

UNIT TEST



Fill in the blanks.

1. Change $5\pi/4$ radians to degrees. _____
2. Give two other ways to express $(-2, -21^\circ)$ using degrees. _____
3. The point $(r \sin \theta)$ in polar coordinates is the same as _____ with rectangular coordinates.
4. Any set of ordered pairs is a _____ .
5. The set of possible y coordinates for a function is the _____ .
6. Common logarithms are in base 10. Natural logarithms are in base _____ .

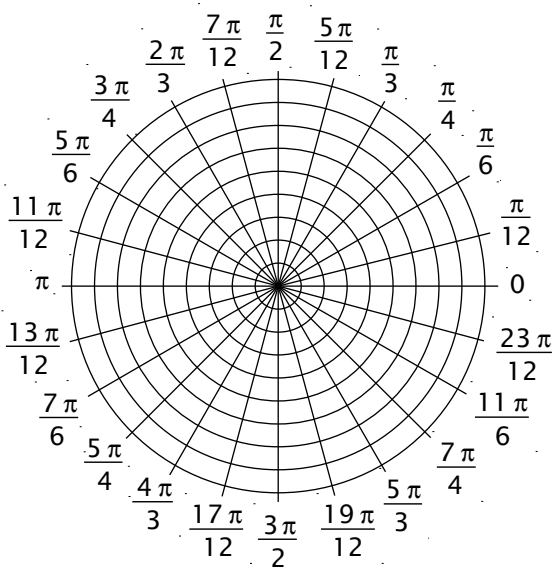
Follow the directions.

7. Write the equation $x - 2y = 5$ in terms of polar coordinates.

8. Change the rectangular coordinates $(4, 4\sqrt{3})$ to polar coordinates and graph. Use the graph by #9.

9. Graph the following equation:

$$r = \frac{2}{\cos \theta - \sin \theta}$$



10. The first vector (first throw) was $(-15', 15^\circ)$. The resultant vector (one throw) was $(28.5', 256.2^\circ)$. What were the polar coordinates of the second vector (second throw)?

11. Which of the following are functions?

A. $x = 2y$

B. $x^2 + y^2 = 4$

C. $y = \ln x$

D. $y = -x^2$

12. Suppose that at a time t (hours), the number of bacteria in a culture is given by $B(t) = 4000 e^{-2t}$. How many bacteria are in the culture after six hours? How long will it take for the bacteria count to reach 100,000?

13. Solve for x : $e^{3x} = \ln 2$

14. Factor: $\ln^2 x + 3 \ln x - 10$

Given the following functions, find the composite functions.

$$f(x) = \ln x + 3$$

$$h(x) = x^2 - 8$$

$$g(x) = e^x$$

$$j(x) = -3x$$

15. $f(x) + g(x) + h(x) =$

16. $j(g(x)) =$

17. $f(g(x)) =$
(Give in simplest terms.)

18. $f(g(j(-1))) =$