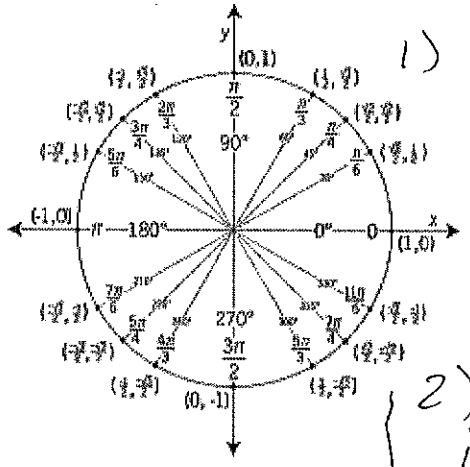
AA5: Trigonometric Functions

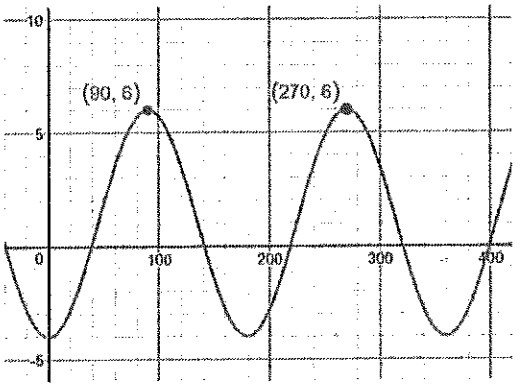
Questions	Notes
I can use triangles to find central angles and coordinate points on the unit circle. 1) • Find the (x,y) coordinates on a unit circle with a central angle of 40°. 2) • Use a unit circle to show that ○ $sin\,(60) = sin\,(120)$. ○ $cos(\frac{\pi}{3}) = cos(\frac{11\pi}{3})$ 3) • Use a unit circle to show that ○ $tan(30) = tan(210)$. ○ $tan(\frac{\pi}{4}) = tan(-\frac{3\pi}{4})$ 4) • Use the UNIT CIRCLE to explain why $(sin\theta)^2 + (cos\theta)^2 = 1$ 5) • Use the Pythagorean Identity to solve for $sin\theta$ and $tan\theta$ given that $cos\theta = 0.6$ 6) • Solve $2 = 4\,sin(x) + 2$ in the interval $0 \le x \le 360$. 7) • Find the first 3 positive solutions to the equation $4\,cos(2x - 1) - 5 = 3$ (in radians).	 1) $\cos\theta = x$, $\sin\theta = y$ So, $\cos 40° = .766$, $\sin 40° = .643$ (Make sure you're in degree mode) 2) The y-value at 60° is the same as the y-value at 120°. The x-value at $\pi/3$ is the same as at $11\pi/3$. 3) $\tan\theta = \frac{\sin\theta}{\cos\theta}$ = slope The slope at 30° = slope at 210° Slope at $\pi/4$ = slope at $-3\pi/4$ 4) $\sin\theta = y$, $\cos\theta = x$ Make a right triangle, use $a^2+b^2=c^2$. Unit circle means $c=1$. So $x^2+y^2=1$ or $(\cos\theta)^2+(\sin\theta)^2=1$ 5) $(0.6)^2+(\sin\theta)^2=1$ $.36+(\sin\theta)^2=1$ $(\sin\theta)^2=.64$ $\sin\theta = \pm.8$ $\tan\theta = \pm\frac{.8}{.6}$ $\tan\theta = \pm\frac{4}{3}$ 6) $2 = 4\sin x + 2$ $-2 \quad -2$ $\frac{0}{4} = \frac{4\sin x}{4}$ $0 = \sin x$ $x = 0°, 180°$ 7) $4\cos(2x-1) - 5 > 3$ $+5 \quad +5$ $\frac{4\cos(2x-1)}{4} = \frac{8}{4}$ $\cos(2x-1) = 2$ No Solution! $\cos\theta \le 1$
I can graph transformed sine and cosine functions. • Find the amplitude, midline, range and period of $m(x) = 2\,sin(3x) + 1$ • What is the relationship between FREQUENCY and PERIOD?	Amp = 2 Mid = 1 Range: $-1 \le y \le 3$ period = $\frac{2\pi}{3}$ OR $\frac{360}{3}$ Frequency = 3 Frequency = $\frac{\text{Full Circle}}{\text{period}}$

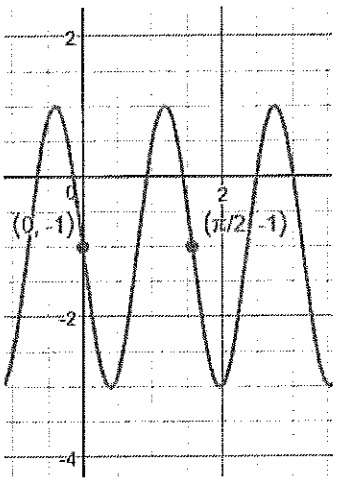
- What is the Period of $f(x) = 5sin(10x) - 1$ in
  - Degrees?
  - Radians?

Degrees: $\frac{360}{10} = 36°$

Radians: $\frac{2\pi}{10} = \frac{\pi}{5}$

- Find a function that represents each of the graphs shown.





I can build and interpret trigonometric models

- $L(t) = 52\ sin(\frac{2\pi}{365}t) + 720$

  $L(t)$ represents the length of each day after the spring equinox in Manila. What is the first day after the spring equinox that the day length is 750 minutes?
- On Sunday, high tide in Oahu was be 0.41 meters at 4:00 am. Low tide hit -0.05 meters at 11:00 am. Write a function to model this information. Define your variables and specific whether you are using radians or degrees.