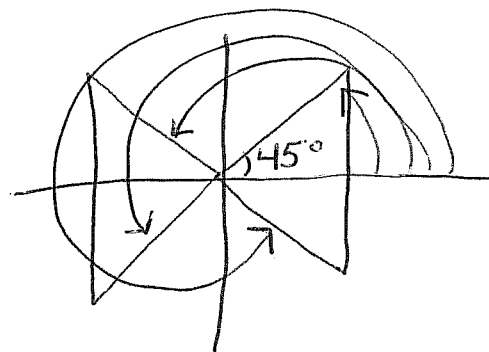
$$\csc^2 x = 2$$

$$\csc x = \pm\sqrt{2}$$

$$\frac{1}{\sin x} = \pm\sqrt{2}$$

$$\sin x = \pm\frac{1}{\sqrt{2}}$$

$$\sin^{-1}\left(\frac{1}{\sqrt{2}}\right) = 45^\circ$$



Solutions are

$$26.6^\circ, 153.4^\circ, 206.6^\circ, 333.4^\circ$$

$$45^\circ, 135^\circ, 225^\circ, 315^\circ$$

