

Practice Question # 1

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

$$d = -7$$

Practice Question # 2

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

$$3,985,805$$

Practice Question # 7

- Solve for x:

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

$$x = -9.2056 \quad x = 54.5982$$

Practice Question # 8

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

$$\text{Find: } f(4) + 2f(-3) - 5f(1)$$

$$-51$$

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?

$$46,620 \text{ slates}$$

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?

$$2\%$$

- What is the probability of drawing a King or a red card from a standard deck of cards?

$$53.8\%$$

Practice Question # 9

- A power function contains the points (4, 8) and (6, 10). What is the value of y when x = 15?

$$y = 16.6$$

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?

$$83.85\%$$

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?

$$48.7\%$$

Practice Question # 6

- Mr. Francis teaches two small Algebra 1 classes. Below are his classes' scores on their last test:

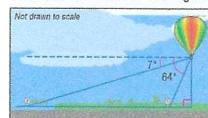
1st Period: {78, 95, 83, 80, 90, 72, 45, 67, 94, 89}
2nd Period: {63, 87, 82, 91, 54, 74, 85, 94, 97, 81}

What is the difference between the means of the classes' scores?

$$1.5$$

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?



$$689.6 \text{ ft}$$

Practice Question # 12

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

$$\theta = 25.8^\circ$$

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?

$$9^{\text{th}} \text{ term}$$

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?

$$6.8\%$$

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
1980	84.1
1990	85.2
2000	86.3
2010	87.4

$$97.2\%$$

Practice Question # 20

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

$$11.6 \text{ years}$$

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?

benefit + player
b/c gam \$0.42
everytime play game.

Practice Question # 16

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

$$a.) f(x) = -|x+2| + 4 \quad D: (-\infty, \infty) \quad R: (-\infty, 4]$$

$$b.) f(x) = \sqrt{x-3} + 1 \quad D: [3, \infty) \quad R: [1, \infty)$$

$$c.) f(x) = \ln(x+4) - 3 \quad D: (-4, \infty) \quad R: (-\infty, \infty)$$

Practice Question # 21

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

$$P = \left(\frac{5}{2}, -\frac{5\sqrt{3}}{2} \right)$$

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?

$$\$187.27$$

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° . It will cost \$8 per foot to fence the pen. How much will Verne have to spend on his pen?

$$\$10,808$$

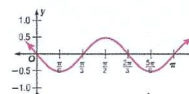
Practice Question # 18

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

$$\theta = 213.7^\circ$$

Practice Question # 23

- What specific trigonometric function is represented below?



$$y = \frac{1}{2} \sin(3x - \pi)$$

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° and flies on this course for 75 miles. What angle does the pilot use to head to her destination?

$$\theta = 19.9^\circ$$

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?

12 terms

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?

Sum = 239.5

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?

45.5 years old

Practice Question # 32

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

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

$\frac{7\sqrt{6}}{6}$

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?

4097

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?

39,000 possible passwords

Practice Question # 33

- Given the piecewise function:

$$f(x) = \begin{cases} 2x+4 & \text{if } x \leq -2 \\ 3-x^2 & \text{if } x > -2 \end{cases}$$

Find (as a reduced fraction): $\frac{f(6)+3f(-4)}{f(-8)-6f(0)}$

$\frac{3}{2}$

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 trillion of dollars)
1998	6.0
1999	6.3
2000	7.0
2001	7.4
2002	8.4
2003	9.2
2004	10.3

19.9 trillion

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.

Scenario #2 by 6.1% more

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?

about 27 students took exam

Practice Question # 35

- Parker, Devin, and Andy are all standing in a grassy field and form a triangle around a circular pond that is 6 feet in diameter. Parker and Devin are 15 feet apart from each other where they both can see Andy. Parker's line of sight to Andy is 38° and Devin's line of sight to Andy is 63°. A bird is attempting to land in the triangle the boys have formed. What is the probability that the bird will land in the GRASS?

55%

Practice Question # 36

- The table shows the numbers N of commercials banks in the U.S. from 1996 to 2005, where x = 6 for 1996. A logarithmic model best models this data. In what year will the number of banks drop to 5,300?

Year	Number, N
1996	10,000
1997	9,500
1998	9,000
1999	8,500
2000	8,000
2001	7,500
2002	7,000
2003	6,500
2004	6,000
2005	5,500

2036