

Name \_\_\_\_\_

Circle your answer to problems 1-3. You must show your work to receive credit.

pts) 1. The exact radian measure of  $510^\circ$  is:

- A.  $\frac{5}{6}$
- B.  $\frac{15}{6}$
- C.  $\frac{17}{6}$
- D.  $\frac{7}{6}$
- E. None of these

pts) 2. If the terminal side of  $\theta$  is in quadrant II and  $\sin \theta = \frac{3}{4}$ , then  $\cot \theta =$ 

- A.  $\frac{4}{5}$
- B.  $-\frac{\sqrt{7}}{4}$
- C.  $\frac{\sqrt{7}}{3}$
- D.  $-\frac{3}{\sqrt{7}}$
- E. None of these

pts) 3. If  $\tan \theta < 0$  and  $\sec \theta > 0$ , find the quadrant containing  $\theta$ .

- A. I
- B. II
- C. III
- D. IV
- E. Cannot be determined

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

- ) pts) 4. The minute hand of a clock is 15 in. long. How far does a point on the tip move in 25 minutes (angle of  $150^\circ$ )? Round your answer to the nearest tenth of an inch.

Length = 

- ) pts) 5. Approximate to the nearest 0.1 degree all angles in the interval  $[0^\circ, 360^\circ)$  that satisfy  $\tan \theta = -0.4727$ .

- ) pts) 6. Verify the following identity. (Work with only one side of the identity at a time.)

$$\csc \theta - \sin \theta = \cos \theta \cot \theta$$

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- 2 pts) 7. A portion of the graph of  $y = a \sin (bx + c)$  with  $a > 0$  and  $b > 0$  is sketched below. Find the values of  $a$ ,  $b$ , and  $c$ .



$$a = \boxed{\phantom{000}}$$

$$b = \boxed{\phantom{000}}$$

$$c = \boxed{\phantom{000}}$$

- 2 pts) 8. For parts (a) and (b), first find the reference angle,  $\theta_R$ , for the given angle  $\theta$ . Then, find the exact value of the given trigonometric function. (Do not use a calculator.)

(6 pts) a)  $\theta = -150^\circ$ , find  $\cos \theta$ .

$$\theta_R = \boxed{\phantom{000}}$$

$$\cos(-150^\circ) = \boxed{\phantom{000}}$$

(6 pts) b)  $\theta = \frac{5}{4}$ , find  $\csc \theta$ .

$$\theta_R = \boxed{\phantom{000}}$$

$$\csc \frac{5}{4} = \boxed{\phantom{000}}$$

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- 2 pts) 9. An airplane, flying at an altitude of 35000 feet, begins a  $6^\circ$  descent to a runway. Approximate, to the nearest mile, the distance in the air from the airplane to the runway. (Draw and label a sketch, set up the equations and solve.) Remember that 1 mile = 5,280 feet.

Distance = 

- 2 pts) 10. Mary notes the angle of elevation to the top of a mountain is  $15^\circ$ . Two miles closer to the mountain, she notes the angle of elevation is  $26^\circ$ . To the nearest foot, how high is the mountain? (Draw and label a sketch, set up equations and solve.) Remember that 1 mile = 5,280 feet.

Height =