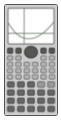
Problem Set 1

 A. How many solutions does $\cos^2 t - 1 = 0$ have on the interval $[0, 2\pi)$?	 B. How many solutions does $\tan^2 t + 3 = 0$ have on the interval $[0, 2\pi)$?
 C. How many solutions does $4\sin^2 t - 2 = 0$ have on the interval $[0, 2\pi)$?	 D. How many solutions does $\tan^2 t - 1 = 0$ have on the interval $[0, 2\pi)$?

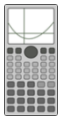
Problem Set 2

A. The temperature in a certain city is modeled by the function below where x is the day and $f(x)$ is the temperature in degrees Fahrenheit. For how many days (to the nearest whole number) each year is the temperature predicted to be greater than or equal to $70°\text{F}$?



$$f(x) = 68 + 6\sin\left(\frac{2\pi}{365}(x - 90)\right)$$

B. The temperature in a certain city is modeled by the function below where x is the day and $f(x)$ is the temperature in degrees Fahrenheit. For how many days (to the nearest whole number) each year is the temperature predicted to be greater than or equal to $75°\text{F}$?

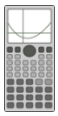


$$f(x) = 70 + 8\cos\left(\frac{2\pi}{365}(x - 90)\right)$$

C. The number of hours of sunlight in a certain city is modeled by the function below where x is the day and $f(x)$ is the hours of sunlight. For how many days (to the nearest whole number) each year is the number of hours of sunlight predicted to be greater than or equal to 9 hours?

$$f(x) = 8 + 5\sin\left(\frac{2\pi}{365}(x - 90)\right)$$

D. The number of hours of sunlight in a certain city is modeled by the function below where x is the day and $f(x)$ is the hours of sunlight. For how many days (to the nearest whole number) each year is the hours of sunlight predicted to be less than or equal to 5 hours?



$$f(x) = 6 + 4\cos\left(\frac{2\pi}{365}(x - 90)\right)$$

Problem Set 3

 A. Solve over $[0, 2\pi)$: $2\cos x - \sqrt{3} = 0$ If there are two solutions, use the largest answer to find the magic sum!	 B. Solve over $[0, 2\pi)$: $2\sin x - 1 = 0$ If there are two solutions, use the smallest answer to find the magic sum!
 C. Solve over $[0, 2\pi)$: $\tan x - 1 = 0$ If there are two solutions, use the largest answer to find the magic sum!	 D. Solve over $[0, 2\pi)$: $2\sin x - \sqrt{2} = 0$ If there are two solutions, use the smallest answer to find the magic sum!

Problem Set 4

A. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the largest one for your magic sum. $2\sin^2 x - \sin x - 1 = 0$	B. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the largest one for your magic sum. $3\tan^2 x + 4\sqrt{3}\tan x + 3 = 0$
C. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the smallest one for your magic sum. $2\cos^2 x - 5\cos x + 2 = 0$	D. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the smallest one for your magic sum. $4\sin^2 x - 1 = 0.$

Problem Set 5

A. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the largest one for your magic sum. $3\tan^2 x - 4\tan x - 4 = 0$	B. Solve the equation below on $[0, 2\pi)$. If is more than one solution, use the largest one for your magic sum. $6\cos^2 x - 10\cos x - 6 = 0$
C. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the smallest nonzero solution for your magic sum. $4\sin^2 x - 5\sin x + 1 = 0$	D. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the smallest nonzero solution for your magic sum. $3\sin^2 x + 2\sin x - 1 = 0$

Problem Set 6

 A. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the smallest nonzero solution for your magic sum. $2\sin^2\theta = \sin\theta$	 B. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the smallest nonzero solution for your magic sum. $\sin\theta = \sqrt{3}\cos\theta$
 C. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the largest nonzero solution for your magic sum. $\tan^2\theta + \tan\theta = 0$	 D. Solve the equation below on $[0, 2\pi)$. If there is more than one solution, use the largest nonzero solution for your magic sum. $2\sin\theta\cos\theta = \sqrt{2}\cos\theta$