Math 130 - Review 1

Name _____

September 9, 2019

Score _____

These problems may help you review for Test 1. Your actual test will not be as long as this review packet. With the exception of rationalizing denominators, simplify all answers.

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1. Use radian measure to say what it means for an angle to be *acute*.

2. The angle θ lies in standard position and has radian measure $-5\pi/4$.

   (a) Roughly sketch the angle θ.

   (b) In which quadrant does θ lie?

   (c) Determine the degree measure of θ.

   (d) Determine two (additional) coterminal angles and write in radian measure.

3. Determine the complement and the supplement of $\pi/12$. Write your answers in both radian and degree measure.

4. Convert $255°$ to radian measure. Write your answer as a fraction (in lowest terms) times π.

5. The minute hand of a clock is 8 in long.

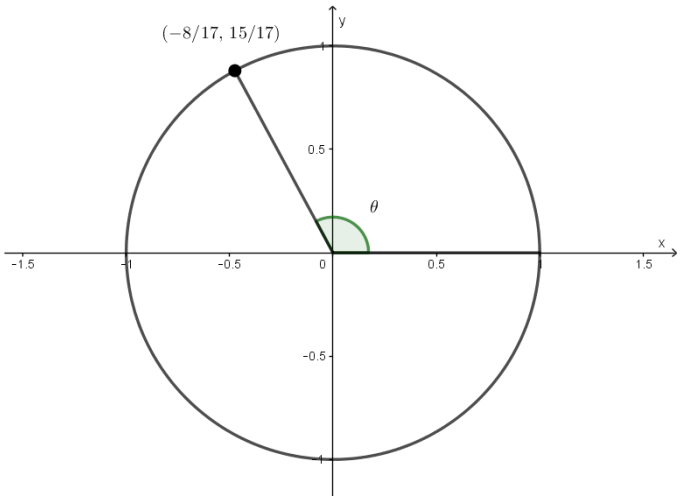
   (a) What angle does the hand sweep out in 20 minutes?

   (b) What arc length is swept out in 20 minutes?

   (c) Determine the angular speed of the minute hand.

   (d) Determine the linear speed of the tip of the minute hand.

6. Find the exact values of the six trigonometric functions at θ. Write your answers as fractions in lowest terms.



7. Find the exact coordinates of the point (x, y) on the unit circle that corresponds to the angle θ. Do not use a calculator.

   (a) $\theta = \pi/2$

   (b) $\theta = 4\pi/3$

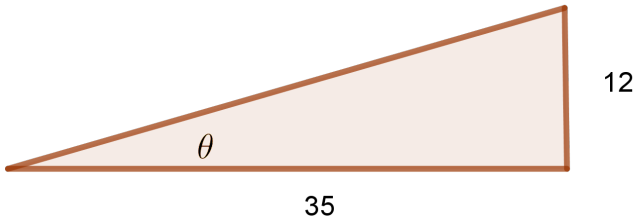
8. Briefly explain why $\sin(13\pi/6) = \sin(\pi/6)$.

9. If $\sin t = \frac{1}{2}$, then what are the values of $\sin(-t)$ and $\csc(-t)$?

10. Without using your calculator, determine the value of $\tan(\pi/2)$. Suppose your classmate used a calculator to compute the value and got 0.0274224. What did your classmate do wrong?

11. A right triangle has sides of lengths 20, 99, and 101. Let θ be smallest angle. Find the values of the six trigonometric functions at θ. Write your answers as fractions in lowest terms.

12. Refer to the right triangle shown below. Find the values of the six trigonometric functions at θ. Write your answers as fractions in lowest terms.



13. Sketch a right triangle with an acute angle θ such that $\sec\theta = \frac{6}{5}$. Then find the values of the six trigonometric functions at θ. Write your answers as fractions in lowest terms.

14. Is it true that $\dfrac{\sin 60^\circ}{\sin 30^\circ} = \sin 2^\circ$? If someone thinks so, what mistake are they probably making?

15. Based only on your memory, write the values of each of the following.

(a) $\sin 30^\circ$

(b) $\cos(\pi/3)$

(c) $\tan(\pi/4)$

16. Use trig identities to transform one side of the equation into the other.

(a) $\cot\alpha \sin\alpha = \cos\alpha$

(b) $(\sec\theta + \tan\theta)(\sec\theta - \tan\theta) = 1$

17. A guy wire runs from the ground to a cell tower. The wire is attached to the tower 150 feet above the ground, and the angle formed between the wire and the ground is 43°. Assume that the tower makes a right angle with the ground.

(a) How long is the guy wire? Round to the nearest tenth of a foot.

(b) How far is the base of the tower from the point on the ground where the guy wire is anchored? Round to the nearest tenth of a foot.

18. $\theta = 300°$. Determine the reference angle. Without using your calculator or unit circle, determine the values of the six trigonometric functions at θ. Simplify your answers as much as possible.

19. $\tan\theta = 15/8$ and $\sin\theta < 0$.
Find the exact values of the six trigonometric functions at θ. Simplify your answers as much as possible.

20. The point $(-5, 2)$ is on the terminal side of an angle in standard position. Find the exact values of the six trigonometric functions at that angle. Simplify your answers as much as possible.

21. Determine the quadrant in which θ lies.

(a) $\sin\theta < 0, \quad \cos\theta < 0$ (b) $\sec\theta > 0, \quad \cot\theta < 0$

22. Determine the period and amplitude.

(a) $y = 5\sin 2x$

(b) $y = -8\cos 100\pi x$

23. Describe how the graph of each equation below can be obtained from the graph of $y = \sin x$.

(a) $y = -3\sin x$

(b) $y = \sin(x - \pi)$

(c) $y = 2 + \sin \pi x$

24. On the attached graph paper, sketch the graph of $y = -1 + \cos 4\pi x$. (Include two full periods.)

25. On the attached graph paper, sketch the graph of $y = -\sin\left(\pi x + \frac{\pi}{4}\right)$. (Include two full periods.)

26. Write an equation whose graph has the given characteristics.

    (a) A sine curve with period π, an amplitude of 2, a right phase shift of $\pi/2$, and a vertical translation up 1 unit.

    (b) A cosine curve with period 4π, an amplitude of 3, a left phase shift of $\pi/2$, and a vertical translation down 2 units.