

### Practice Question # 1

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

$$\begin{aligned} a_1 &= 36 & a_{15} &= -62 \\ a_n &= a_1 + d(n-1) \\ -62 &= 36 + (15-1)d \\ -98 &= 14d \\ \frac{-98}{14} &= \frac{14d}{14} \rightarrow \boxed{d = -7} \end{aligned}$$

### Practice Question # 2

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

$$a_1 = 5 \quad r = \frac{15}{5} = 3 \quad n = 13 \quad S_{13} = ?$$

$$\begin{aligned} S_{13} &= \frac{5(1-3^{13})}{(1-3)} \\ &= \boxed{3,985,805} \end{aligned}$$

### 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?

$${}_{37}P_3 = \boxed{46,620 \text{ slates}}$$

### Practice Question # 4

- What is the probability of drawing a five <sup>multiply</sup> and a club from a standard deck of cards if replacement does not occur?

$$\frac{4}{52} \cdot \frac{13}{51} = \frac{52}{2652} = \boxed{2\%}$$

- What is the probability of drawing a King <sup>add</sup> or a red card from a standard deck of cards?

$$\frac{4}{52} + \frac{26}{52} - \frac{2}{52} = \frac{28}{52} = \boxed{53.8\%}$$

### 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?

$$P(4) + P(5) \rightarrow$$

$$\begin{aligned} &5C_4 (.68)^4 (.32)^1 \\ &+ 5C_5 (.68)^5 (.32)^0 \\ &= \boxed{48.7\%} \end{aligned}$$

### 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}

$$\bar{x} = 79.3$$

$$\bar{x} = 80.8$$

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

$$80.8 - 79.3 = \boxed{1.5}$$

Key Cont'd

### Practice Question # 7

- Solve for x:

a.)  $4e^{x+3} - 6 = 26$

$$\frac{4e^{x+3}}{4} = \frac{32}{4}$$

$$e^{x+3} = 8$$

$$x+3 = \ln(8)$$

$$x = \ln(8) - 3$$

$$x = -1.2036$$

b.)  $\log_2(\ln x + 4) = 3$

$$2^3 = \ln x + 4$$

$$8 = \ln x + 4$$

$$4 = \ln x$$

$$e^4 = x$$

$$x = e^4$$

$$x = 54.5982$$

### Practice Question # 8

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

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

$$f(4) = 4 - 3(4)^2 = -44$$

$$f(-3) = 2(-3) - 5 = -11$$

$$f(1) = 2(1) - 5 = -3$$

$$\Rightarrow -44 + 2(-11) - 5(-3) = -51$$

### Practice Question # 9

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

What is the value of y when x = 15?

x	y
4	8
6	10

regression equation  $\rightarrow$

$$y = 3.73037476x^{.550329713}$$

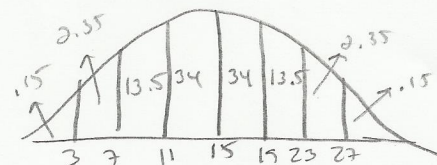
$$x = 15$$

$$y = ? \text{ table}$$

$$y = 16.6$$

### Practice Question # 10

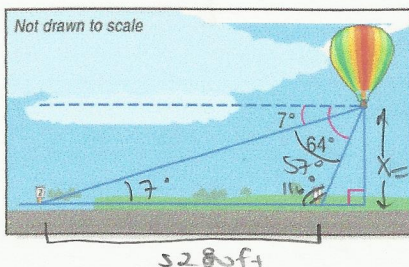
- The shelf life of a particular dairy product is normally distributed with a mean of 15 days and a standard deviation of 4 days. What percent of the products lasts between 3 and 19 days?



$$0.0175 + 0.0175 + 0.34 + 0.34 = 0.835$$

### 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?



$$\frac{5280}{\sin 57^\circ} = \frac{x}{\sin 7^\circ}$$

$$x = 767.3$$

$$\frac{5280}{\sin 17^\circ} = \frac{x}{\sin 64^\circ}$$

$$x = 767.3$$

$$x = 689.67$$

### 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?

$$6061.5 = 6077 - 25 \cos(2\theta)$$

$$\frac{-15.5}{25} = \frac{-25 \cos(2\theta)}{25}$$

$$\cos^{-1}(.62) = \cos(2\theta) \cos^{-1}$$

$$\frac{51.7^\circ}{2} = \frac{2\theta}{2} \rightarrow \theta = 25.8^\circ$$