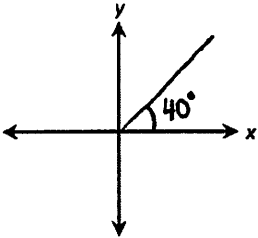


**Pre-Calculus 11**  
**Unit 2 - Trigonometry**  
**Extra Practice**

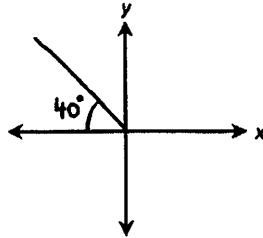
A. Sketch each of the following angles in standard position and find the reference angle for each.

1.  $\theta = 40^\circ$



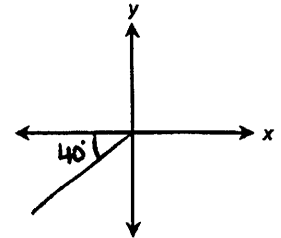
reference angle =  $40^\circ$

2.  $\theta = 140^\circ$



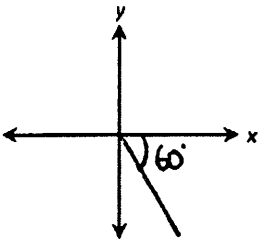
reference angle =  $40^\circ$

3.  $\theta = 220^\circ$



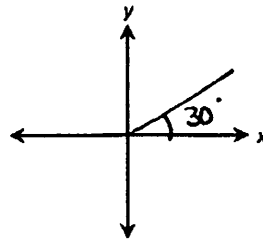
reference angle =  $40^\circ$

4.  $\theta = 300^\circ$



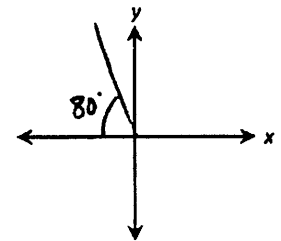
reference angle =  $60^\circ$

5.  $\theta = 390^\circ$



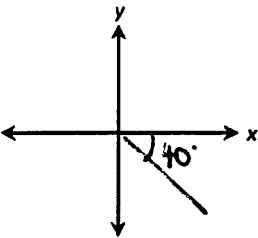
reference angle =  $30^\circ$

6.  $\theta = 820^\circ$



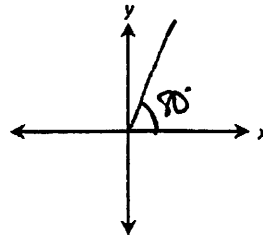
reference angle =  $80^\circ$

7.  $\theta = -40^\circ$



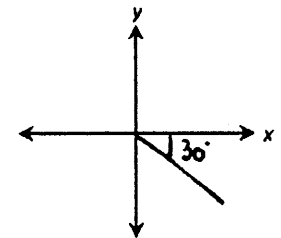
reference angle =  $40^\circ$

8.  $\theta = -280^\circ$



reference angle =  $80^\circ$

9.  $\theta = -750^\circ$



reference angle =  $30^\circ$

B. Determine the QUADRANT (I, II, III, IV) in which the terminal arm of  $\theta$  lies and the possible values of  $\theta$ , if:

1.  $\cos\theta > 0$  and  $\sin\theta > 0$

Ⓐ I II III IV

□  $0^\circ \leq \theta \leq 90^\circ$

2.  $\sin\theta < 0$  and  $\tan\theta > 0$

I II Ⓒ III IV

□  $180^\circ \leq \theta \leq 270^\circ$

3.  $\tan\theta < 0$  and  $\cos\theta < 0$

I Ⓐ II III IV

□  $90^\circ \leq \theta \leq 180^\circ$

4.  $\cos\theta < 0$  and  $\sin\theta < 0$

I II Ⓒ III IV

□  $180^\circ \leq \theta \leq 270^\circ$

5.  $\sin\theta > 0$  and  $\tan\theta < 0$

I Ⓐ II III IV

□  $90^\circ \leq \theta \leq 180^\circ$

6.  $\sin\theta > 0$  and  $\cos\theta < 0$

I Ⓐ II III IV

□  $90^\circ \leq \theta \leq 180^\circ$

7.  $\tan\theta = 0.568$  and  $\cos\theta = -0.289$

I II Ⓒ III IV

□  $\_\_\_ \leq \theta \leq \_\_\_$

8.  $\sin\theta = -0.873$  and  $\cos\theta = 0.927$

I II III Ⓒ IV

□  $\_\_\_ \leq \theta \leq \_\_\_$

9.  $\cos\theta = 0.197$  and  $\tan\theta = -3.8$

I II III Ⓒ IV

□  $\_\_\_ \leq \theta \leq \_\_\_$

10.  $\cos\theta = 0.519$  and  $\tan\theta = 4$

Ⓐ I II III IV

□  $\_\_\_ \leq \theta \leq \_\_\_$

11.  $\sin\theta > 0$

Ⓐ I Ⓐ II III IV

θ:  $0^\circ < \theta < 180^\circ$

12.  $\cos\theta < 0$

I Ⓐ II Ⓒ III IV

θ:  $90^\circ < \theta < 270^\circ$

13.  $\tan\theta < 0$

I Ⓐ II III Ⓒ IV

θ:

14.  $\cos\theta = 0.587$

Ⓐ I II III Ⓒ IV

θ:  $\theta \approx 54^\circ$  or  $\theta \approx 306^\circ$

15.  $\sin\theta = -0.98$

I II Ⓒ III Ⓒ IV

θ:  $\theta \approx 258.5^\circ$  or  $\theta \approx 281.5^\circ$

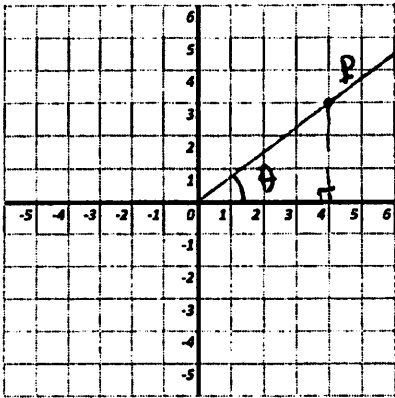
16.  $\tan\theta = 3.6$

Ⓐ I II Ⓒ III IV

θ:  $\theta \approx 74.5^\circ$  or  $\theta \approx 254.5^\circ$

C. The given point  $P$  is on the terminal arm of an angle  $\theta$  in standard position. Sketch the angle and find exact values of  $\sin\theta$ ,  $\cos\theta$ , and  $\tan\theta$ .

1.  $P(4, 3)$



$$x = 4 \quad y = 3$$

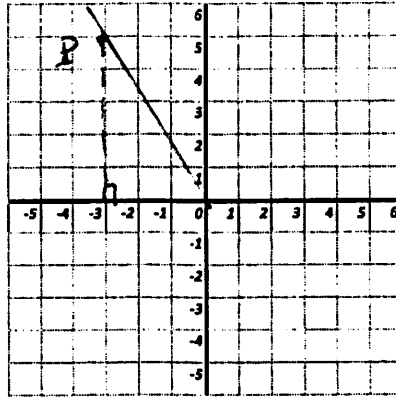
$$r = 5 \text{ (Pythagore)}$$

$$\sin\theta = \frac{3}{5}$$

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

$$\tan\theta = \frac{3}{4}$$

2.  $P(-3, 5)$



$$x = -3 \quad y = 5$$

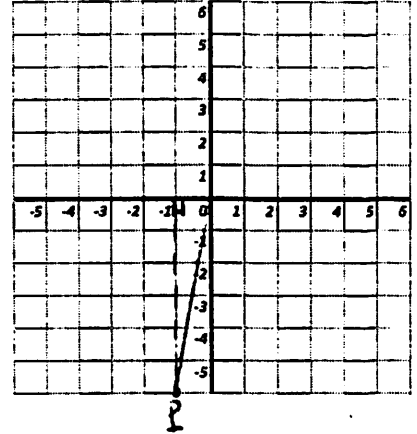
$$r = \sqrt{34}$$

$$\sin\theta = \frac{5}{\sqrt{34}}$$

$$\cos\theta = -\frac{3}{\sqrt{34}}$$

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

3.  $P(-1, -6)$



$$x = -1 \quad y = -6$$

$$r = \sqrt{37}$$

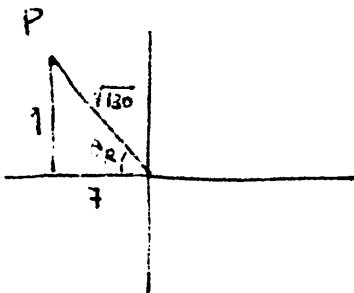
$$\sin\theta = -\frac{6}{\sqrt{37}}$$

$$\cos\theta = -\frac{1}{\sqrt{37}}$$

$$\tan\theta = 6$$

Given the coordinates of a point  $P$  on the terminal arm, find  $\sin\theta$ ,  $\cos\theta$ , and  $\tan\theta$ , without sketching the angle.

4.  $P(-7, 9)$

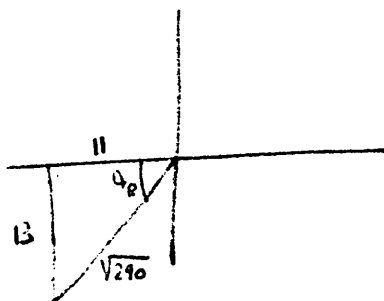


$$\sin\theta = \frac{9}{\sqrt{130}}$$

$$\cos\theta = -\frac{7}{\sqrt{130}}$$

$$\tan\theta = -\frac{9}{7}$$

5.  $P(-11, -13)$

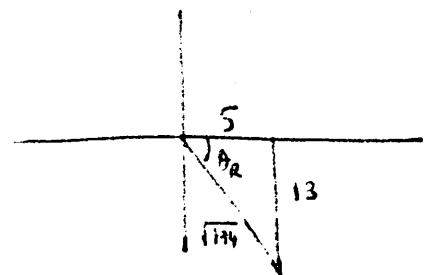


$$\sin\theta = -\frac{13}{\sqrt{290}}$$

$$\cos\theta = -\frac{11}{\sqrt{290}}$$

$$\tan\theta = \frac{13}{11}$$

6.  $P(5, -13)$



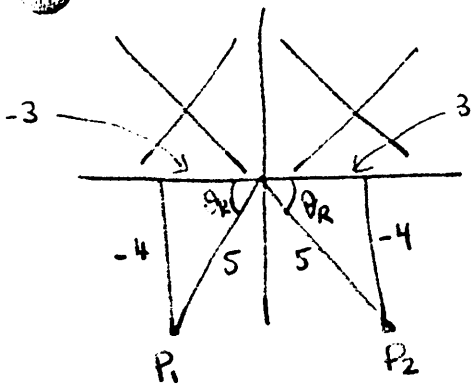
$$\sin\theta = -\frac{13}{\sqrt{194}}$$

$$\cos\theta = \frac{5}{\sqrt{194}}$$

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

FOUR CAPS TO A

5. If  $\sin\theta = -\frac{4}{5}$ , find the coordinates of a point P on the terminal arm of  $\theta$ . Also, find  $\cos\theta$ , and  $\tan\theta$ .



$$P_1(-3, -4) \quad \text{or} \quad P_2(3, -4)$$

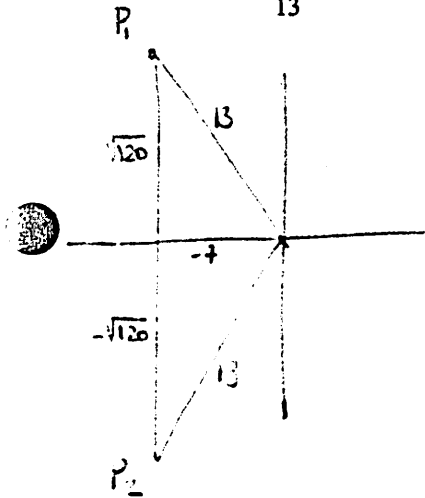
$$\cos\theta = -\frac{3}{5}$$

$$\cos\theta = \frac{3}{5}$$

$$\tan\theta = \frac{4}{3}$$

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

6. If  $\cos\theta = -\frac{7}{13}$ , find the coordinates of a point P on the terminal arm of  $\theta$ . Also, find  $\sin\theta$ , and  $\tan\theta$ .



$$P_1(-7, \sqrt{120}) \quad \text{or} \quad P_2(-7, -\sqrt{120})$$

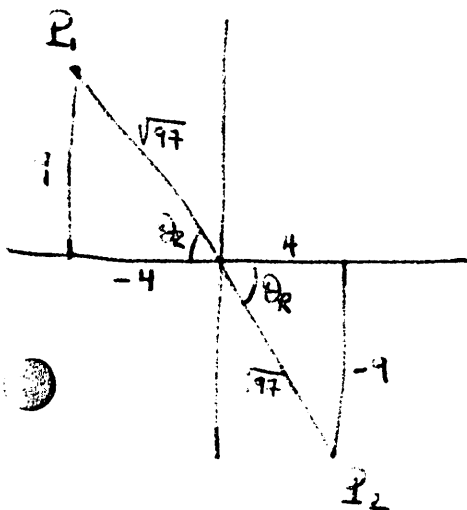
$$\sin\theta = \frac{\sqrt{120}}{13}$$

$$\sin\theta = -\frac{\sqrt{120}}{13}$$

$$\tan\theta = -\frac{\sqrt{120}}{7}$$

$$\tan\theta = \frac{\sqrt{120}}{7}$$

7. If  $\tan\theta = -\frac{9}{4}$ , find the coordinates of a point P on the terminal arm of  $\theta$ . Also, find  $\sin\theta$ , and  $\cos\theta$ .



$$P_1(-4, 9) \quad \text{or} \quad P_2(4, -9)$$

$$\sin\theta = \frac{9}{\sqrt{97}}$$

$$\sin\theta = -\frac{9}{\sqrt{97}}$$

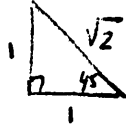
$$\cos\theta = -\frac{4}{\sqrt{97}}$$

$$\cos\theta = \frac{4}{\sqrt{97}}$$

D. Without using a calculator, determine the EXACT VALUES of the following trigonometric values.



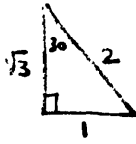
1.  $\sin 45^\circ = \frac{1}{\sqrt{2}}$



2.  $\cos 45^\circ = \frac{1}{\sqrt{2}}$

3.  $\tan 45^\circ = 1$

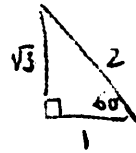
4.  $\sin 30^\circ = \frac{1}{2}$



5.  $\cos 30^\circ = \frac{\sqrt{3}}{2}$

6.  $\tan 30^\circ = \frac{1}{\sqrt{3}}$

7.  $\sin 60^\circ = \frac{\sqrt{3}}{2}$



8.  $\cos 60^\circ = \frac{1}{2}$

9.  $\tan 60^\circ = \sqrt{3}$

10.  $\sin 120^\circ = \frac{\sqrt{3}}{2}$

↑  
Quad II  
 $\theta_R = 60^\circ$



11.  $\cos 315^\circ = \frac{1}{\sqrt{2}}$

↑  
Quad IV  
 $\theta_R = 45^\circ$



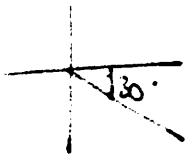
12.  $\tan 240^\circ = \sqrt{3}$

↑  
Quad III  
 $\theta_R = 60^\circ$



13.  $\sin 330^\circ = -\frac{1}{2}$

↑  
Quad IV  
 $\theta_R = 30^\circ$



14.  $\cos 150^\circ = -\frac{\sqrt{3}}{2}$

↑  
Quad II  
 $\theta_R = 30^\circ$

15.  $\tan 300^\circ = -\sqrt{3}$

↑  
Quad IV  
 $\theta_R = 60^\circ$

16.  $\sin 225^\circ = -\frac{1}{\sqrt{2}}$

↑  
Quad III  
 $\theta_R = 45^\circ$

17.  $\cos 240^\circ = -\frac{1}{2}$

↑  
Quad III  
 $\theta_R = 60^\circ$

18.  $\tan 135^\circ = -1$

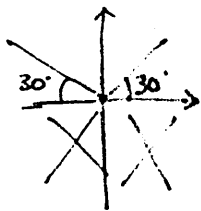
↑  
Quad II  
 $\theta_R = 45^\circ$



E. Without using a calculator, solve the following trigonometric equations to find the EXACT VALUE(S) of  $\theta$ .

1. Solve:  $2\sin\theta = 1; 0 < \theta < 360$

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

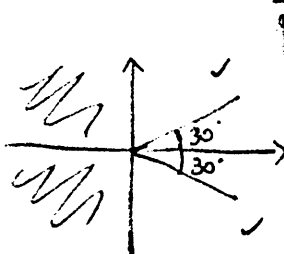


$$\theta_R = 30^\circ$$

$$\theta = 30^\circ \text{ or } \theta = 150^\circ$$

2. Solve:  $2\cos\theta = \sqrt{3}; 0 < \theta < 360$

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



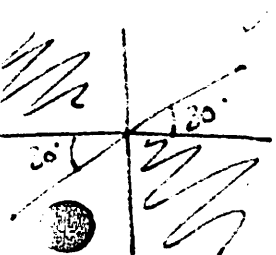
$$\theta_R = 30^\circ$$

$$\theta = 30^\circ \text{ or } \theta = 330^\circ$$

3. Solve:  $\sqrt{3}\tan\theta = 1; 0 < \theta < 360$

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

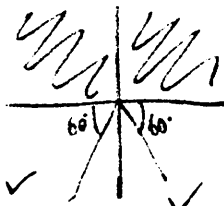
$$\theta_R = 30^\circ$$



$$\theta = 30^\circ \text{ or } \theta = 210^\circ$$

4. Solve:  $2\sin\theta = -\sqrt{3}; 0 < \theta < 360$

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



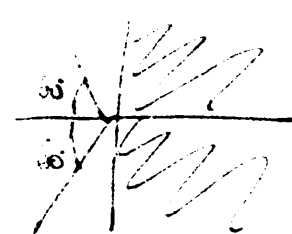
$$\theta_R = 60^\circ$$

$$\theta = 240^\circ \text{ or } 300^\circ$$

5. Solve:  $-2\cos\theta = 1; 0 < \theta < 360$

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

$$\theta_R = 60^\circ$$

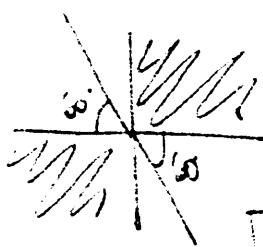


$$\theta = 120^\circ \text{ or } 240^\circ$$

6. Solve:  $-\tan\theta = \sqrt{3}; 0 < \theta < 180$

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

$$\theta_R = 60^\circ$$



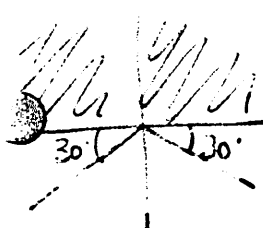
$$\theta = 120^\circ \text{ or } 300^\circ$$

because we want  $0 < \theta < 180$

7. Solve:  $-2\sin\theta = 1; \theta$  is in quadrant IV

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

$$\theta_R = 30^\circ$$

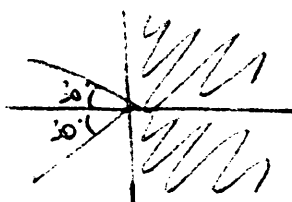


$$\theta = 330^\circ \text{ or } 210^\circ$$

because

8. Solve:  $\cos\theta = -\frac{\sqrt{3}}{2}; 270 < \theta < 360$

$$\theta_R = 30^\circ$$



$$\theta = 150^\circ \text{ or } 210^\circ$$

no solution