

NAME: \_\_\_\_\_ Score \_\_\_\_\_ /100  
 Please print

SHOW ALL YOUR WORK IN A NEAT AND ORGANIZED FASHION

Questions are each worth 4 points.

1.  $\cos\left(\frac{\pi}{3}\right) =$  \_\_\_\_\_

2. What is the exact value of  $\cos(225^\circ)$ ? \_\_\_\_\_

3. The range of the cos function is \_\_\_\_\_

4. The domain of the ln function is \_\_\_\_\_

5. Circle those values in the following list which are zeros of the sin function.

- $0, \frac{\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{4}, \pi, \frac{5\pi}{4}, \frac{3\pi}{2}, 2\pi, \frac{5\pi}{2}$

6. Circle those values in the following list which are zeros of the cos function.

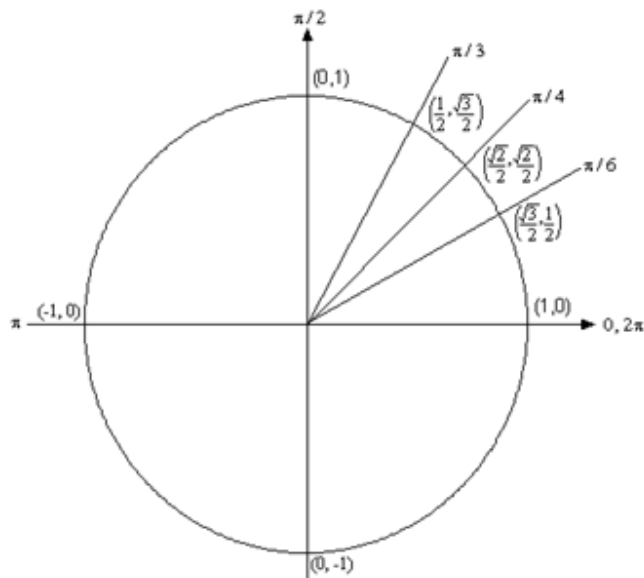
- $0, \frac{\pi}{4}, \frac{\pi}{2}, \frac{3\pi}{4}, \pi, \frac{5\pi}{4}, \frac{3\pi}{2}, 2\pi, \frac{5\pi}{2}$

7. If  $\cos(\theta) < 0$  and  $\tan(\theta) > 0$ , then  $\theta$  is in Quadrant \_\_\_\_\_.

8. Find the exact value of  $\ln\left(e^{\sqrt{7}}\right)$  \_\_\_\_\_

9. What is the domain of the function whose rule is  $f(x) = \frac{3x^2 - 4x + 5}{2x^2 + 3x}$ ?

10. In a discussion of the  $\sin^{-1}$  function the domain of sin function is restricted to the interval \_\_\_\_\_



11. In a right triangle with acute angles  $\alpha = \frac{2\pi}{5}$  and  $\beta$ , the exact value of  $\beta$  is \_\_\_\_\_

12. What is the amplitude of the  $3\sin(5x + \frac{\pi}{3})$ ? \_\_\_\_\_

13. What is the period of the  $3\sin(5x + \frac{\pi}{3})$ ? \_\_\_\_\_

14. What is the phase shift of the  $3\sin(5x + \frac{\pi}{3})$ ? \_\_\_\_\_

**For Problems 15 – 25, Show all necessary work. NO WORK – NO CREDIT**  
**Sentences are good. Lines of equalities are very good. If two expressions are equal say that by using the = symbol. If two expressions are not equal do not put the = symbol between them.**  
**If two expressions are approximately equal say that by using the symbol  $\approx$ .**

15. In Figure 1 at the right,  $b = 9$ ,  $a = 40$ , and  $c = 41$ . Calculate  $\sin(\beta)$ .  
Write your answer as a fraction (no decimals).

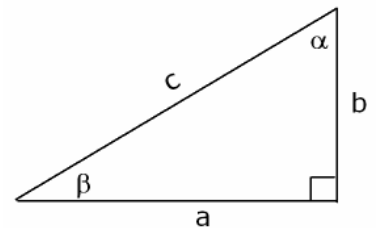
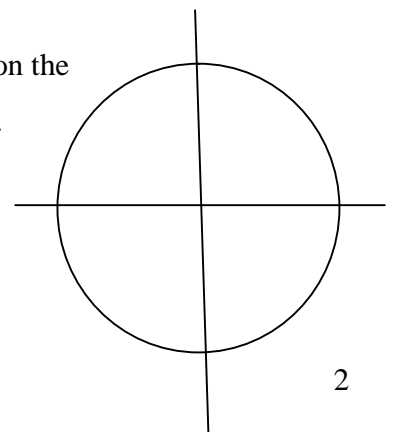


Figure 1

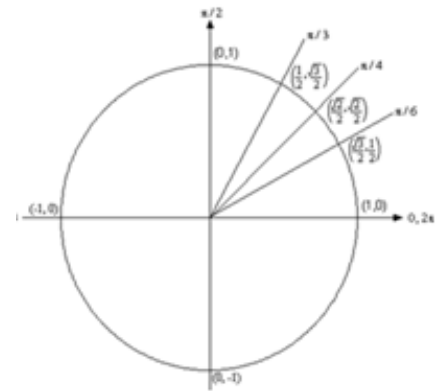
16. Find the exact solutions of the equation  $e^{3x+2} = 7$ .

17. What is the reference angle  $\alpha$  for the angle  $\theta = -\frac{5\pi}{4}$ ? Draw a diagram on the unit circle at the right to illustrate both  $\theta$  and  $\alpha$  and the reference triangle. Write the value of  $\alpha$ .

$\alpha =$



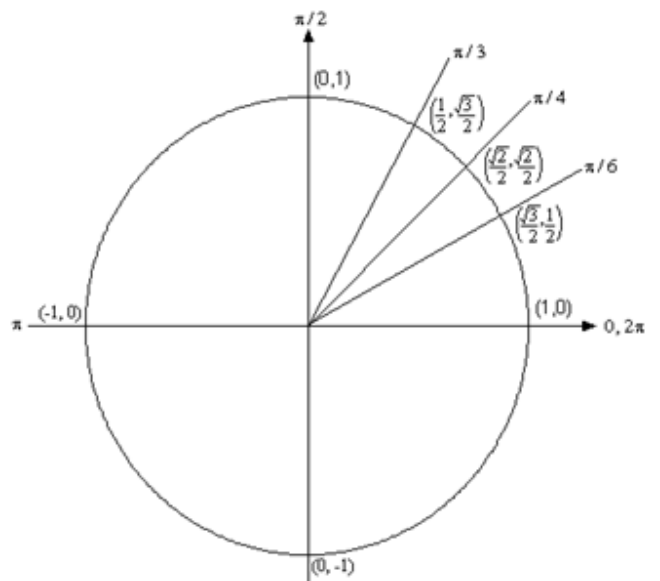
18. Find the smallest positive  $\theta$  for which  $\sin(\theta) = -\frac{\sqrt{3}}{2}$



19. If  $\tan(\alpha) = \frac{5}{12}$  and  $\alpha$  is an acute angle, what is the exact value, expressed as a fraction, of  $\sin(\alpha)$ ?  
Hint: Draw the appropriate triangle.

20. Find the exact value of  $\beta = \sin^{-1}\left(-\frac{\sqrt{3}}{2}\right)$ .

Use the unit circle at the right to answer this question and illustrate your process – locate the angle  $\beta$ . Draw and label the angle  $\beta$  on the unit circle at the right.



21. Sketch the graph of  $\sin(x)$  from  $-180^\circ$  to  $360^\circ$



22. Solve the triangle at the right if  $\alpha = 35.73^\circ$  and  $b = 6.48$   
Your answers should be correct to two decimal places. Your work should be organized in a neat and readable fashion.

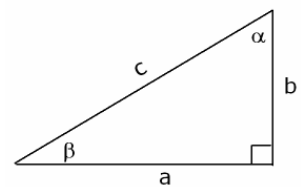
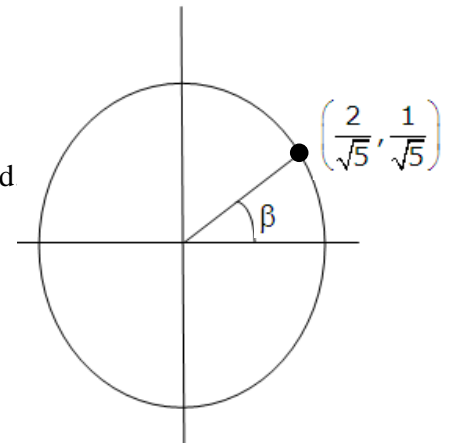


Figure 1

23. Refer to the diagram on the unit circle at the right. (Use a calculator)  
 Determine the measure of  $\beta$  in radians or degrees (your choice).  
 Your answer should be correct to two decimal places.  
 Label your answer as degree or radians.  
 Tell me (preferably with a line of equalities) the computations you did



$\beta =$

24. What are (and why) the vertical asymptotes for the function whose rule is

$$f(x) = \frac{(x-2)(x+3)(x-4)}{(x+3)(x-5)}$$

25. What is (and why) the horizontal asymptote for the function whose rule is  $f(x) = \frac{5x^3 - 4x^2 + 5}{3x^3 + 3x}$