

# TRIG Midterm Review

## Advanced Math Chapter 5 Practice Test

Name \_\_\_\_\_  
Date \_\_\_\_\_ Hour \_\_\_\_\_

Show your work.

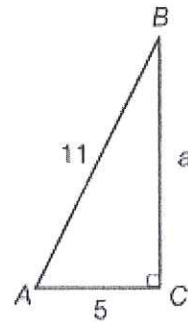
1. Change  $128.433^\circ$  to degrees, minutes, and seconds
2. Write  $21^\circ 44' 3''$  as a decimal to the nearest thousandth of a degree.
3. Give the angle measure represented by 0.5 rotations clockwise.
4. Identify the coterminal angle between  $0^\circ$  and  $360^\circ$  for the angle  $480^\circ$ .
5. Find the measure of the reference angle for  $1046^\circ$
6. If  $\cos \theta = 0.5$ , find  $\sec \theta$ .
7. Find  $\cot (-180^\circ)$ .
8. Find the exact value of  $\cos 135^\circ$ .
9. If  $0^\circ \leq x \leq 360^\circ$ , solve the equation  $\tan x = -1$ .

10. Assuming an angle in quadrant I, evaluate  $\cos(\tan^{-1}\frac{4}{3})$ .

For 11-13, refer to the figure at the right. Leave as exact answers.

11. Find the value of the sine for  $\angle A$ .

12. Find the value of the cotangent for  $\angle A$ .



13. Find the value of the secant for  $\angle A$ .

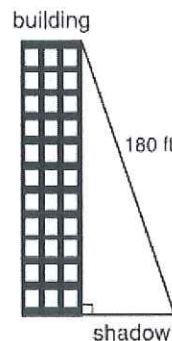
14. Find the **exact value** of  $\sec \theta$  for angle  $\theta$  in standard position if the point at  $(-3, 2)$  lies on its terminal side.

15. Suppose  $\theta$  is an angle in standard position whose terminal side lies in Quadrant IV. If  $\cos \theta = \frac{12}{13}$ , find the **exact value** of  $\csc \theta$ .

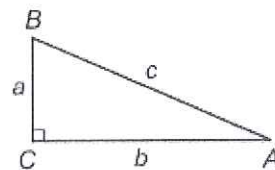
For 16 and 17 refer to the figure. The angle of elevation from the end of the shadow to the top of the building is  $70^\circ$  and the distance is 180 feet.

16. Find the height of the building to the nearest foot.

17. Find the length of the shadow to the nearest foot.



18. Given the triangle at the right, find  $B$  to the nearest tenth of a degree if  $b = 10$  and  $c = 14$ .



19. Determine the number of possible solutions if  $A = 48^\circ$ ,  $a = 5$ , and  $b = 6$ .

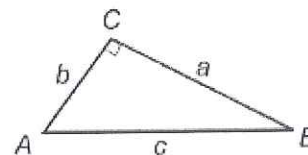
20. In  $\triangle ABC$ ,  $a = 2.4$ ,  $b = 8.2$ , and  $c = 10.1$ . Find  $B$  to the nearest tenth of a degree.

21. If  $a = 12$ ,  $b = 30$ , and  $c = 22$ , find the area of  $\triangle ABC$ .

22. In  $\triangle ABC$ ,  $A = 47^\circ 15'$ ,  $B = 58^\circ 33'$ , and  $c = 23$ . Find  $b$ .

23. In  $\triangle ABC$ ,  $A = 32.2^\circ$ ,  $b = 21.5$ , and  $c = 11.3$ . Find the area of  $\triangle ABC$ .

24. Given the triangle at the right, find  $a$  if  $A = 37^\circ$  and  $b = 6$ .



25. A ship at sea is 70 miles from one radio transmitter and 130 miles from another. The measurement of the angle between signals is  $130^\circ$ . How far apart are the transmitters?

## 6.1 – 6.3 Review

Name \_\_\_\_\_

Date \_\_\_\_\_ Hour \_\_\_\_\_

If necessary, round answers to the nearest tenth.

For #1-3, change each degree measure to radian measure in terms of  $\pi$ .

1.  $60^\circ$

2.  $-75^\circ$

3.  $240^\circ$

For #4-6, change each radian measure to degree measure.

4.  $\frac{5\pi}{6}$

5.  $-\frac{7\pi}{4}$

6. 2.4

7. Given a central angle of  $76.4^\circ$ , find the length of the intercepted arc in a circle of radius 6 centimeters.

8. Find the length of the arc intercepted by a central angle of  $\frac{\pi}{8}$  radians on a circle of radius 8 inches.

9. Find the area of a sector if the central angle measures  $\frac{7\pi}{12}$  radians and the radius is 2.6 meters.

10. Find the area of a sector if the central angle measures  $66^\circ$  and the radius of the circle is 12.1 yards.

11. Determine whether the graph at the right represents  $y = \sin x$ ,  $y = \cos x$ , or neither.

12. A belt runs a pulley that has a diameter of 12 centimeters. If the pulley rotates at 80 revolutions per minute, what are its angular velocity in radians per second and its linear velocity in centimeters per second?

13. Determine the linear velocity of a point that rotates  $\frac{5\pi}{18}$  radians in 5 seconds and is at a distance of 10 centimeters from the center of the rotating object.

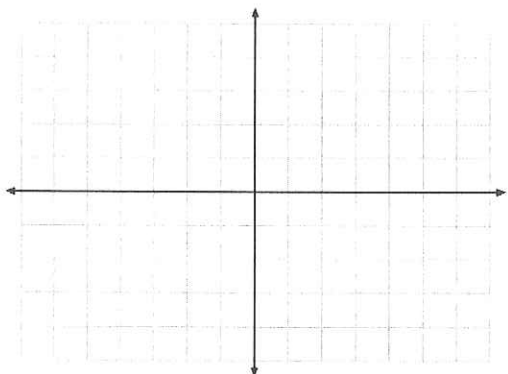
For #14– 16, evaluate each expression.

14.  $\cos \frac{4\pi}{3}$

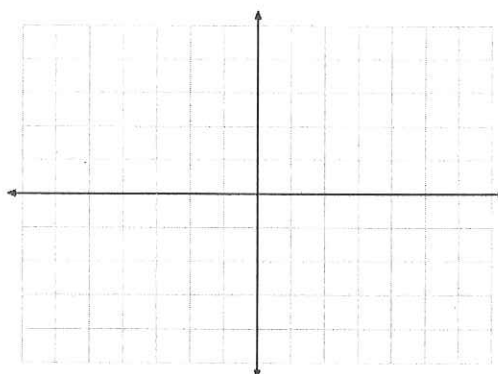
15.  $\tan \frac{25\pi}{6}$

16.  $\sin -\frac{19\pi}{6}$

17. Graph  $y = \cos x$  for  $\frac{7\pi}{2} \leq x \leq 5\pi$



18. Graph  $y = \sin x$  for  $-8\pi \leq x \leq -5\pi$



For #19 – 22, find each value by referring to the graph of the cosine function or the sine function.

19.  $\cos 5\pi$

20.  $\sin 13\pi$

21.  $\sin \frac{9\pi}{2}$

22.  $\cos \left( -\frac{7\pi}{2} \right)$

## 6.4 – 6.5 Review

Name \_\_\_\_\_  
Date \_\_\_\_\_ Hour \_\_\_\_\_

State the amplitude and period for each function. Then graph each function

1.  $y = 4\cos 2\theta$

2.  $y = 0.5 \sin 4\theta$

3.  $y = -\frac{1}{3} \cos \frac{\theta}{2}$

4.  $y = 0.5 \sin \frac{\theta}{6}$

State the amplitude, period, phase shift and vertical shift for each function. Then graph each function on a separate sheet of graph paper.

5.  $y = 5 - 4\sin(2\theta - \pi)$

6.  $y = 2\cos(\theta + 2\pi) + 1$

7.  $y = \sin\left(\frac{\theta}{2} + \frac{\pi}{2}\right) - 9$

8.  $y = 4 + 3\cos\left(\frac{\theta}{4} - \frac{\pi}{4}\right)$

9.  $y = 2\sin(2\theta + \pi) - 5$

10.  $y = 4\cos\left(\frac{\theta}{2} + \pi\right) - 6$

11. Write an equation of a cosine function with amplitude 1.5 and period  $5\pi$ .

12. Write an equation of a sine function with amplitude  $\frac{2}{3}$  and period 6.

13. Write an equation of a sine function with amplitude 4, period  $\frac{\pi}{2}$ , phase shift  $-2\pi$ , and vertical shift  $-1$ .

14. Write an equation of a sine function with amplitude 0.5, period  $\pi$ , phase shift  $\frac{\pi}{3}$ , and vertical shift 3.

15. Write an equation of a cosine function with amplitude  $\frac{3}{4}$ , period  $\frac{\pi}{4}$ , phase shift 0, and vertical shift 5.



**Chapter Six Practice Test**

Name: \_\_\_\_\_

1. Change  $-312^\circ$  to radian measure in terms of  $\pi$ .
2. Change  $-\frac{23\pi}{6}$  radians to degree measure. Round to the nearest tenth.
3. Determine the angular velocity if 11.3 revolutions are completed in 3.9 seconds. Round to the nearest tenth.
4. A gyroscope of radius 18 centimeters rotates 35 times per minute. Find the linear velocity of a point on the edge of the gyroscope. Round to the nearest tenth.
5. An arc is 0.04 meters long and is intercepted by a central angle of  $\frac{\pi}{8}$  radians. Find the diameter of the circle. Round to the nearest tenth.
6. Find the area of sector if the central angle measures  $225^\circ$  and the radius of the circle is 11.04 meters. Round to the nearest tenth.

7. Write an equation of the cosine function with amplitude 20, period  $\frac{\pi}{2}$ , phase shift of  $2\pi$  and a vertical shift of 4.

8. Write an equation for a cotangent function with period  $\frac{\pi}{3}$ , phase shift  $-\frac{\pi}{12}$ , and vertical shift  $-4$ .

9. State the amplitude, period, phase shift, and vertical shift for  $y = -\sin(3\theta - \frac{\pi}{5}) + 2$ .

10. Write the equation for the inverse of  $y = \text{Arctan}(x + 3)$ .

11. Evaluate  $\text{Cos}^{-1}(\sqrt{3}/2)$ .

12. Evaluate  $\sin(\text{Cos}^{-1}(\frac{1}{2}) + \text{Sin}^{-1} 0)$ .

13. Write a sinusoidal function that models the monthly temperatures in Detroit, using  $t = 1$  to represent January.

Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
25.3	27.1	35.8	48.2	59.5	69.1	73.8	72.1	64.6	53.4	41.4	30.2

14. A tractor tire has a diameter of 6 feet and is revolving at a rate of 45 rpm. At  $t = 0$ , a certain point on the tread of the tire is at height 0.

15. An oar floating on the water bobs up and down, covering a distance of 12 feet from its lowest point to its highest point. The oar moves from its lowest point to its highest point and back to its lowest point every 15 seconds. Write a cosine function with phase shift 0 for the height of the oar after  $t$  seconds.

**Use the sine or cosine graph to find each value.**

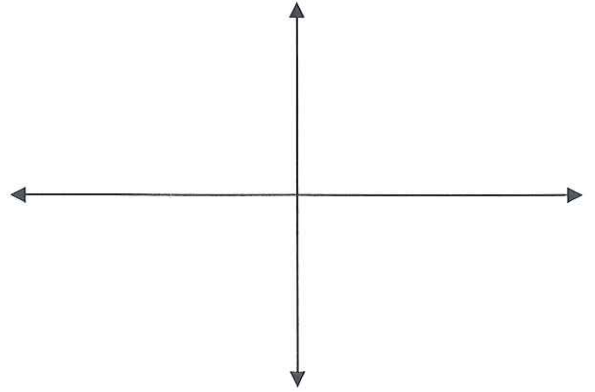
16.  $\cos\left(\frac{-9\pi}{2}\right)$

17.  $\sin(3\pi)$

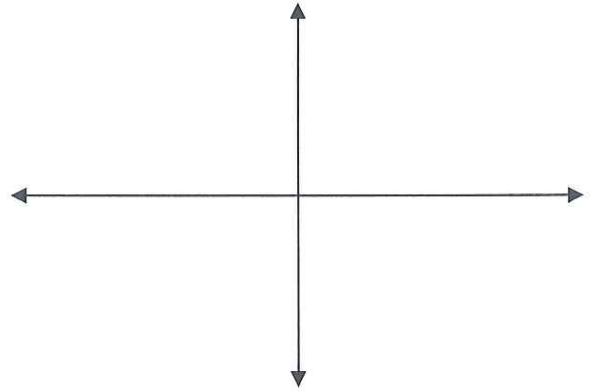
18.  $\csc(\pi)$

**Graph each function.**

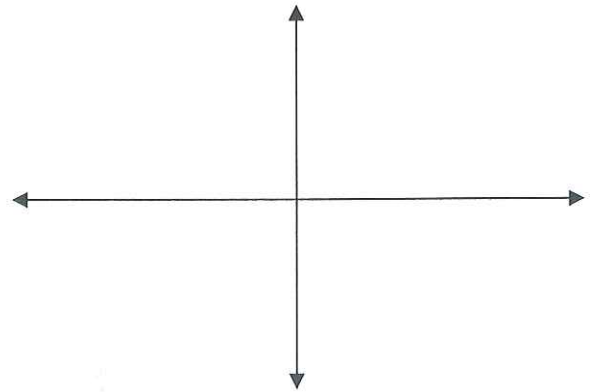
19.  $y = \tan\left(\frac{\theta}{4} + \frac{\pi}{2}\right) + 1$



20.  $y = -4\cos\left(\frac{\theta}{2} + \pi\right) - 2$



21.  $y = 2\sin\left(4\theta + \frac{\pi}{2}\right) - 5$



## Chapter Six Review

Name \_\_\_\_\_

1. Change  $-54^\circ$  to radian measure in terms of  $\pi$ . (2pts)
2. Change 15 radians to degree measure. Round to the nearest tenth. (2pts)
3. Determine the angular velocity if 29 revolutions are completed in 2 seconds. (3pts)
4. Determine the linear velocity of a point rotating at an angular velocity of  $15\pi$  radians per second at a distance of 12 feet from the center of the rotating object. (3pts)
5. Given a central angle of  $105^\circ$ , find the length of the intercepted arc in a circle of radius 9 inches. Round to the nearest tenth? (3pts)
6. Find the area of a sector if the central angle measures  $30^\circ$  and the radius of the circle is 15 centimeters. (3pts)

7. Write an equation of the sine function with amplitude 2, period  $3\pi$ , phase shift of  $-\frac{\pi}{2}$  and a vertical shift of 6. (4pts)

8. Write an equation for a tangent function with period  $\frac{\pi}{4}$ , phase shift  $2\pi$ , and vertical shift 1. (4pts)

9. State the amplitude, period, phase shift, and vertical shift for  $y = -\frac{2}{5}\sin(10\theta + \frac{\pi}{2})$ . (4pts)

10. Write the equation for the inverse of  $y = \cos x + 1$ . (3pts)

11. Evaluate  $\tan\left[\sin^{-1}\left(\frac{1}{2}\right) - \frac{2\pi}{3}\right]$ . (3pts)

12. Evaluate  $\cos(2\sin^{-1}\frac{1}{2})$ . (3pts)

13. Write a sinusoidal function that models the monthly temperatures in Spokane International Airport, in Washington, using  $t = 1$  to represent January. (5pts)

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
27.1°	33.3°	38.7°	45.9°	53.8°	61.9°	68.7°	68.4°	58.8°	47.3°	35.1°	27.9°

14. According to your model from #13, what is the average temperature in April? (1pt)

15. A boat trailer tire has a diameter of 8 feet and is revolving at a rate of 30 rpm. At  $t = 0$ , a nail in the tire is at its lowest point at height 0. Write a function for the height of the nail above ground after  $t$  seconds.

**Use the sine or cosine graph to find each value.** (3pts each)

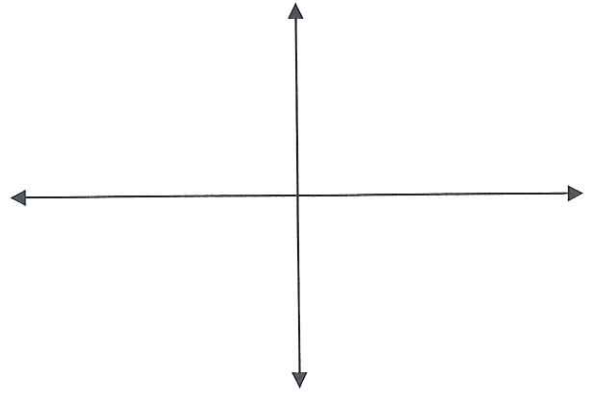
16.  $\cos(-5\pi)$

17.  $\sin\left(\frac{11\pi}{2}\right)$

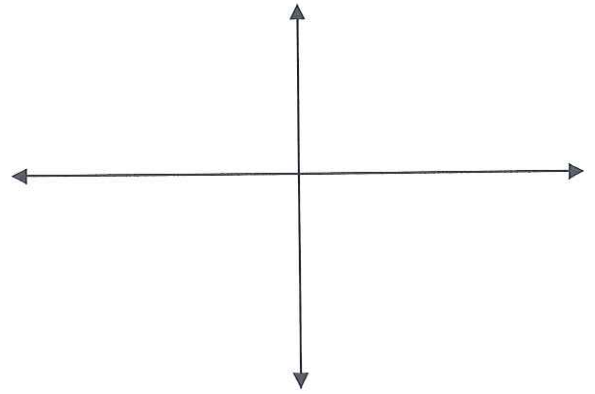
18.  $\tan\left(\frac{10\pi}{3}\right)$

**Graph each function. (5pts each)**

19.  $y = \tan\left(\frac{\theta}{2} + \pi\right) - 2$



20.  $y = 4\cos\left(\frac{\theta}{4} - \pi\right) + 3$



21.  $y = -3\sin(4\theta + \pi) - 6$

