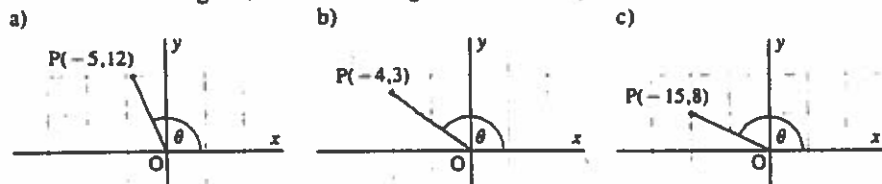


1. Use a calculator to find the value of each trigonometric ratio to 3 decimal places.

- a)  $\sin 98^\circ$  b)  $\tan 113^\circ$  c)  $\cos 124^\circ$  d)  $\sec 174^\circ$  e)  $\csc 161^\circ$  f)  $\cot 143^\circ$

2. For each obtuse angle  $\theta$ , state the six trigonometric ratios.



3. Evaluate each trigonometric ratio. Give exact answers.

- a)  $\cos 120^\circ$  b)  $\sin 150^\circ$  c)  $\cot 135^\circ$  d)  $\csc 150^\circ$  e)  $\sec 135^\circ$  f)  $\sin 135^\circ$   
g)  $\tan 120^\circ$  h)  $\cot 120^\circ$  i)  $\sin 120^\circ$  j)  $\cot 150^\circ$  k)  $\csc 135^\circ$  l)  $\sec 120^\circ$

4. Evaluate each trigonometric ratio to 2 decimal places.

- a)  $\cos 110^\circ$  b)  $\cot 95^\circ$  c)  $\csc 138^\circ$  d)  $\tan 108^\circ$  e)  $\sin 142^\circ$  f)  $\tan 170^\circ$   
g)  $\sec 115^\circ$  h)  $\cot 130^\circ$  i)  $\csc 165^\circ$  j)  $\cos 140^\circ$  k)  $\sec 175^\circ$  l)  $\sin 100^\circ$

5. Given  $\theta$  is an obtuse angle and the value of one trigonometric ratio, find the other trigonometric ratios.

- a)  $\sin \theta = \frac{15}{17}$ ; find  $\tan \theta$  and  $\sec \theta$       b)  $\tan \theta = -\frac{7}{24}$ ; find  $\cos \theta$  and  $\csc \theta$   
c)  $\sec \theta = -\frac{13}{5}$ ; find  $\sin \theta$  and  $\cot \theta$       d)  $\cot \theta = -\frac{20}{21}$ ; find  $\cos \theta$  and  $\csc \theta$   
e)  $\cos \theta = -\frac{40}{41}$ ; find  $\sin \theta$  and  $\cot \theta$       f)  $\csc \theta = \frac{5}{4}$ ; find  $\tan \theta$  and  $\sec \theta$

**B**

6. Find each value of  $\theta$  if  $\theta$  is obtuse.

- a)  $\sin \theta = \frac{1}{\sqrt{2}}$       b)  $\sec \theta = -2$       c)  $\tan \theta = -\sqrt{3}$       d)  $\cos \theta = -\frac{1}{\sqrt{2}}$   
e)  $\csc \theta = 2$       f)  $\cot \theta = -\sqrt{3}$       g)  $\cot \theta = -1$       h)  $\sin \theta = \frac{\sqrt{3}}{2}$   
i)  $\cos \theta = -\frac{\sqrt{3}}{2}$       j)  $\sec \theta = -\frac{2}{\sqrt{3}}$       k)  $\tan \theta = -1$       l)  $\csc \theta = \sqrt{2}$

7. Find each value of  $\theta$  to the nearest degree if  $\theta$  is obtuse.

- a)  $\sin \theta = 0.906$       b)  $\cos \theta = -0.574$       c)  $\tan \theta = -3.732$   
d)  $\cot \theta = -1.428$       e)  $\csc \theta = 1.743$       f)  $\sec \theta = -2.669$   
g)  $\tan \theta = -0.532$       h)  $\sin \theta = 0.978$       i)  $\cot \theta = -0.123$   
j)  $\csc \theta = 1.086$       k)  $\cos \theta = -0.777$       l)  $\sec \theta = -1.010$

8. Given  $\theta$  is an obtuse angle and the value of one trigonometric ratio, find the other trigonometric ratio, and  $\theta$  to the nearest degree.

- a)  $\sin \theta = \frac{3}{\sqrt{13}}$ ; find  $\sec \theta$  and  $\theta$       b)  $\cot \theta = -\frac{3}{7}$ ; find  $\cos \theta$  and  $\theta$   
c)  $\cos \theta = -\frac{2}{9}$ ; find  $\cot \theta$  and  $\theta$       d)  $\csc \theta = \frac{\sqrt{5}}{2}$ ; find  $\tan \theta$  and  $\theta$   
e)  $\tan \theta = -3$ ; find  $\csc \theta$  and  $\theta$       f)  $\sec \theta = -\frac{53}{45}$ ; find  $\sin \theta$  and  $\theta$

**C**

9. If  $\theta$  is an acute angle defined by  $P(x,y)$ , use  $x$ ,  $y$ , and  $r$  to define the six trigonometric ratios of: a)  $(180^\circ + \theta)$       b)  $(360^\circ - \theta)$ .

10. State the value of each ratio exactly. Draw a diagram to illustrate each angle.

- a)  $\sin 225^\circ$       b)  $\cos 240^\circ$       c)  $\cot 210^\circ$   
d)  $\sin 270^\circ$       e)  $\tan 300^\circ$       f)  $\sec 315^\circ$   
g)  $\cos 180^\circ$       h)  $\csc 330^\circ$       i)  $\sec 360^\circ$

11. State two values of  $\theta$  to the nearest degree for each trigonometric ratio.

- a)  $\sin \theta = 0.906$       b)  $\cos \theta = -0.616$       c)  $\tan \theta = -5.671$   
d)  $\csc \theta = -2.924$       e)  $\sec \theta = 1.743$       f)  $\cot \theta = 2.145$   
g)  $\tan \theta = -0.700$       h)  $\sec \theta = -1.155$       i)  $\sin \theta = -0.966$   
j)  $\cos \theta = -0.423$       k)  $\csc \theta = 1.035$       l)  $\cot \theta = -2.747$

**ANSWERS**

1. a) 0.990      b) -2.356      c) -0.559  
d) -1.006      e) 3.072      f) -1.327
2. a)  $\sin \theta = \frac{12}{13}$ ,  $\cos \theta = -\frac{5}{13}$ ,  $\tan \theta = -\frac{12}{5}$ ,  
 $\csc \theta = \frac{13}{12}$ ,  $\sec \theta = -\frac{13}{5}$ ,  $\cot \theta = -\frac{5}{12}$   
b)  $\sin \theta = \frac{3}{5}$ ,  $\cos \theta = -\frac{4}{5}$ ,  $\tan \theta = -\frac{3}{4}$ ,  
 $\csc \theta = \frac{5}{3}$ ,  $\sec \theta = -\frac{5}{4}$ ,  $\cot \theta = -\frac{4}{3}$   
c)  $\sin \theta = \frac{8}{17}$ ,  $\cos \theta = -\frac{15}{17}$ ,  $\tan \theta = -\frac{8}{15}$ ,  
 $\csc \theta = \frac{17}{8}$ ,  $\sec \theta = -\frac{17}{15}$ ,  $\cot \theta = -\frac{15}{8}$
3. a)  $-\frac{1}{2}$       b)  $\frac{1}{2}$       c) -1      d) 2      e)  $-\sqrt{2}$   
f)  $\frac{1}{\sqrt{2}}$       g)  $-\sqrt{3}$       h)  $-\frac{1}{\sqrt{3}}$       i)  $\frac{\sqrt{3}}{2}$   
j)  $-\sqrt{3}$       k)  $\sqrt{2}$       l) -2      4. a) -0.34  
b) -0.09      c) 1.49      d) -3.08      e) 0.62  
f) -0.18      g) -2.37      h) -0.84      i) 3.86  
j) -0.77      k) -1.00      l) 0.98
5. a)  $-\frac{15}{8}$ ,  $-\frac{17}{8}$       b)  $-\frac{24}{25}$ ,  $\frac{25}{7}$       c)  $\frac{12}{13}$ ,  $-\frac{5}{12}$   
d)  $-\frac{20}{29}$ ,  $\frac{29}{21}$       e)  $\frac{9}{41}$ ,  $-\frac{40}{9}$       f)  $-\frac{4}{3}$ ,  $-\frac{5}{3}$
6. a)  $135^\circ$       b)  $120^\circ$       c)  $120^\circ$       d)  $135^\circ$   
e)  $150^\circ$       f)  $150^\circ$       g)  $135^\circ$       h)  $120^\circ$   
i)  $150^\circ$       j)  $150^\circ$       k)  $135^\circ$       l)  $135^\circ$
7. a)  $115^\circ$       b)  $125^\circ$       c)  $105^\circ$       d)  $145^\circ$   
e)  $145^\circ$       f)  $112^\circ$       g)  $152^\circ$       h)  $102^\circ$   
i)  $97^\circ$       j)  $113^\circ$       k)  $141^\circ$       l)  $172^\circ$
8. a)  $-\frac{\sqrt{13}}{2}$ ,  $124^\circ$       b)  $-\frac{3}{\sqrt{58}}$ ,  $113^\circ$   
c)  $-\frac{2}{\sqrt{77}}$ ,  $103^\circ$       d) -2,  $117^\circ$   
e)  $\frac{\sqrt{10}}{3}$ ,  $108^\circ$       f)  $\frac{28}{53}$ ,  $148^\circ$
9. a)  $\sin(180^\circ + \theta) = -\frac{y}{r}$ ;  $\csc(180^\circ + \theta) = -\frac{r}{y}$   
 $\cos(180^\circ + \theta) = -\frac{x}{r}$ ;  $\sec(180^\circ + \theta) = -\frac{r}{x}$   
 $\tan(180^\circ + \theta) = \frac{y}{x}$ ;  $\cot(180^\circ + \theta) = \frac{x}{y}$   
b)  $\sin(360^\circ - \theta) = -\frac{y}{r}$ ;  $\csc(360^\circ - \theta) = -\frac{r}{y}$   
 $\cos(360^\circ - \theta) = \frac{x}{r}$ ;  $\sec(360^\circ - \theta) = \frac{r}{x}$   
 $\tan(360^\circ - \theta) = -\frac{y}{x}$ ;  $\cot(360^\circ - \theta) = -\frac{x}{y}$
10. a)  $-\frac{1}{\sqrt{2}}$       b)  $-\frac{1}{2}$       c)  $\sqrt{3}$       d) -1  
e)  $-\sqrt{3}$       f)  $\sqrt{2}$       g) -1      h) -2      i) 1
11. a)  $65^\circ$ ,  $115^\circ$       b)  $128^\circ$ ,  $232^\circ$       c)  $100^\circ$ ,  $280^\circ$   
d)  $200^\circ$ ,  $340^\circ$       e)  $55^\circ$ ,  $305^\circ$       f)  $25^\circ$ ,  $205^\circ$   
g)  $145^\circ$ ,  $325^\circ$       h)  $150^\circ$ ,  $210^\circ$       i)  $255^\circ$ ,  $285^\circ$   
j)  $115^\circ$ ,  $245^\circ$       k)  $75^\circ$ ,  $105^\circ$       l)  $160^\circ$ ,  $340^\circ$

1 a)  $\sin 98^\circ \approx 0.990$     b)  $\tan 113^\circ \approx 2.356$     c)  $\cos 124^\circ \approx -0.559$     d)  $\sec 174^\circ = \frac{1}{\cos 174^\circ} \approx -1.006$     e)  $\csc 161^\circ = \frac{1}{\sin 161^\circ} \approx -3.072$

f)  $\cot 143^\circ = \frac{1}{\tan 143^\circ} \approx -1.327$

2. a)  $P(-5, 12)$   
 $r = \sqrt{25 + 144} = 13$   
 $\sin \theta = \frac{12}{13}$      $\cos \theta = \frac{-5}{13}$      $\tan \theta = \frac{-12}{5}$   
 $\csc \theta = \frac{13}{12}$      $\sec \theta = \frac{-13}{5}$      $\cot \theta = \frac{-5}{12}$

b)  $P(-4, 3)$   
 $r = 5$   
 $\sin \theta = \frac{3}{5}$      $\cos \theta = \frac{-4}{5}$      $\tan \theta = \frac{-3}{4}$   
 $\csc \theta = \frac{5}{3}$      $\sec \theta = \frac{-5}{4}$      $\cot \theta = \frac{-4}{3}$

c)  $P(-15, 8)$   
 $r = \sqrt{225 + 64} = 17$   
 $\sin \theta = \frac{8}{17}$      $\cos \theta = \frac{-15}{17}$      $\tan \theta = \frac{-8}{15}$   
 $\csc \theta = \frac{17}{8}$      $\sec \theta = \frac{-17}{15}$      $\cot \theta = \frac{-15}{8}$

3. a)  $\cos 120^\circ = -\cos 60^\circ = -\frac{1}{2}$     b)  $\sin 150^\circ = \sin 30^\circ = \frac{1}{2}$     c)  $\cot 135^\circ = -\cot 45^\circ = -1$

d)  $\csc 150^\circ = \frac{1}{\sin 30^\circ} = 2$     e)  $\sec 135^\circ = \frac{-1}{\cos 45^\circ} = -\sqrt{2}$     f)  $\sin 135^\circ = \sin 45^\circ = \frac{1}{\sqrt{2}}$     g)  $\tan 120^\circ = -\tan 60^\circ = -\sqrt{3}$

h)  $\cot 120^\circ = \frac{-1}{\tan 60^\circ} = -\frac{1}{\sqrt{3}}$     i)  $\sin 120^\circ = \sin 60^\circ = \frac{\sqrt{3}}{2}$     j)  $\cot 150^\circ = \frac{-1}{\tan 30^\circ} = -\sqrt{3}$     k)  $\csc 135^\circ = \frac{1}{\sin 45^\circ} = \sqrt{2}$

l)  $\sec 120^\circ = \frac{-1}{\cos 60^\circ} = -2$

4a)  $\cos 110^\circ$   
 $\approx -0.34$

b)  $\cot 95^\circ$   
 $= \frac{1}{\tan 95^\circ}$   
 $\approx -0.09$

c)  $\csc 138^\circ$   
 $= \frac{1}{\sin 138^\circ}$   
 $\approx 1.49$

d)  $\tan 108^\circ$   
 $\approx -3.08$

e)  $\sin 142^\circ$   
 $\approx 0.62$

f)  $\tan 170^\circ$   
 $\approx -0.18$

g)  $\sec 115^\circ$   
 $= \frac{1}{\cos 115^\circ}$   
 $\approx -2.37$

h)  $\cot 130^\circ$   
 $= \frac{1}{\tan 130^\circ}$   
 $\approx -0.84$

i)  $\csc 165^\circ$   
 $= \frac{1}{\sin 165^\circ}$   
 $\approx 3.86$

j)  $\cos 140^\circ$   
 $\approx -0.77$

k)  $\sec 175^\circ$   
 $= \frac{1}{\cos 175^\circ}$   
 $\approx -1.00$

l)  $\sin 100^\circ$   
 $\approx 0.98$

5. a)  $\sin \theta = \frac{15}{17}$   $90^\circ \leq \theta \leq 180^\circ$  ← obtuse angle  $\neq 5$ .

$$x^2 = 17^2 - 15^2$$

$$= 289 - 225$$

$$= 64$$

$$x = -8$$

$$\cos \theta = \frac{-8}{17}$$

$$\tan \theta = \frac{-15}{8}$$

$$\sec \theta = \frac{-17}{8}$$

b)  $\tan \theta = -\frac{7}{24}$

$$y = 7, x = -24$$

$$r = \sqrt{49 + 576}$$

$$r = \sqrt{625}$$

$$r = 25$$

$$\cos \theta = \frac{-24}{25}$$

$$\sin \theta = \frac{7}{25}$$

$$\csc \theta = \frac{25}{7}$$

c)  $\sec \theta = -\frac{13}{5}$

$$\cos \theta = -\frac{5}{13}$$

$$\sin \theta = \frac{12}{13}$$

$$x = -5, r = 13$$
  
$$y = 12$$

$$\cot \theta = \frac{-5}{12}$$

d)  $\cot \theta = -\frac{20}{21}$

$$x = -20,$$
  
$$y = 21$$

$$r = \sqrt{400 + 441}$$
  
$$r = \sqrt{841}$$
  
$$r = 29$$

$$\cos \theta = \frac{-20}{29}$$

$$\csc \theta = \frac{29}{21}$$

e)  $\cos \theta = -\frac{40}{41}$

$$\sin \theta = \frac{9}{41}$$
  
$$\cot \theta = \frac{-40}{9}$$

$$y = \sqrt{41^2 - 40^2}$$
  
$$y = \sqrt{1681 - 1600}$$
  
$$y = \sqrt{81}$$
  
$$y = 9$$

f)  $\csc \theta = \frac{5}{4}$   $x = -3, y = 4, r = 5$

$$\sin \theta = \frac{4}{5}$$

$$\tan \theta = \frac{-4}{3}$$
  
$$\sec \theta = \frac{-5}{3}$$

6.  $90^\circ \leq \theta \leq 180^\circ$

Worksheet 5-5 ③

a)  $\sin \theta = \frac{1}{\sqrt{2}}$

$\beta = 45^\circ$   
 $\theta = 135^\circ$

b)  $\sec \theta = -2$

$\cos \theta = -\frac{1}{2}$

$\beta = 60^\circ$   
 $\theta = 120^\circ$

c)  $\tan \theta = -\sqrt{3}$

$\beta = 60^\circ$   
 $\theta = 120^\circ$

d)  $\cos \theta = -\frac{1}{\sqrt{2}}$

$\beta = 45^\circ$

$\theta = 135^\circ$

e)  $\csc \theta = 2$

$\sin \theta = \frac{1}{2}$

$\beta = 30^\circ$   
 $\theta = 150^\circ$

f)  $\cot \theta = -\sqrt{3}$

$\tan \theta = -\frac{1}{\sqrt{3}}$

$\beta = 30^\circ$   
 $\theta = 150^\circ$

g)  $\cot \theta = -1$   
 $\tan \theta = -1$

$\beta = 45^\circ$   
 $\theta = 135^\circ$

h)  $\sin \theta = \frac{\sqrt{3}}{2}$

$\beta = 60^\circ$   
 $\theta = 120^\circ$

i)  $\cos \theta = -\frac{\sqrt{3}}{2}$

$\beta = 30^\circ$   
 $\theta = 150^\circ$

j)  $\sec \theta = -\frac{2}{\sqrt{3}}$

$\cos \theta = -\frac{\sqrt{3}}{2}$

$\beta = 30^\circ$   
 $\theta = 150^\circ$

k)  $\tan \theta = -1$

$\beta = 45^\circ$   
 $\theta = 135^\circ$

l)  $\csc \theta = \sqrt{2}$

$\sin \theta = \frac{1}{\sqrt{2}}$

$\beta = 45^\circ$   
 $\theta = 135^\circ$

7 a)  $\beta = \sin^{-1} 0.906$

$\beta \doteq 65^\circ$

$\theta \doteq 115^\circ$

b)  $\beta = \cos^{-1} 0.574$

$\beta \doteq 55^\circ$

$\theta \doteq 125^\circ$

c)  $\beta = \tan^{-1} 3.732$

$\beta \doteq 75^\circ$

$\theta \doteq 105^\circ$

d)  $\cot \theta = -1.428$

$\beta = \tan^{-1}(1 \div 1.428)$

$\beta \doteq 35^\circ$

$\theta \doteq 145^\circ$

e)  $\beta = \sin^{-1}(1 \div 1.743)$

$\beta \doteq 35^\circ$

$\theta \doteq 145^\circ$

f)  $\beta = \cos^{-1}(1 \div 2.669)$

$\beta \doteq 68^\circ$

$\theta \doteq 112^\circ$

g)  $\beta = \tan^{-1} 0.532$

$\beta \doteq 28^\circ$

$\theta \doteq 152^\circ$

h)  $\beta = \sin^{-1} 0.978$

$\beta \doteq 78^\circ$

$\theta \doteq 102^\circ$

i)  $\beta = \tan^{-1}(1 \div 0.123)$

$\beta \doteq 83^\circ$

$\theta \doteq 97^\circ$

$$7j) \beta = \sin^{-1}(1 \div 1.086) \quad \beta \doteq 67^\circ \quad \theta \doteq 113^\circ$$

$$k) \beta = \cos^{-1}(0.777) \quad \beta \doteq 39^\circ \quad \theta \doteq 141^\circ$$

$$l) \beta = \cos^{-1}(1 \div 1.010) \quad \beta \doteq 8^\circ \quad \theta \doteq 172^\circ$$

$$8a) \sin \theta = \frac{3}{\sqrt{13}} \\ 9 + x^2 = 13 \\ x^2 = 4 \\ x = -2 \\ \sec \theta = \frac{-\sqrt{13}}{2}$$

$$\beta = \sin^{-1}(3 \div \sqrt{13}) \\ \beta \doteq 56^\circ \\ \theta \doteq 124^\circ$$

$$b) \cot \theta = -\frac{3}{7} \\ r = \sqrt{9+49} \\ r = \sqrt{58} \\ \cos \theta = \frac{-3}{\sqrt{58}}$$

$$\beta = \cos^{-1}(3 \div \sqrt{58}) \\ \beta \doteq 67^\circ \\ \theta \doteq 113^\circ$$

$$c) \cos \theta = -\frac{2}{9} \\ 4 + y^2 = 81 \\ y^2 = 77 \\ \cot \theta = \frac{-2}{\sqrt{77}}$$

$$\beta = \cos^{-1}(2 \div 9) \\ \beta \doteq 77^\circ \\ \theta \doteq 103^\circ$$

$$d) \csc \theta = \frac{\sqrt{5}}{2}$$

$$\beta = \sin^{-1}(2 \div \sqrt{5}) \\ \beta \doteq 63^\circ$$

$$\tan \theta = \frac{-2}{1}$$

$$\theta \doteq 117^\circ$$

$$\tan \theta = -2$$

$$e) \tan \theta = -3 \\ x = -1, y = 3 \quad r = \sqrt{9+1} \\ \csc \theta = \frac{\sqrt{10}}{3}$$

$$\beta = \tan^{-1} 3 \\ \beta \doteq 72^\circ \\ \theta \doteq 108^\circ$$

$$f) \sec \theta = \frac{-53}{45} \\ \sin \theta = \frac{28}{53}$$

$$r = 53 \quad x = -45 \\ 53^2 - 45^2 = y^2 \\ y^2 = 784 \\ y = 28$$

$$\beta = \sin^{-1}(28 \div 53) \\ \beta \doteq 32^\circ \\ \theta \doteq 148^\circ$$


9. a)  $\sin(180^\circ + \theta) = -\sin \theta = -\frac{4}{5}$   
 $\cos(180^\circ + \theta) = -\cos \theta = -\frac{3}{5}$   
 $\tan(180^\circ + \theta) = +\tan \theta = \frac{4}{3}$

$\csc(180^\circ + \theta) = -\frac{5}{4}$   
 $\sec(180^\circ + \theta) = -\frac{5}{3}$   
 $\cot(180^\circ + \theta) = \frac{3}{4}$

b)  $\sin(360^\circ - \theta) = -\sin \theta = -\frac{4}{5}$   
 $\cos(360^\circ - \theta) = \cos \theta = \frac{3}{5}$   
 $\tan(360^\circ - \theta) = -\tan \theta = -\frac{4}{3}$

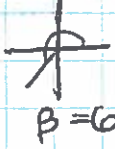
$\csc(360^\circ - \theta) = -\frac{5}{4}$   
 $\sec(360^\circ - \theta) = \frac{5}{3}$   
 $\cot(360^\circ - \theta) = -\frac{3}{4}$

10 a)  $\sin 225^\circ = -\sin 45^\circ = -\frac{1}{\sqrt{2}}$



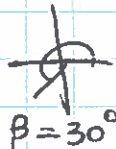
$\beta = 45^\circ$

b)  $\cos 240^\circ = -\cos 60^\circ = -\frac{1}{2}$



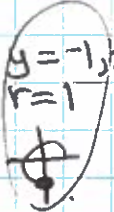
$\beta = 60^\circ$

c)  $\cot 210^\circ = \frac{1}{\tan 30^\circ} = \sqrt{3}$



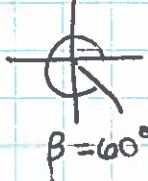
$\beta = 30^\circ$

d)  $\sin 270^\circ = -1$



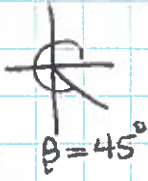
$y = -1, x = 0, r = 1$

e)  $\tan 300^\circ = -\tan 60^\circ = -\sqrt{3}$



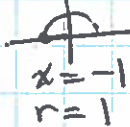
$\beta = 60^\circ$

f)  $\sec 315^\circ = \frac{1}{\cos 45^\circ} = \sqrt{2}$



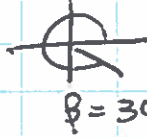
$\beta = 45^\circ$

g)  $\cos 180^\circ = -1$



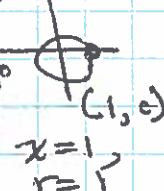
$x = -1, y = 0, r = 1$

h)  $\csc 330^\circ = \frac{-1}{\sin 30^\circ} = -2$



$\beta = 30^\circ$

i)  $\sec 360^\circ = \frac{1}{\cos 360^\circ} = 1$



$(1, 0), x = 1, y = 0, r = 1$

11 a)  $\beta = \sin^{-1}(0.906)$   
 $\beta \approx 65^\circ$   
 $\theta = 65^\circ @ 115^\circ$

b)  $\beta = \cos^{-1} 0.616$   
 $\beta \approx 52^\circ$   
 $\theta = 128^\circ @ 232^\circ$

c)  $\beta = \tan^{-1} 5.671$   
 $\beta \approx 80^\circ$   
 $\theta = 100^\circ @ 280^\circ$

d)  $\csc \theta = -2.924$   
 $\beta = \sin^{-1}(1 \div 2.924)$   
 $\beta \approx 20^\circ$

e)  $\sec \theta = 1.743$   
 $\beta = \cos^{-1}(1 \div 1.743)$   
 $\beta \approx 55^\circ$

f)  $\beta = \tan^{-1}(1 \div 2.145)$   
 $\beta \approx 25^\circ$

$\theta \approx 200^\circ @ 340^\circ$

$\theta \approx 55^\circ @ 305^\circ$

$\theta \approx 25^\circ @ 205^\circ$

$$11 \text{ g) } \beta = \tan^{-1} 0.7$$

$$\beta \doteq 35^\circ$$

$$\begin{array}{c|c} \text{S} & \\ \hline \text{T} & \end{array} \quad \theta \doteq 145^\circ @ 325^\circ$$

$$h) \beta = \cos^{-1}(1 \div 1.155)$$

$$\beta \doteq 30^\circ$$

$$\begin{array}{c|c} \text{S} & \\ \hline \text{T} & \end{array} \quad \theta \doteq 150^\circ @ 210^\circ$$

$$i) \beta = \sin^{-1} 0.966$$

$$\beta \doteq 75^\circ$$

$$\begin{array}{c|c} \text{S} & \\ \hline \text{T} & \end{array} \quad \theta \doteq 255^\circ @ 285^\circ$$

$$j) \beta = \cos^{-1} 0.423$$

$$\beta \doteq 65^\circ$$

$$\begin{array}{c|c} \text{S} & \\ \hline \text{T} & \end{array} \quad \theta \doteq 115^\circ @ 245^\circ$$

$$k) \beta = \sin^{-1}(1 \div 1.035)$$

$$\beta \doteq 75^\circ$$

$$\begin{array}{c|c} \text{S} & \text{A} \\ \hline \text{T} & \end{array} \quad \theta \doteq 75^\circ @ 105^\circ$$

$$l) \beta = \tan^{-1}(1 \div 2.747)$$

$$\beta \doteq 20^\circ$$

$$\begin{array}{c|c} \text{S} & \\ \hline \text{T} & \end{array} \quad \theta \doteq 160^\circ @ 340^\circ$$