

Unit 4 Review

*\*\*Know how to use reciprocal, quotient, Pythagorean, double angle, and sum and difference identities to complete trig proofs.*

$$\frac{\sin^2 x + 4 \sin x + 3}{\cos^2 x} = \frac{3 + \sin x}{1 - \sin x}$$

$$\tan^2 \theta = \csc^2 \theta \tan^2 \theta - 1$$

$$\frac{\sin 2x}{\sin x} - \frac{\cos 2x}{\cos x} = \sec x$$

$$\cos(\alpha + \beta) + \cos(\alpha - \beta) = 2 \cos \alpha \cos \beta$$

*\*\*Know how to use reciprocal, quotient, Pythagorean, double angle, sum and difference identities, and knowledge of the unit circle to solve trig equations.*

$$\cos 2x = \frac{1}{2}$$

$[0, 2\pi)$

$$2\cos^2 x - \cos x = 0$$

$[0, 2\pi)$

What are the values of  $x$ , to the *nearest degree*, in the interval  $0^\circ \leq x < 360^\circ$  that satisfy the equation  $5 \sin^2 x - 4 \sin x - 1 = 0$ ? **\*\*HINT – AC METHOD\*\***

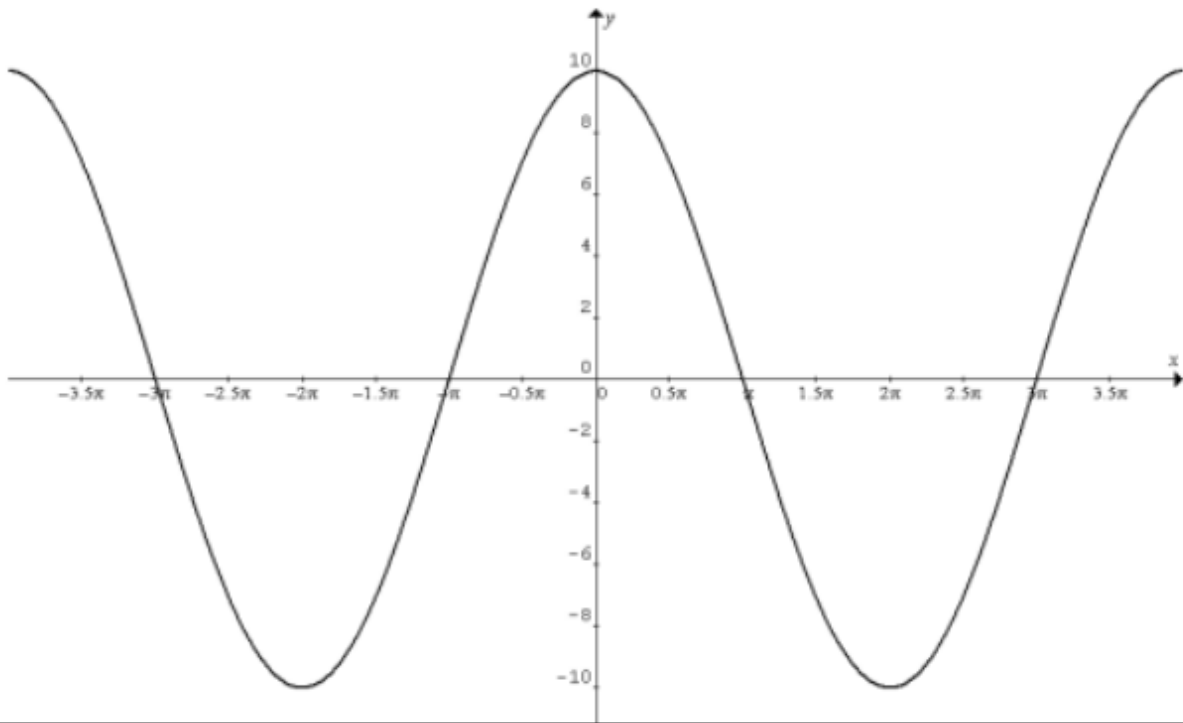
*\*\*Know how to graph sine, cosine, and tangent by hand. Be able to recognize and identify important parts of all 6 types of graphs (especially domain and range.*

Graph the following by hand. Explain what each number of the equation represents and how it helps you graph. Identify the domain and range.

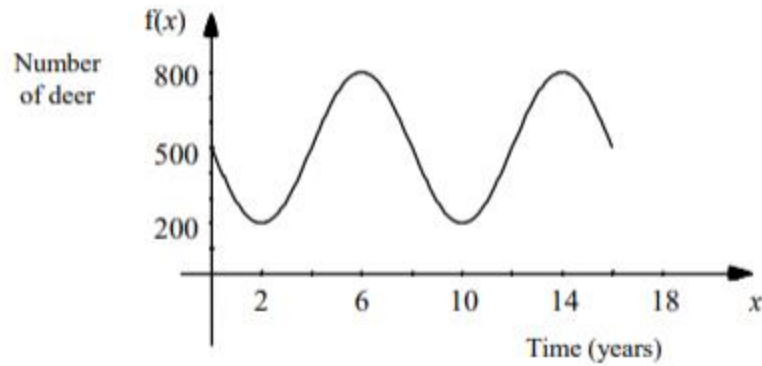
$$f(x) = 2\cos\left(3x - \frac{3\pi}{2}\right) - 1$$

*\*\*Be able to write equations when given graphs.*

Write the equation of the graph seen below:



The following graph shows the evolution of a population of deer as a function of time.



Write the rule that can be used to represent this function.

*\*\*Be able to use your knowledge of parts of the graph to answer questions.*

In a predator/prey model, the predator population is modeled by the function:

$$p = 900 \cos\left(\frac{2\pi}{3}\right)t + 8000 \text{ where } t \text{ is measured in years.}$$

- Find the length of time between successive periods of maximum population.
- Sketch a graph that represents the given population model.
- What is the minimum population? When does this occur in the first cycle?