

Practice Question # 1

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

$$a_n = a_1(r)^{n-1}$$

$$131072 = 2(4)^{n-1}$$

$$65536 = 4^{n-1}$$

$$1 + \frac{\log 65536}{\log 4} = \frac{(n-1)\log 4}{\log 4} + 1$$

$$n = 9 \rightarrow \boxed{9\text{th term}}$$

Practice Question # 2

- 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?

multiply

select 3 so nCr

$$\frac{{}^3C_2 \cdot {}^5C_1}{{}^{12}C_3} = \frac{3 \cdot 5}{220} = \frac{15}{220} = \boxed{6.8\%}$$

Practice Question # 3

- 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?

Find expected value (outcome)

outcomes	+10	+8	-6
probability	$\frac{13}{52}$	$\frac{9}{52}$	$\frac{30}{52}$

$$\rightarrow 10\left(\frac{13}{52}\right) + 8\left(\frac{9}{52}\right) - 6\left(\frac{30}{52}\right)$$

$= +\$0.42 \rightarrow$ player/b/c
games \$.42 gain
every time play game

Practice Question # 4

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

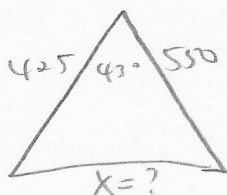
a.) $f(x) = -|x+2|+4$ D: $(-\infty, \infty)$ R: $(-\infty, 4]$

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

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

Practice Question # 5

- 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?



$$X^2 = 425^2 + 550^2 - 2(425)(550)\cos 43$$

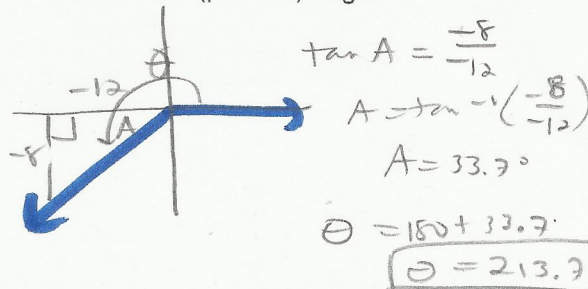
$$X = 376$$

$$\text{Perimeter} = 425 + 550 + 376 = 1351 \text{ ft}$$

$$\Rightarrow 1351 \times \$8 = \boxed{\$10,808}$$

Practice Question # 6

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



Key cont'd

Practice Question # 7

- 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?

High School Graduates

Year	Percent
1970	52.3
1975	61.5
1980	66.5
1985	72.9
1990	77.8
1995	81.7
1999	83.4

Source: U.S. Census Bureau

$$y = 1.03997018x - 1992.20826$$

$$x = 2010 \quad \text{table}$$

$$y = ?$$

$$y = 97.2$$

$$\rightarrow [97.2\%]$$

Practice Question # 8

- 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?

$$P = A \left(1 + \frac{r}{n}\right)^{nt}$$

$$200 = 100 \left(1 + \frac{0.06}{4}\right)^{4t}$$

$$2 = (1.015)^{4t}$$

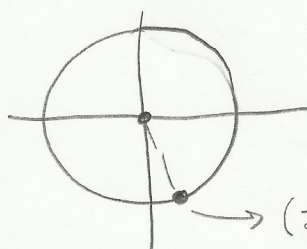
$$\log 2 = 4t \log(1.015)$$

$$t = \frac{\log 2}{4 \log(1.015)}$$

$$t = 11.6 \text{ years}$$

Practice Question # 9

- 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?



$$x = r \cos \theta$$

$$x = 5 \cos 30^\circ = \frac{5}{2}$$

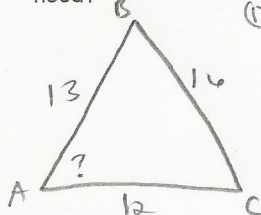
$$y = r \sin \theta$$

$$y = 5 \sin 30^\circ = -\frac{5\sqrt{3}}{2}$$

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

Practice Question # 10

- Karen is carpeting a triangular section of a room in her house. The lengths of the section that needs carpet are 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?



$$16^2 = 13^2 + 12^2 - 2(13)(12)\cos A$$

$$256 = 169 + 144 - 312 \cos A$$

$$A = 79.5^\circ$$

$$A = \frac{1}{2}(13)(12)\sin 79.5^\circ$$

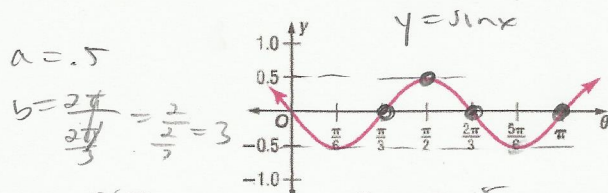
$$76.7 \text{ ft}^2$$

$$76.7 \times 22 = 1687.27$$

$$1687.27 - 1500 = 187.27$$

Practice Question # 11

- What specific trigonometric function is represented below?



$$a = .5$$

$$b = \frac{2\pi}{3} = \frac{2}{\frac{2}{3}} = 3$$

$$c = -\frac{\pi}{3} = -\pi$$

$$d = 0$$

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

$$\text{amp} = .5$$

$$\text{period} = \frac{2\pi}{3} = \frac{3\pi}{3} - \frac{\pi}{3} = \frac{2\pi}{3}$$

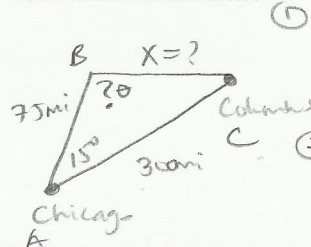
$$\text{or } 4 \text{ m dash}$$

$$\text{phase} = \text{right } \frac{\pi}{3}$$

$$k = \text{V shift}$$

Practice Question # 12

- 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?



$$x^2 = 75^2 + 300^2 - 2(75)(300)\cos 15^\circ$$

$$x = 228.4$$

$$\frac{228.4}{\sin 15^\circ} = \frac{300}{\sin \theta}$$

$$\theta = 19.9^\circ$$