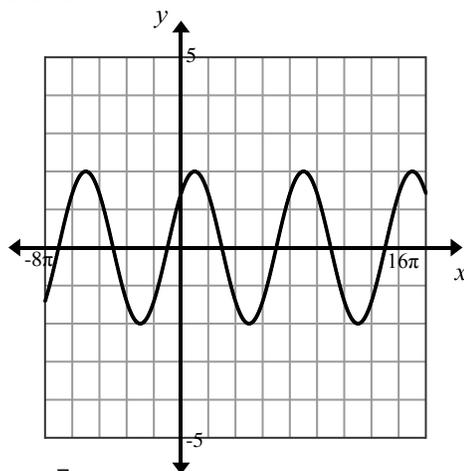


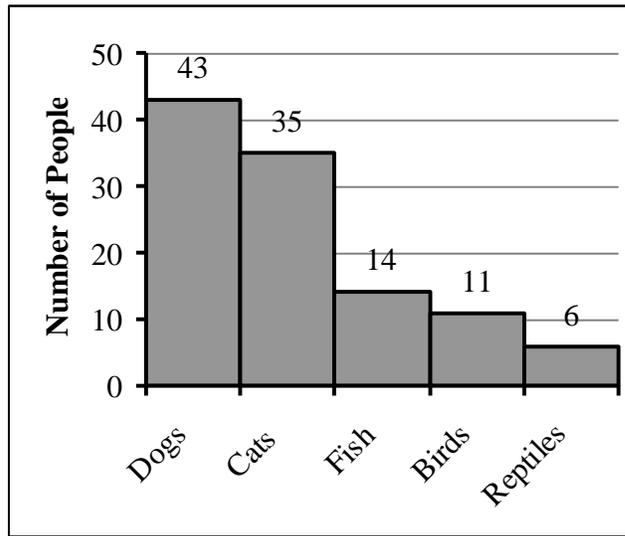
1. Based on the parent function $f(x) = \cos x$ shown above, determine which of these functions represents the following graph.



- A. $f(x) = 2 \cos \left[\frac{1}{4}(x - \pi) \right]$
- B. $f(x) = 4 \sin \left[\frac{1}{2}(x + \pi) \right]$
- C. $f(x) = 2 \sin \left(\frac{x}{4} - \pi \right)$
- D. $f(x) = 4 \cos 2(x + \pi)$
2. Simplify: $2x + 1 - \frac{x+1}{x-4}$

- A. $\frac{2x^2 - 8x - 3}{x - 4}$
- B. $\frac{2x^2 - 8x - 5}{x - 4}$
- C. $\frac{2x^2 - 10x - 5}{x - 4}$
- D. $\frac{2x^2 - 9x - 3}{x - 4}$

3. The following graph shows the number of people who own each kind of pet listed. What percent of pet owners have fish?



- A. 12.84%
B. 14.00%
C. 15.21%
D. 17.00%
4. Find the domain and range of:
- $$g(x) = -2 \sin\left(3x - \frac{\pi}{2}\right) + 1$$
- A. Domain: $x \geq \frac{\pi}{6}$ Range: $-2 \leq y \leq 2$
B. Domain: all real numbers Range: $-1 \leq y \leq 3$
C. Domain: $x \leq \frac{\pi}{2}$ Range: $-3 \leq y \leq 3$
D. Domain: all real numbers Range: $-2 \leq y \leq 2$
5. If x and y are on the interval $[0, 90^\circ]$, and if $\cos x = 1$ and $\tan y = 1$, then what is $x + y$?
- A. 45°
B. 60°
C. 120°
D. 135°

6. Describe the shift of the graph g with respect to the graph of f if $g(x) = \sin(x - \frac{\pi}{3})$ and $f(x) = \sin x$.
- A. $\frac{\pi}{3}$ units up
 - B. $\frac{\pi}{3}$ units down
 - C. $\frac{\pi}{3}$ units left
 - D. $\frac{\pi}{3}$ units right
7. When would the interquartile range serve as a better measure of spread than the standard deviation or range?
- A. When data values are spread evenly over a large range of numbers
 - B. When data values are spread evenly over a small range of numbers
 - C. When most data values are relatively close to each other
 - D. When most data values are relatively close to each other but outliers exist
8. If 136 students represent 85% of those surveyed who said that math was their favorite class, then how many students didn't say math was their favorite?
- A. 36
 - B. 15
 - C. 24
 - D. 30
9. Solve the rational equation $\frac{4}{x} + \frac{5}{2} = \frac{-11}{x}$.
- A. $x = -150$
 - B. $x = -30$
 - C. $x = -15$
 - D. $x = -6$

10. $\frac{x^2 + 4x}{x + 3} \cdot \frac{x^2 - 9}{x^2 + x - 12} =$

- A. 1
- B. x
- C. $x + 4$
- D. $\frac{x + 3}{x - 5}$

11. Find the value of the function shown here:

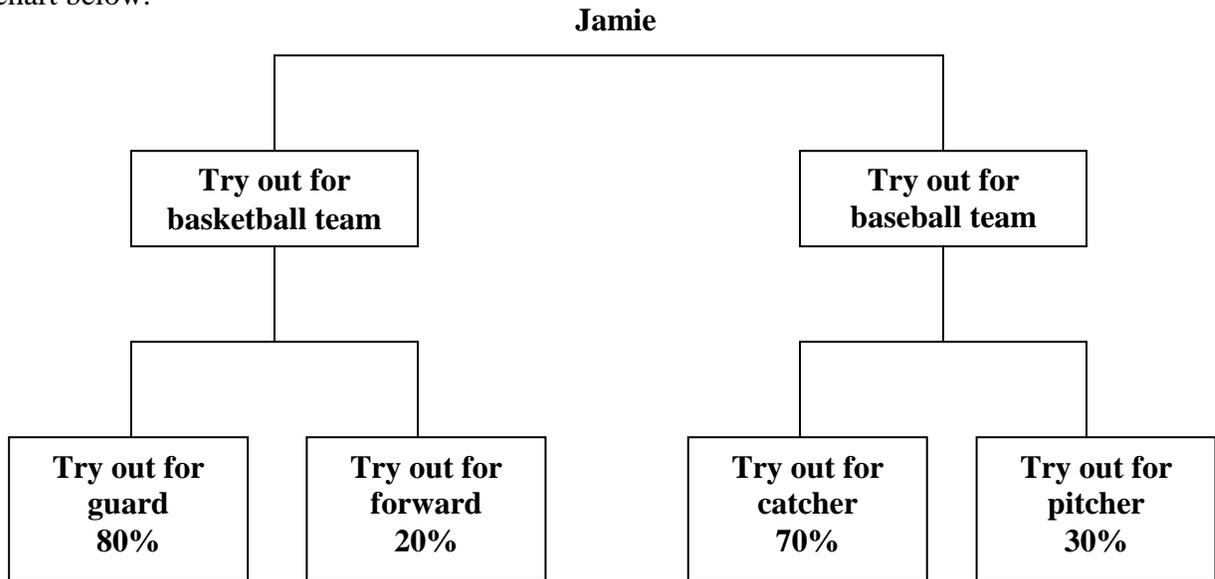
$$\sin\left(\frac{-2}{3}\pi\right)$$

- A. $\frac{-1}{2}$
- B. $\frac{-\sqrt{2}}{2}$
- C. $\frac{-\sqrt{5}}{2}$
- D. $\frac{-\sqrt{3}}{2}$

12. Which point (x, y) on the unit circle corresponds to the real number $\theta = \frac{4\pi}{3}$?

- A. $\left(\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
- B. $\left(-\frac{1}{2}, \frac{\sqrt{3}}{2}\right)$
- C. $\left(\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$
- D. $\left(-\frac{1}{2}, -\frac{\sqrt{3}}{2}\right)$

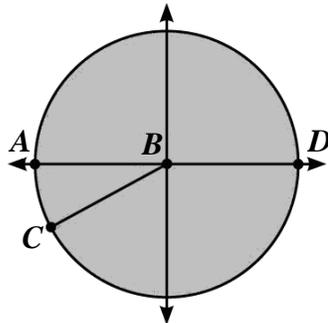
13. The probabilities that Jamie will try out for various sports and team positions are shown in the chart below.



Jamie will definitely try out for either basketball or baseball, but not both. The probability that Jamie will try out for baseball and try out for catcher is 42%. What is the probability that Jamie will try out for basketball?

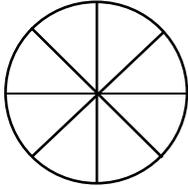
- A. 40%
- B. 60%
- C. 80%
- D. 90%

14. Find the length of DAC given $\overline{BC} = 3$, and $\angle DBC = -\left(\frac{5\pi}{6}\right)$.



- A. $\frac{5\pi}{2}$
- B. $\frac{21\pi}{2}$
- C. $\frac{7\pi}{2}$
- D. $\frac{15\pi}{2}$

15. A group of students are having a pizza party. They get one slice of pizza from each of three 20 inch diameter pizzas that are all cut exactly the same as shown below. The interior angle of a slice measures 45° . What is the area of one slice of pizza?



- A. $\frac{25\pi}{8}$
B. $\frac{25\pi}{2}$
C. 562.5
D. 2250
16. The problem below is an example of which of the following?
- A standard deck of playing cards has four suits with thirteen different cards in each suit. If the order in which the cards are dealt is not important, how many different five card hands are possible?*
- A. Binomial Theorem
B. Combination
C. Fundamental Counting Principle
D. Permutation
17. Marcia has 8 shirts, 5 pairs of pants, and 4 pairs of shoes. Assuming everything is clean, how many ways can she select clothing to wear to school?
- A. 324 different ways
B. 160 different ways
C. 44 different ways
D. 17 different ways
18. Evaluate ${}_{48}C_5$ using technology or the formula ${}_nC_r = \frac{n!}{(n-r)!r!}$.
- A. 0.1042
B. 240
C. 1,712,304
D. 205,476,480

19. Fifteen people apply for a job. How many ways can the company choose 3 of these people to hire for the position?

- A. 126
- B. 42
- C. 2,730
- D. 455

20. Evaluate ${}_{12}P_3$ using technology or the formula ${}_nP_r = \frac{n!}{(n-r)!}$.

- A. 36
- B. 220
- C. 1320
- D. 79,833,600

21. Which of the following is a dependent event?

- A. Rolling a die three times
- B. Throwing three darts at a dartboard
- C. Choosing three people for a class presidency
- D. Spinning a spinner on a wheel three times

22. Find the interquartile range for the following set of numbers: {72, 30, 25, 94, 92, 5, 12, 69, 98, 63, 31, 9, 99, 20}

- A. 47
- B. 56
- C. 72
- D. 94

23. Find the standard deviation for the following set of numbers: {16, 13, 16, 9, 3, 7, 9, 10, 13, 4}.

- A. 18.6
- B. 1.5
- C. 9.3
- D. 4.3

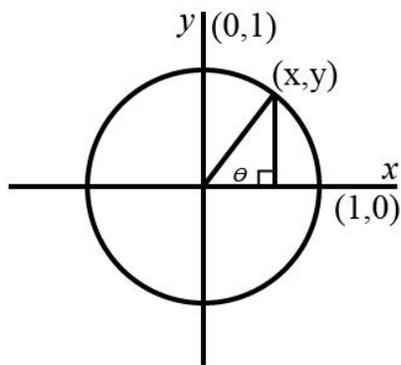
24. If $\tan \theta = 0.9004$ and $180^\circ \leq \theta \leq 270^\circ$, then $\theta = ?$

- A. 242°
- B. 269°
- C. 198°
- D. 222°

25. If $\sin \theta = \frac{1}{2}$, then θ could be _____.

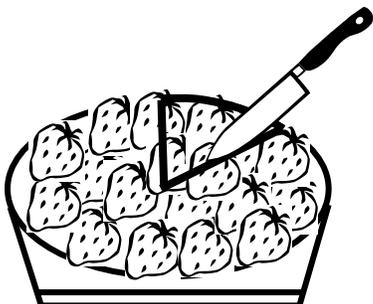
- A. $\frac{\pi}{3}$
- B. $\frac{7\pi}{6}$
- C. $\frac{\pi}{6}$
- D. $\frac{5\pi}{3}$

26. For the unit circle pictured, find $\cos \theta$.



- A. $\frac{1}{y}$
- B. y
- C. $\frac{1}{x}$
- D. x

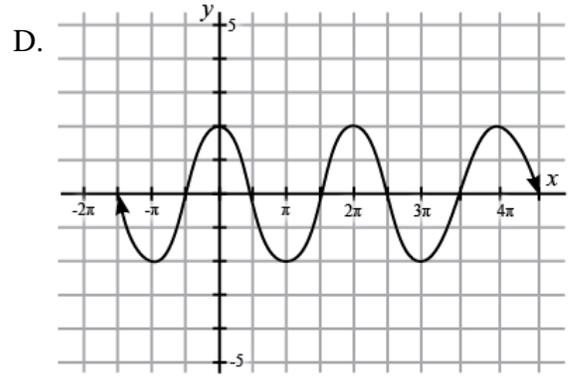
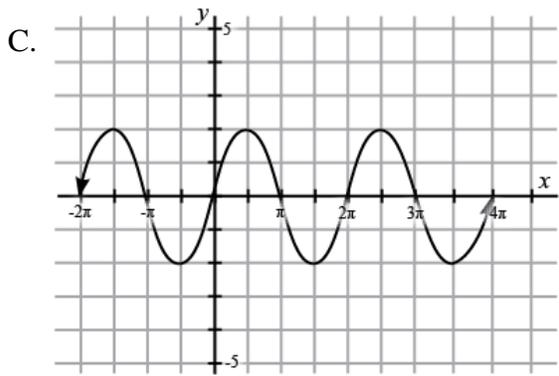
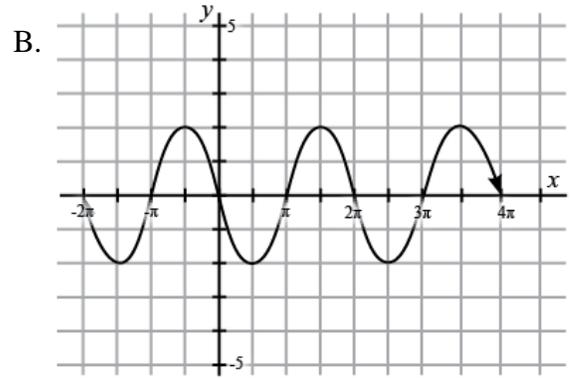
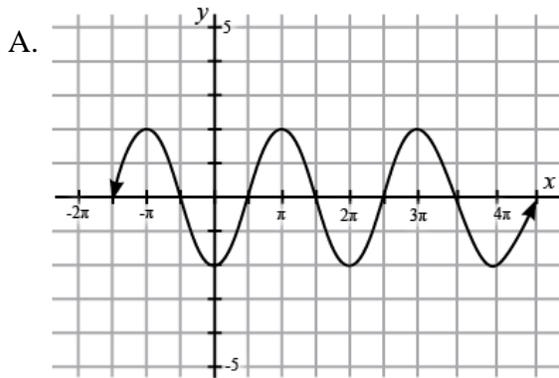
27. You have made strawberry pie that is 10 inches in diameter and would like to share a piece with your friend. You cut your friend a slice that measures $\frac{\pi}{3}$. What is the arc length of your friend's piece of pie?



- A. $\frac{\pi}{3}$
- B. $\frac{5\pi}{3}$
- C. $\frac{10\pi}{3}$
- D. $\frac{20\pi}{3}$
28. Divide $(x^3 - 2x^2 + 6x - 8)$ by $(x - 2)$.

- A. $x^2 + 6 + \frac{4}{x-2}$
- B. $x^2 - 4x + 14 - \frac{36}{x-2}$
- C. $x^2 - 3x + 1 - \frac{9}{x-2}$
- D. $x^2 + x + 9 + \frac{3}{x-2}$

29. Which of these graphs represents the function $f(x) = -2 \sin\left(x - \frac{\pi}{2}\right)$?



30. John and Sam have made a pizza that is 16 inches in diameter. They want to cut a piece that has an angle measure of $\frac{\pi}{3}$ radians. What would be the angle measure of the slice of pizza in degrees?

- A. 30°
- B. 45°
- C. 60°
- D. 120°