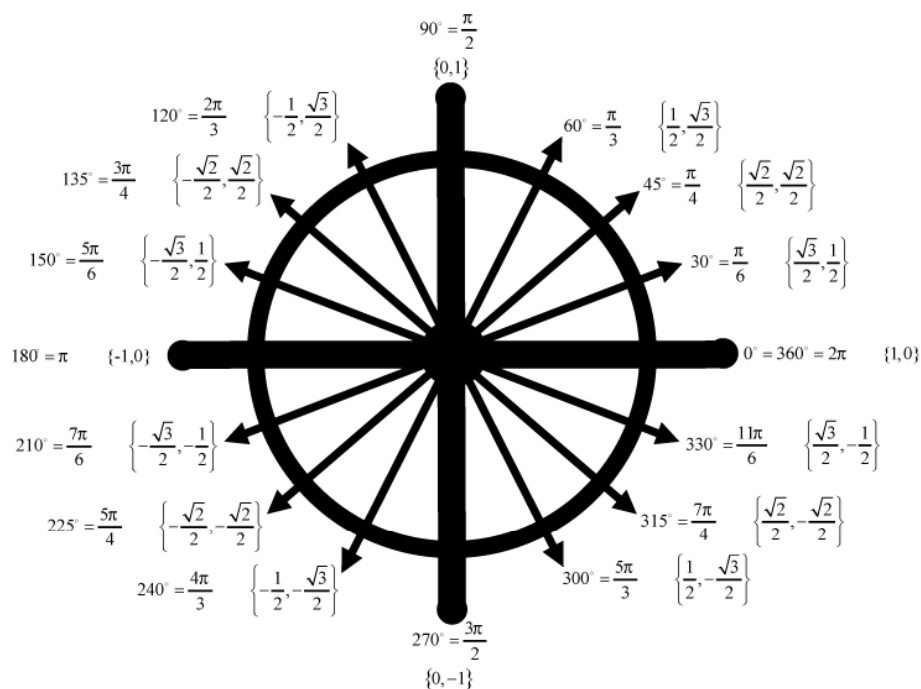


Principles of Mathematics 12

TRIGONOMETRY I



LESSON SIX

Graphing a, b, c & d

Principles of
Math 12

EXPLAINED!

By
Barry
Mabillard

TRIGONOMETRY LESSON 6

PART I GRAPHING ABCD

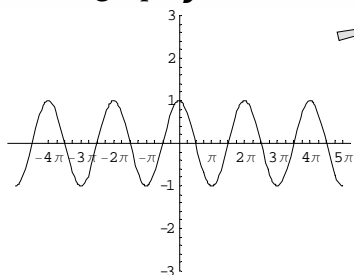
Now that we have looked at all the transformations separately, we can combine them together.

$$y = a \sin b(\theta \pm c) \pm d$$

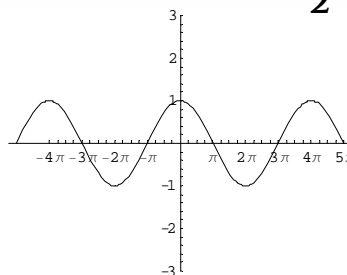
When drawing a graph from an equation, we must pay close attention to the order. First we apply the stretches (a & b , in either order), then the translations (c & d , in either order).

Example 1: Graph $y = 2 \cos \frac{1}{2}(\theta - \frac{\pi}{4}) + 3$

First graph $y = \cos \theta$

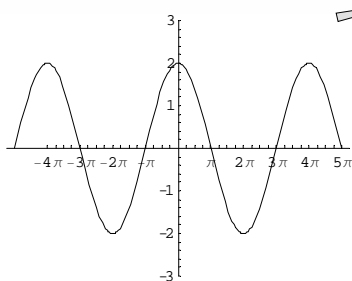


Now graph $y = \cos \frac{1}{2} \theta$

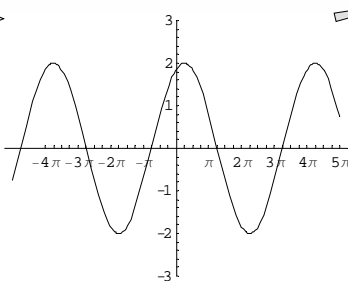


Now do the phase shift and move the graph one unit right.

Next graph $y = 2 \cos \frac{1}{2} \theta$

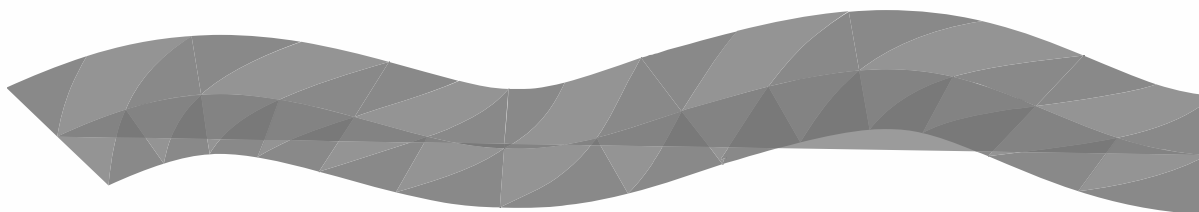
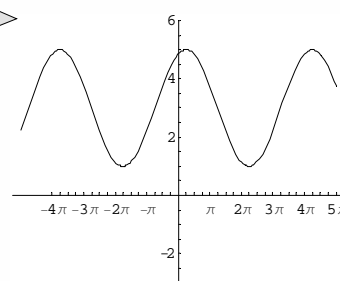


$$y = 2 \cos \frac{1}{2}(\theta - \frac{\pi}{4})$$



Finally, do the vertical translation

$$y = 2 \cos \frac{1}{2}(\theta - \frac{\pi}{4}) + 3$$

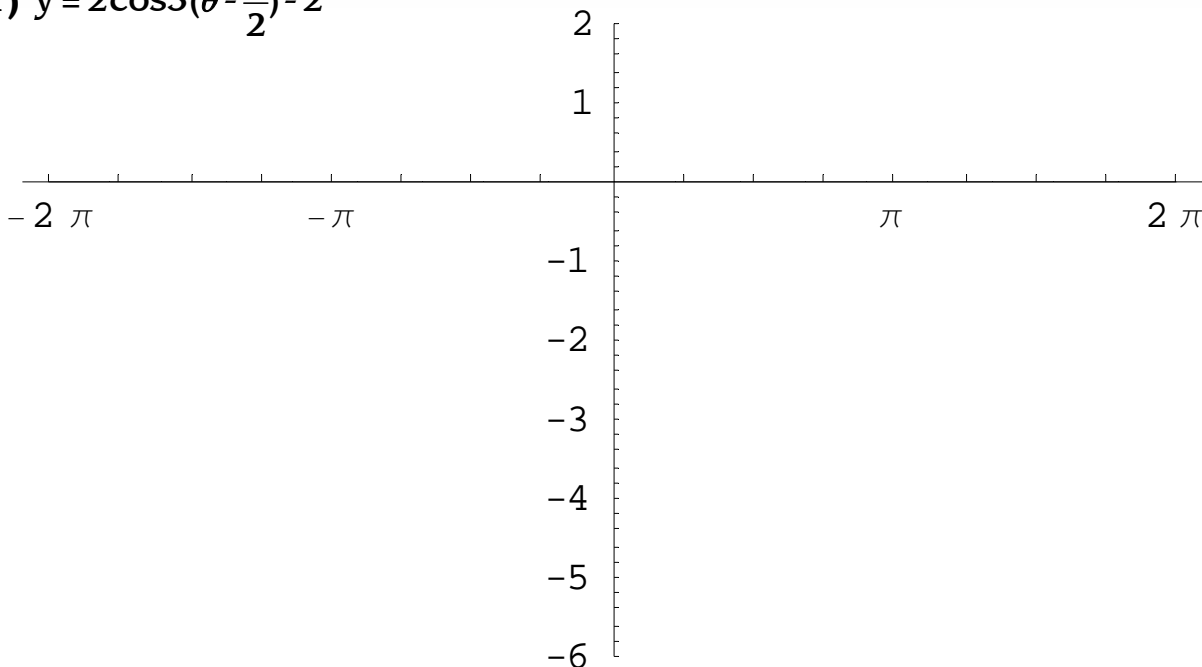


TRIGONOMETRY LESSON 6

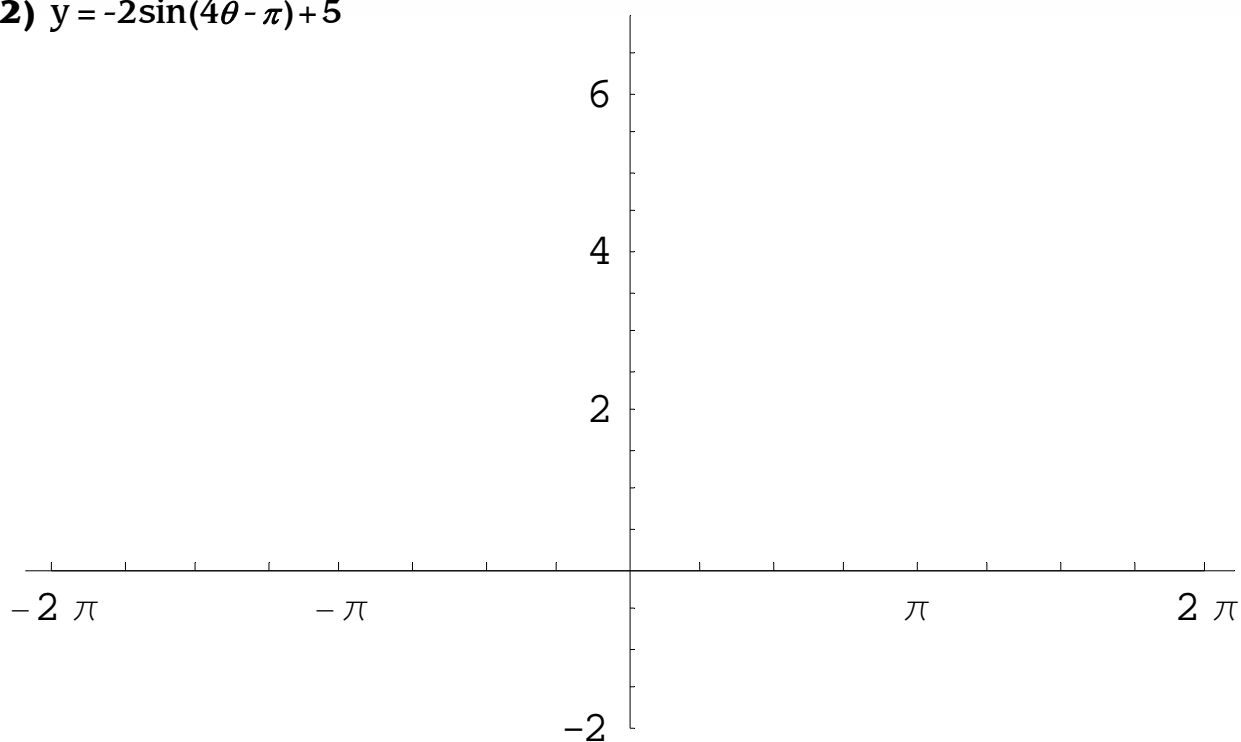
PART I GRAPHING ABCD

Questions: Graph each of the following equations. You may find it useful to draw each transformation in a different color. Remember to factor out numbers attached to θ .

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



2) $y = -2\sin(4\theta - \pi) + 5$

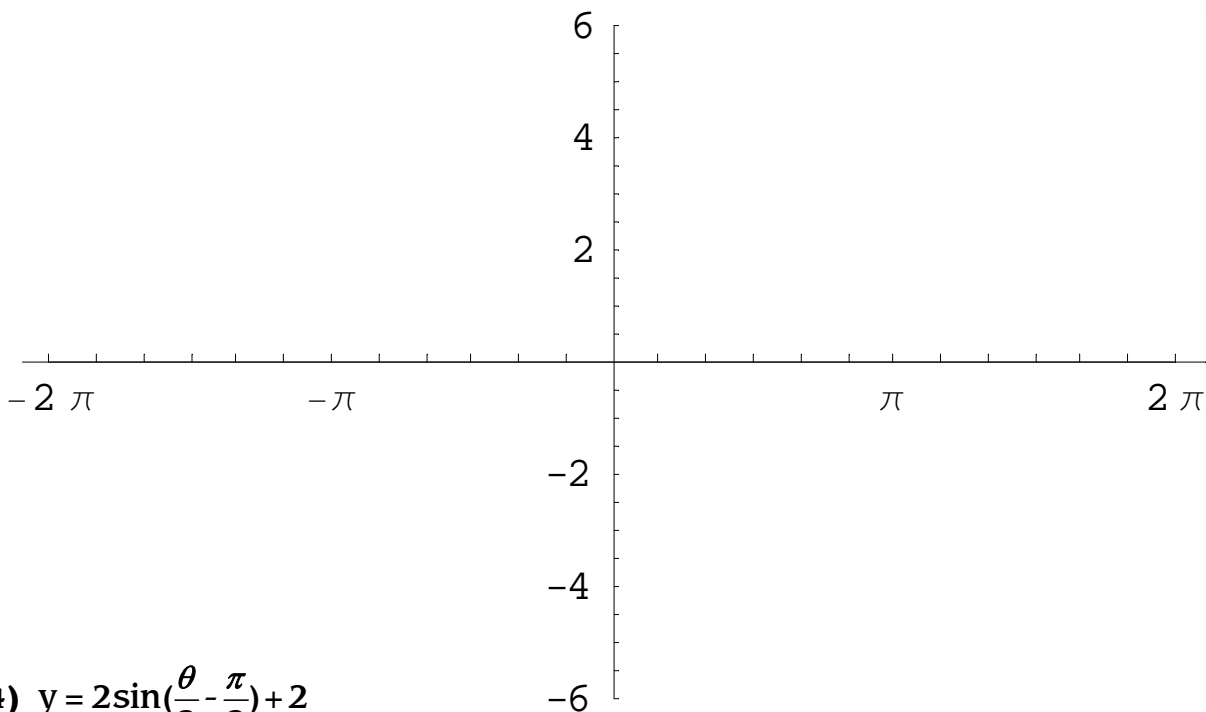


TRIGONOMETRY LESSON 6

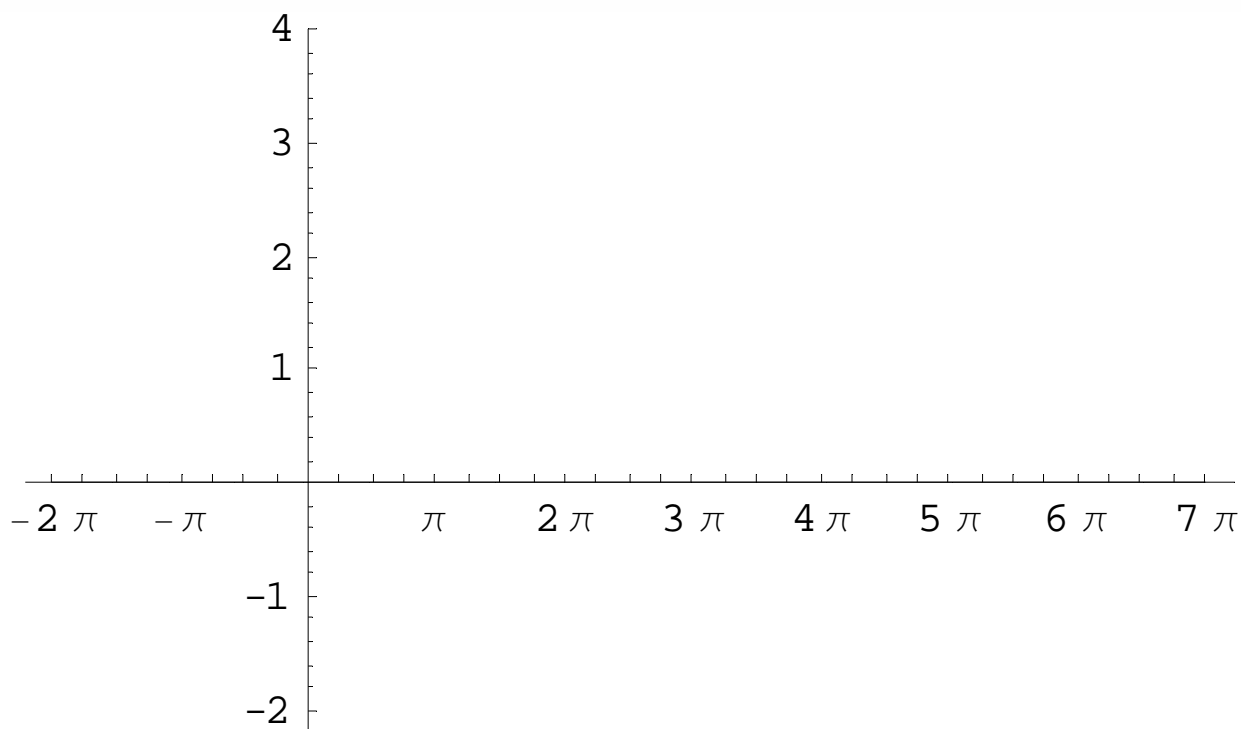
PART I GRAPHING ABCD

Questions:

3) $y = -5\cos(2\theta - \frac{\pi}{3}) + 1$



4) $y = 2\sin(\frac{\theta}{3} - \frac{\pi}{3}) + 2$

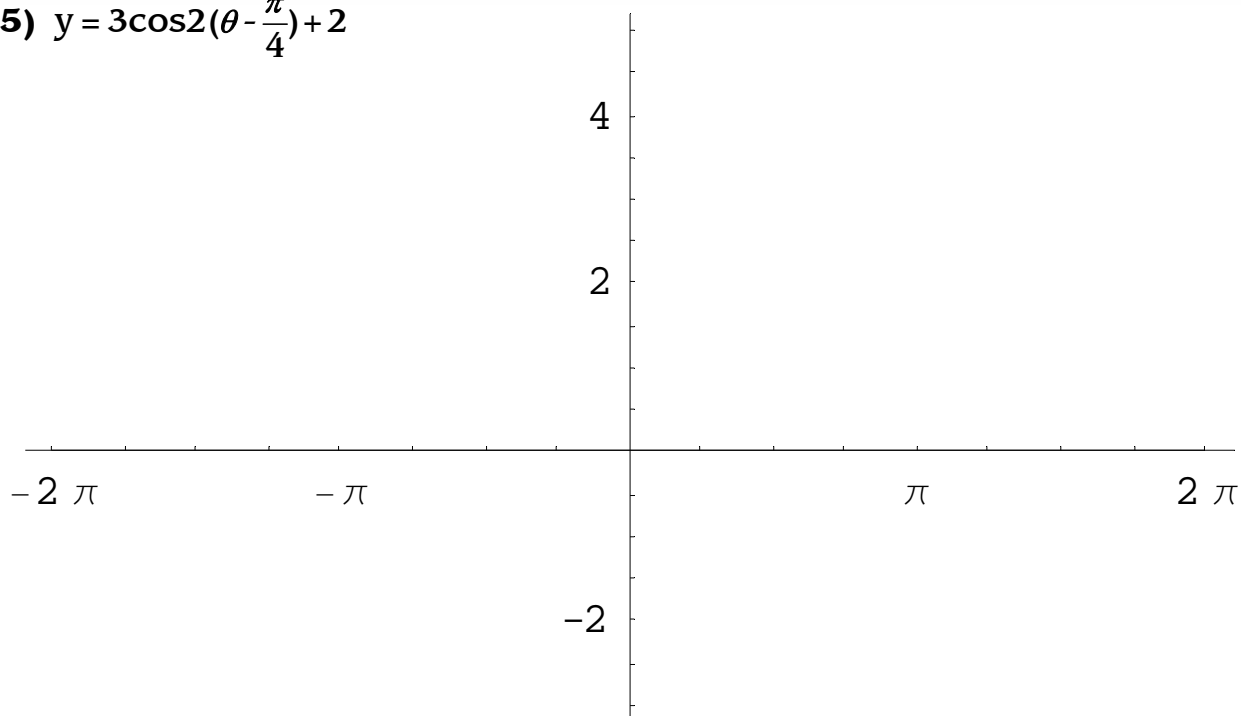


TRIGONOMETRY LESSON 6

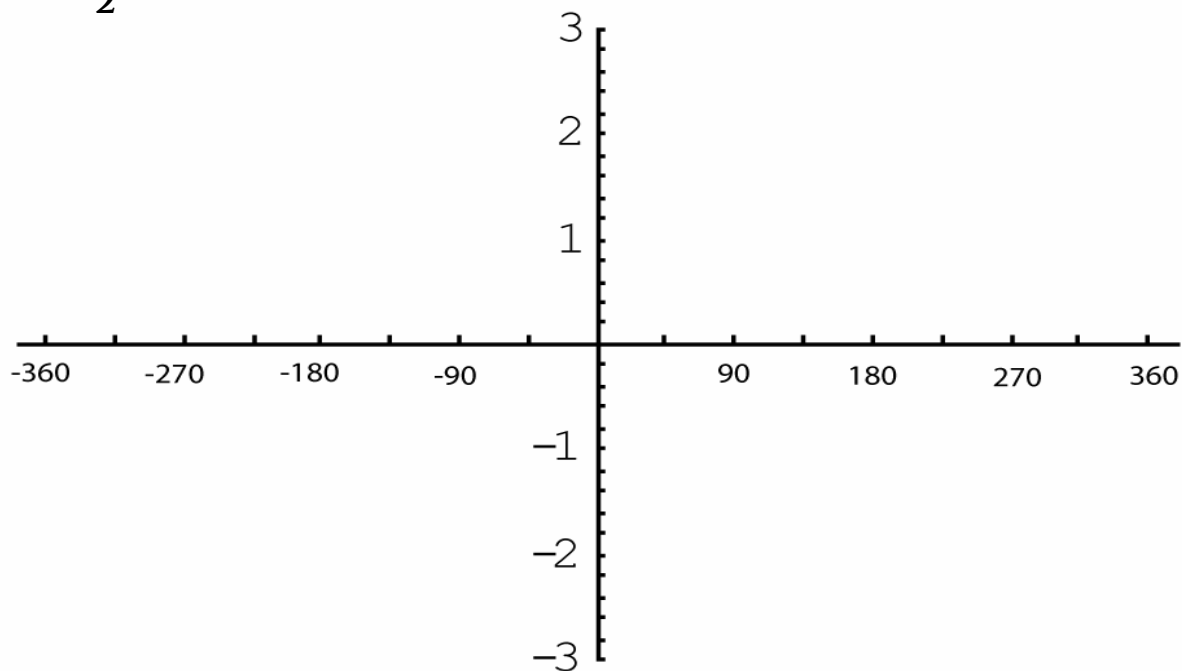
PART I GRAPHING ABCD

Questions:

5) $y = 3\cos 2\left(\theta - \frac{\pi}{4}\right) + 2$



6) $y = -\frac{1}{2}\cos(2\theta - 90^\circ) + 1$

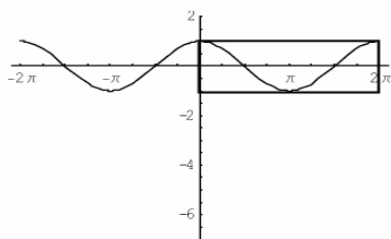


TRIGONOMETRY LESSON 6

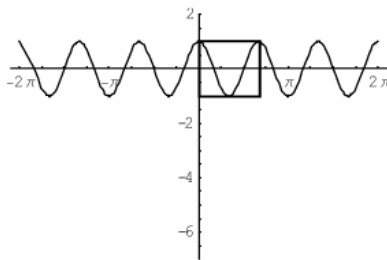
PART I GRAPHING ABCD

Answers 1.

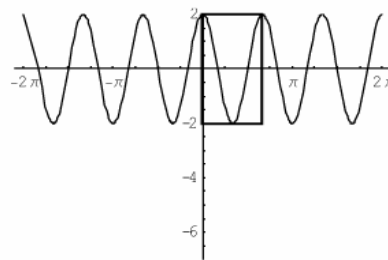
First graph $y = \cos \theta$



Then graph $y = \cos 3\theta$
(Period = $2\pi/3$)

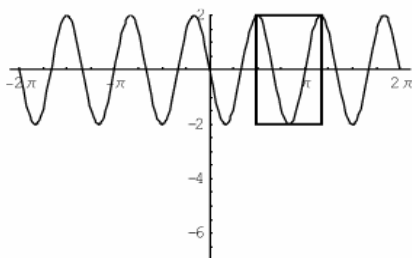


Now graph $y = 2\cos 3\theta$

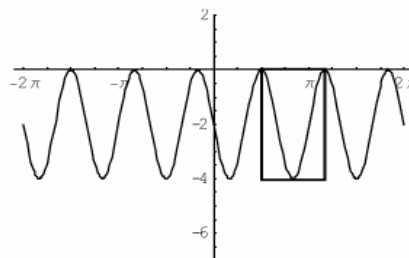


$$y = 2\cos 3\left(\theta - \frac{\pi}{2}\right)$$

Move the graph two ticks right.

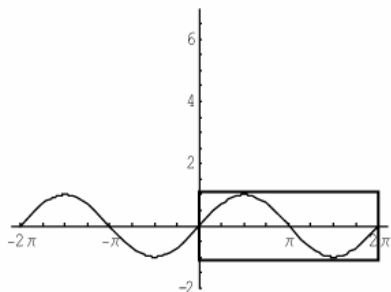


$$y = 2\cos 3\left(\theta - \frac{\pi}{2}\right) - 2$$

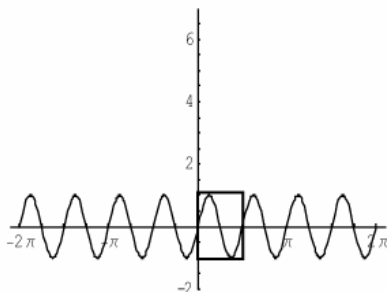


2.

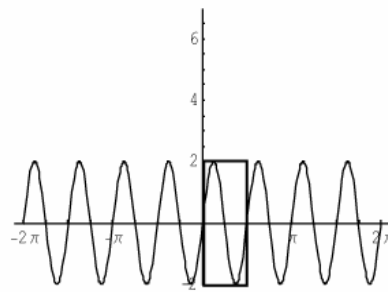
First graph $y = \sin \theta$



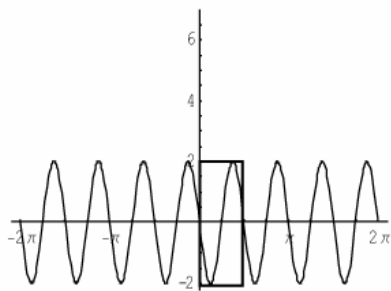
$y = \sin 4\theta$
(Period = $\pi/2$)



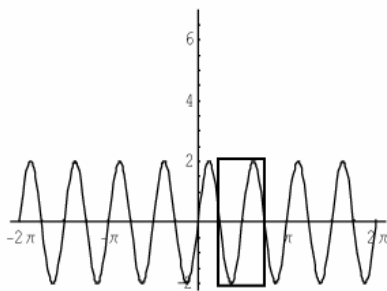
$y = 2\sin 4\theta$



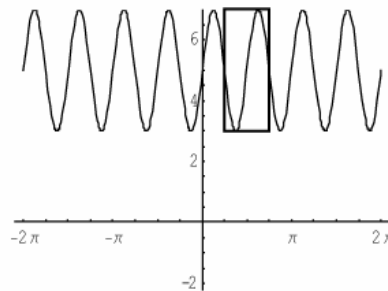
$y = -2\sin 4\theta$
Reflect in x-axis



$$y = -2\sin 4\left(\theta - \frac{\pi}{4}\right)$$



$$y = -2\sin 4\left(\theta - \frac{\pi}{4}\right) + 5$$

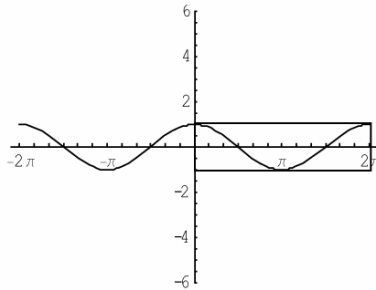


TRIGONOMETRY LESSON 6

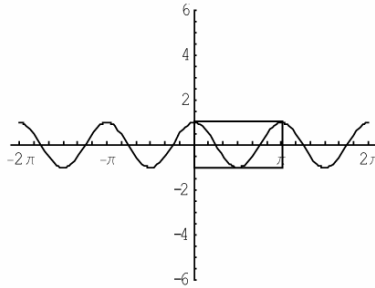
PART I GRAPHING ABCD

Answers: 3.

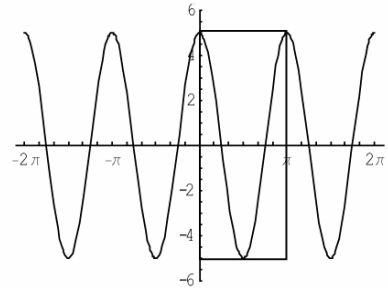
$$y = \cos \theta$$



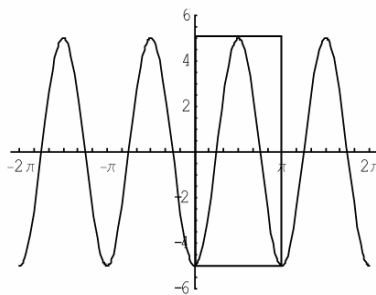
$$y = \cos 2\theta$$



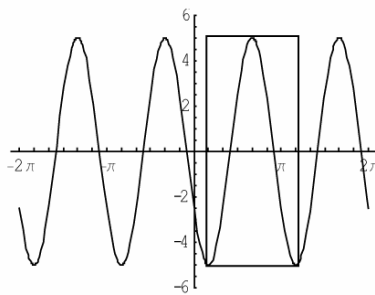
$$y = 5\cos 2\theta$$



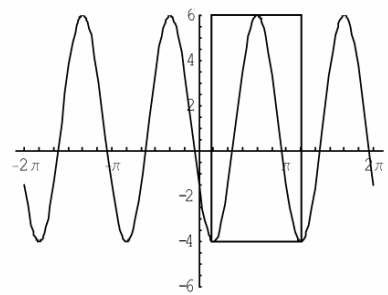
$$y = -5\cos 2\theta$$



$$y = -5\cos 2\left(\theta - \frac{\pi}{6}\right)$$

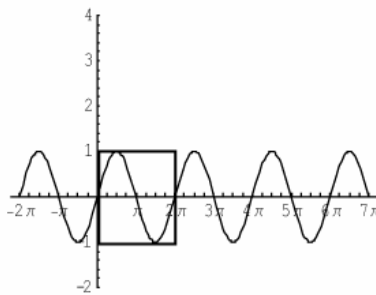


$$y = -5\cos 2\left(\theta - \frac{\pi}{6}\right) + 1$$

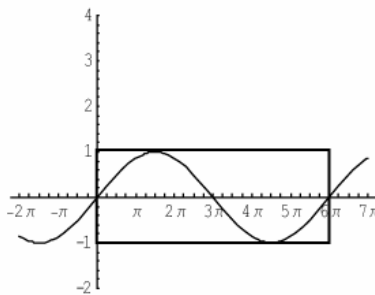


4.

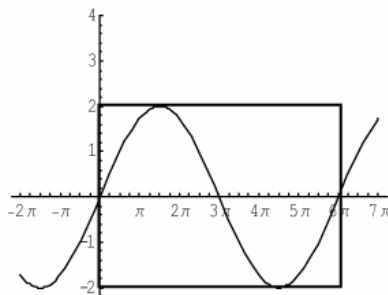
$$y = \sin \theta$$



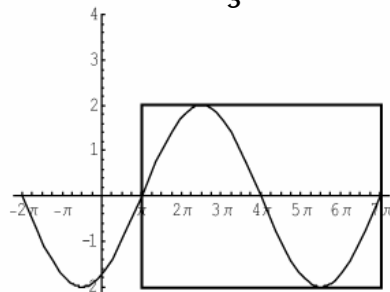
$$y = \sin \frac{1}{3} \theta$$



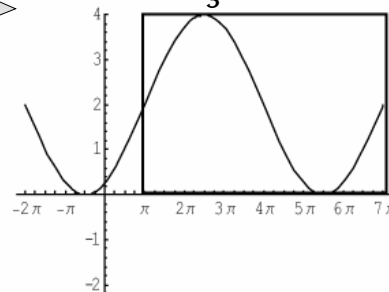
$$y = 2\sin \frac{1}{3} \theta$$



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



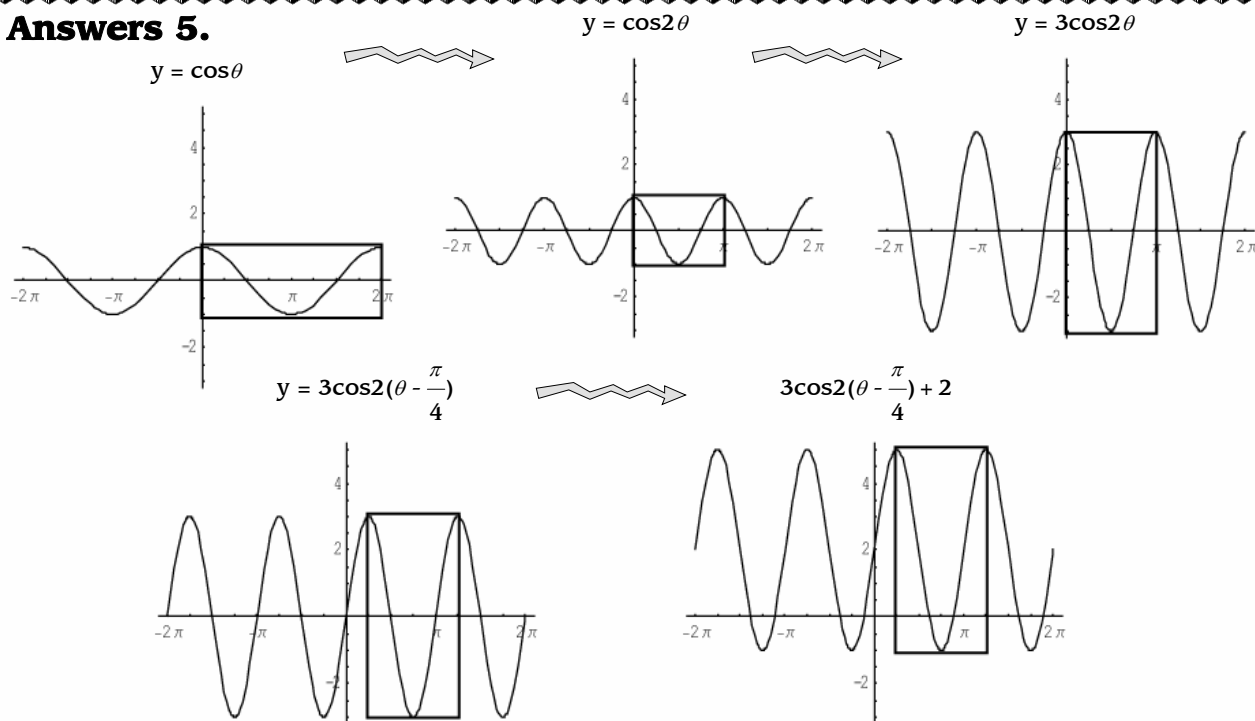
$$y = 2\sin \frac{1}{3} (\theta - \pi) + 2$$



TRIGONOMETRY LESSON 6

PART I GRAPHING ABCD

Answers 5.



6.

