

Name \_\_\_\_\_

Circle the correct answer for 1 – 3. You must show your work to receive credit.

(8 pts) 1. Convert 15 radians to degrees, minutes and seconds.

- A.  $139.44^\circ$
- B.  $26^\circ 17' 59''$
- C.  $859^\circ 26' 12''$
- D.  $139^\circ 26' 12''$
- E. None of these

(8 pts) 2. Find the reference angle,  $\theta_R$  to the nearest tenth of a degree, if  $\theta = -\frac{29}{7}$ .

- A.  $\theta_R = -745.7^\circ$
- B.  $\theta_R = -385.7^\circ$
- C.  $\theta_R = -25.7^\circ$
- D.  $\theta_R = 334.3^\circ$
- E. None of these

(8 pts) 3. A point, P(t) has coordinates  $\frac{-5}{\sqrt{106}}, \frac{9}{\sqrt{106}}$  on a unit circle corresponding to a real number t. Find P(-t).

- A.  $\frac{5}{\sqrt{106}}, \frac{9}{\sqrt{106}}$
- B.  $\frac{-5}{\sqrt{106}}, \frac{9}{\sqrt{106}}$
- C.  $\frac{-5}{\sqrt{106}}, \frac{-9}{\sqrt{106}}$
- D.  $\frac{5}{\sqrt{106}}, \frac{-9}{\sqrt{106}}$
- E. None of these

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Place your answer in the space provided. You must show your work to receive credit.

(12 pts) 4. Verify the following identity. You can only work with one side at a time.

$$\frac{\cos x}{1 - \sin x} = \frac{1 + \sin x}{\cos x}$$

(12 pts) 5. Approximate to the nearest  $0.01^\circ$ , the degree measures of all angles that are in the interval  $[0^\circ, 360^\circ)$  such that  $\sin \theta = -0.4772$ .

=

(12 pts) 6. Calculate the radius of a circle, rounded to the nearest tenth of a meter, which has a central angle of  $142^\circ$  subtended by an arc of length 48.2 meters.

Radius =

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Place your answer in the space provided. You must show your work to receive credit.

- (12 pts) 7. a) Find the exact value of
- $\tan$
- if
- $\sin = -5/13$
- and
- $\sec > 0$
- .

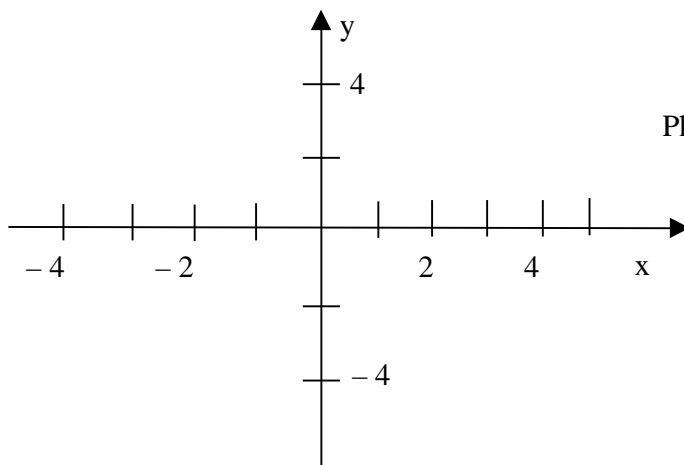
$$\tan = \boxed{\phantom{000000}}$$

- b) Find the exact value of
- $\csc$
- if
- $\tan = -3/5$
- and
- $\cos < 0$
- .

$$\csc = \boxed{\phantom{000000}}$$

- (16 pts) 8. Find the amplitude, period, phase shift, and sketch one period starting at the phase shift of the graph of:

$$y = -3 \sin \frac{1}{2}x + \frac{\pi}{4}$$



Amplitude =

Period =

Phase Shift =


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Place your answer in the space provided. You must show your work to receive credit.

- (12 pts) 9. A rocket is fired straight up and climbs to an altitude of 12,500 feet. An observation radar some distance away on level ground records an angle of  $75^\circ$  when the rocket stops climbing. How far, to the nearest foot, is the observation radar from the rocket when it stops climbing? (Draw and label a sketch, set up an equation(s) and solve.)

Distance =