

### Practice Question # 1

- The first term of an arithmetic sequence is 36 and the fifteenth term is  $-62$ . What is the common difference?

### Practice Question # 2

- What is the sum for a geometric series  $5 + 15 + 45 + \dots$  up to 13 terms?

### Practice Question # 3

- Each year, students at Upton Academy must select class presidents, vice-presidents, and secretaries. If the junior class has 37 students, how many different winning slates are possible?

### Practice Question # 4

- What is the probability of drawing a five and a club from a standard deck of cards if replacement does not occur?
- What is the probability of drawing a King or a red card from a standard deck of cards?

### Practice Question # 5

- Billy typically makes 68% of his free-throw shots. If he shoots 5-free throws, what is the probability that he will get at least 4 of them?

### Practice Question # 6

- Mr. Francis teaches two small Algebra 1 classes. Below are his classes' scores on their last test:  
1<sup>st</sup> Period: {78, 95, 83, 80, 90, 72, 45, 67, 94, 89}  
2<sup>nd</sup> Period: {63, 87, 82, 91, 54, 74, 85, 94, 97, 81}  
  
What is the **difference** between the means of the classes' scores?

### Practice Question # 7

- Solve for x:

a.)  $4e^{x+3} - 6 = 26$       b.)  $\log_2(\ln x + 4) = 3$

### Practice Question # 8

- Given the function:  $f(x) = \begin{cases} 2x-5 & \text{if } x \leq 1 \\ 4-3x^2 & \text{if } x > 1 \end{cases}$

Find:  $f(4) + 2f(-3) - 5f(1)$

### Practice Question # 9

- A power function contains the points (4, 8) and (6, 10).

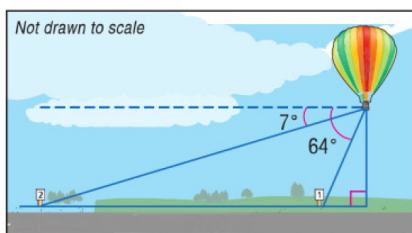
What is the value of y when  $x = 15$ ?

### Practice Question # 10

- The shelf life of a particular dairy product is normally distributed with a mean of 15 days and a standard deviation of 4 days. What percent of the products lasts between 3 and 19 days?

### Practice Question # 11

- A hot-air balloon crosses over a straight portion of interstate, its pilot eyes two consecutive mile posts on the same side of the balloon. How high is the balloon in ft?



### Practice Question # 12

- Ships and airplanes measure distance in nautical miles. The formula  $1 \text{ nautical mile} = 6077 - 25 \cos(2\theta)$  is given where  $\theta$  = latitude line in degrees. What is the degree of latitude if a ship is 6,061.5 nautical miles from this latitude line?

### Practice Question # 13

- The first term in a geometric sequence is two and the common ratio is four. What term is 131,072 in this sequence?

### Practice Question # 14

- Amanda is selecting 3 marbles from a bag at random. In the bag there are 4 blue marbles, 3 yellow marbles, and 5 red marbles. What is the probability that Amanda will select 2 yellow marbles and 1 red marble?

### Practice Question # 15

- A new card game at a casino allows you to draw one card from a standard deck of cards. If you pick a heart, you will win \$10. If you pick a face card, which is not a heart, you win \$8. If you pick any other card, you lose \$6. Does the game benefit the "house" or the player?

### Practice Question # 16

- What are the domain and range (in interval notation) of the following functions?

a.)  $f(x) = -|x + 2| + 4$

b.)  $f(x) = \sqrt{x - 3} + 1$

c.)  $f(x) = \ln(x + 4) - 3$

### Practice Question # 17

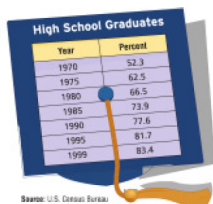
- Verne is constructing a triangular pen with wood fencing. One side is 425 feet long, another side is 550 feet, and the included angle is  $43^\circ$ . It will cost \$8 per foot to fence the pen. How much will Verne have to spend on his pen?

### Practice Question # 18

- The point  $(-12, -8)$  lies on the terminal side of an angle in standard position. What is the value of this (positive) angle?

## Practice Question # 19

- The table below shows the percent of people ages 25 and over with a high school diploma over the last few decades. Using a linear model, what is the percent of high school graduates in 2010?



Year	Percent
1970	52.3
1975	52.5
1980	66.5
1985	73.9
1990	77.8
1995	81.7
1999	83.4

Source: U.S. Census Bureau

## Practice Question # 20

- Marta places \$100 into a savings account with a 6% interest rate compounded quarterly. How long will it take for Marta money to double?

## Practice Question # 21

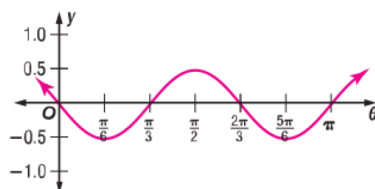
- Point P is located at the intersection of a circle of radius 5 and the terminal side of angle  $\theta$  measuring  $\frac{5\pi}{3}$ . What are the exact coordinates of point P?

## Practice Question # 22

- Karen is carpeting a triangular section of a room in her house. The lengths of the section that needs carpet is 13 feet, 16 feet, and 12 feet. The carpet Karen wants costs \$22 per square foot. Right now, Karen only has \$1,500 saved up. How much more money does she need?

## Practice Question # 23

- What specific trigonometric function is represented below?



## Practice Question # 24

- A pilot is flying from Chicago to Columbus, a distance of 300 miles. In order to avoid an area of thunderstorms, she alters her initial course by  $15^\circ$  and flies on this course for 75 miles. What angle does the pilot use to head to her destination?

### Practice Question # 25

- How many terms were added together for a geometric series whose first term is 4, common ratio is 3, and sum is 1,062,880?

### Practice Question # 26

- A class has test scores: 76, 52, 82, 95, 76, 92, 99, 85, 89, 64, 78, 82, 76, 95. What is the SUM of the measures of central tendency?

### Practice Question # 27

- What is the sum of an arithmetic series whose eleventh term is 75, seventeenth term is 117, and last term is 236?

### Practice Question # 28

- Hank is trying to create a password for his phone. The password has to be 5 characters. The first two characters must be letters, the middle character must be a number, and the last two characters must be vowels. The characters of the password cannot repeat. How many different passwords can Hank make?

### Practice Question # 29

Cammie has a bag of marbles containing 4 red, 3 yellow, 2 green, and 5 blue. She selects 2 marbles at random. Which scenario has a greater chance of happening?

Scenario # 1 – Selecting a yellow and then a blue, no replacement

Scenario # 2 – Selecting two yellows or two blues.

### Practice Question # 30

- A class has exam scores that are normally distributed with a mean of 86 and a standard deviation of 3. Twenty-three of the students scored between 83 and 95. How many students took the exam?

### Practice Question # 31

- Nora, who is 22 years old, wants to invest \$1400 into an account that has a 4.3% interest rate and the account is compounded continuously. How old will Nora be when her account's balance is \$3850?


### Practice Question # 32

- Assuming a right triangle, what is the value of the expression below?

$$\tan\left(\sin^{-1}\frac{5}{7}\right) + \frac{3\sqrt{6}}{4}$$

### Practice Question # 34

- The table below shows the outstanding household credit market debt (in trillion of dollars) from 1998 through 2004. A linear model best models this data. What will the debt be in the year 2018?



Year	Household credit market debt, $D$ (in trillions of dollars)
1998	6.0
1999	6.4
2000	7.0
2001	7.6
2002	8.4
2003	9.2
2004	10.3