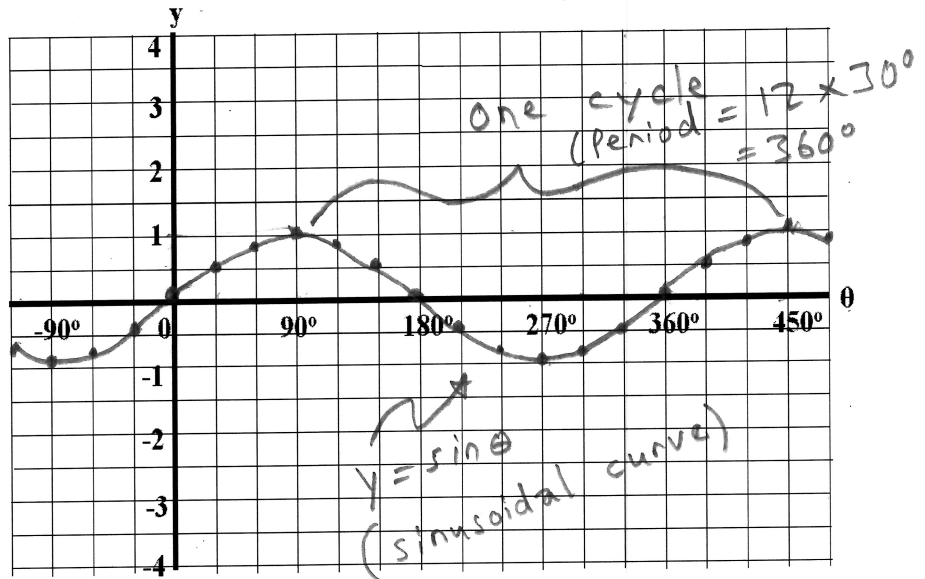


Introduction to the Sine and Cosine Curve

The Sine Curve

1. Complete the table of values and graph the function $y = \sin\theta$.

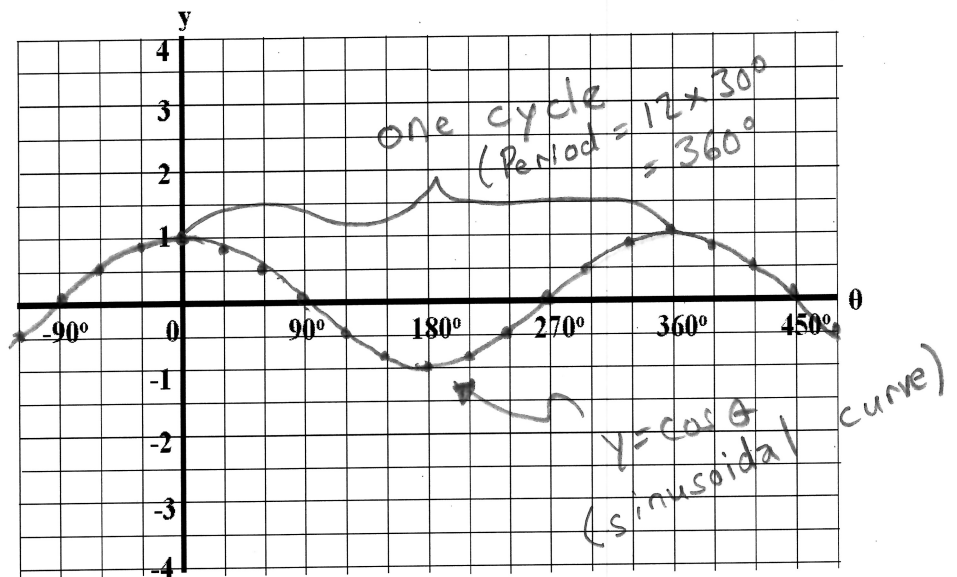
θ	$y = \sin\theta$
0°	0
30°	0.5
60°	0.87
90°	1
120°	0.87
150°	0.5
180°	0
210°	-0.5
240°	-0.87
270°	-1
300°	-0.87
330°	-0.5
360°	0



The Cosine Curve

2. Complete the table of values and graph the function $y = \cos\theta$.

θ	$y = \cos\theta$
0°	1
30°	0.87
60°	0.5
90°	0
120°	-0.5
150°	-0.87
180°	-1
210°	-0.87
240°	-0.5
270°	0
300°	0.5
330°	0.87
360°	1



Follow-Up

3. What do both the sine curve and cosine curve have in common?

→ They are both periodic functions.

→ They both have a period of 360° .

→ They both have an amplitude of 1.

→ They both have the same domain and range.

$$D: \{\theta \in \mathbb{R}\} \quad R: \{y \in \mathbb{R} \mid -1 \leq y \leq 1\}$$

4. What is different about the sine curve and the cosine curve?

→ The cosine curve looks like the sine curve shifted left by 90° .

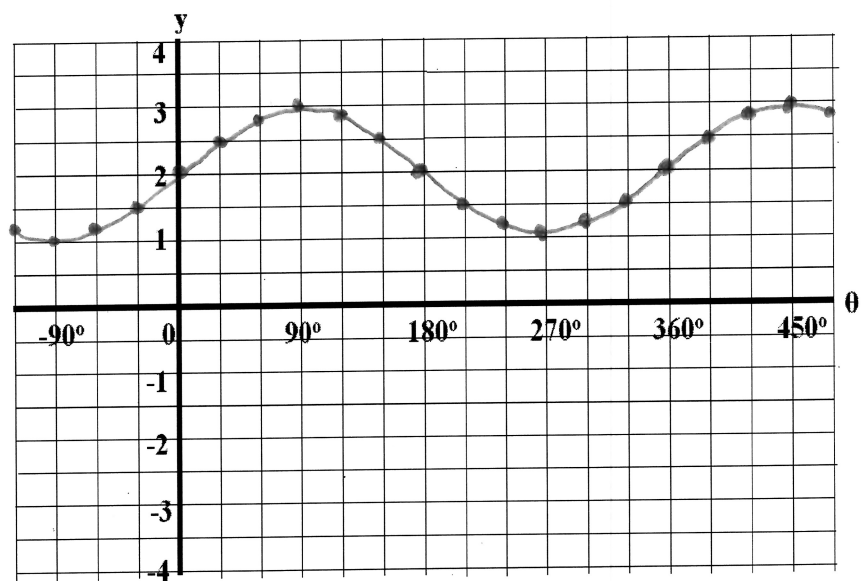
→ The sine curve starts at $y=0$ while the cosine curve starts at a value of $y=1$.

Homework: Complete graphs below
+ pg 363 #2, 7, 9, 10, (1136)

For each equation, complete the table of values and graph the function.

a) $y = \sin\theta + 2$

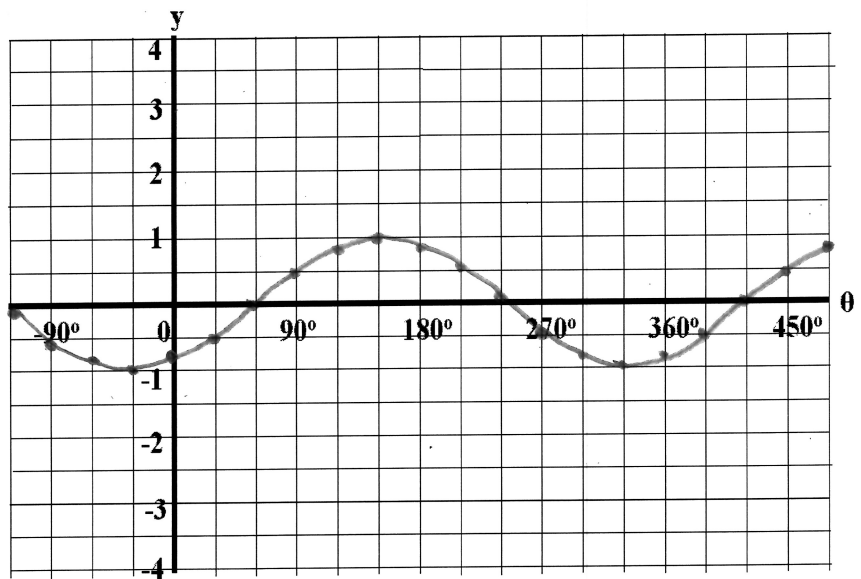
θ	$y = \sin\theta + 2$
0°	2
30°	2.5
60°	2.87
90°	3
120°	2.87
150°	2.5
180°	2
210°	1.5
240°	1.13
270°	1
300°	1.13
330°	1.5
360°	2



Vertical displacement up 2 units.

b) $y = \sin(\theta - 60^\circ)$

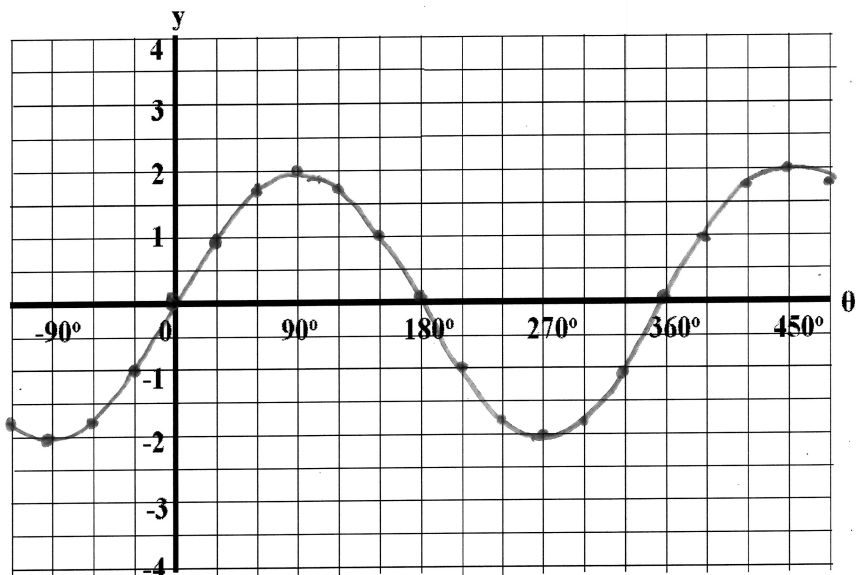
θ	$y = \sin(\theta - 60^\circ)$
0°	-0.87
30°	-0.5
60°	0
90°	0.5
120°	0.87
150°	1
180°	0.87
210°	0.5
240°	0
270°	-0.5
300°	-0.87
330°	-1
360°	-0.87



→ Horizontally Shifted Right 60°
(Phase Shifted)

c) $y = 2\sin\theta$

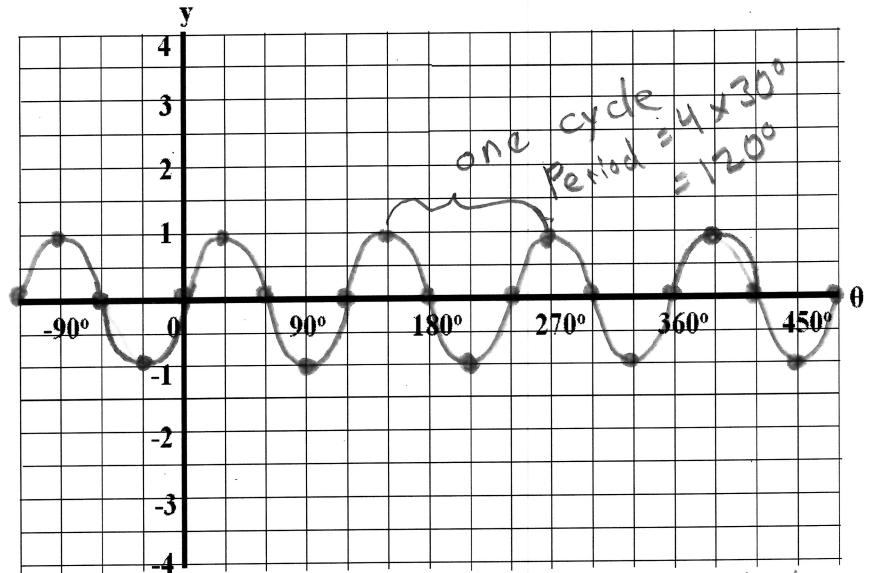
θ	$y = 2\sin\theta$
0°	0
30°	1
60°	1.73
90°	2
120°	1.73
150°	1
180°	0
210°	-1
240°	-1.73
270°	-2
300°	-1.73
330°	-1
360°	0



↕ Vertical expansion by a factor of 2,
(Amplitude is now 2)

d) $y = \sin 3\theta$

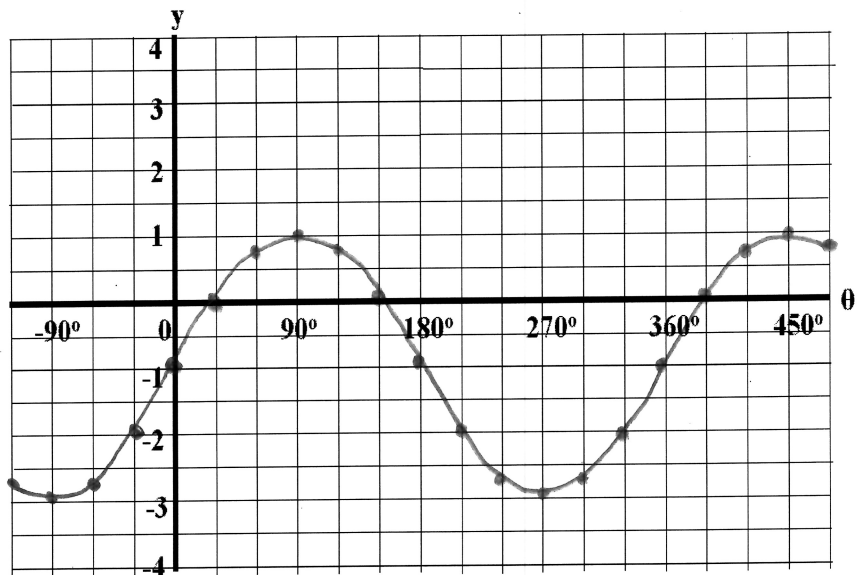
θ	$y = \sin(3\theta)$
0°	0
30°	1
60°	0
90°	-1
120°	0
150°	1
180°	0
210°	-1
240°	0
270°	1
300°	0
330°	-1
360°	0



→ ← | Horizontally compressed by a factor of $\frac{1}{3}$
(Period is now 120°)

e) $y = 2\sin\theta - 1$

θ	$y = 2\sin\theta - 1$
0°	-1
30°	0
60°	0.73
90°	1
120°	0.73
150°	0
180°	-1
210°	-2
240°	-2.73
270°	-3
300°	-2.73
330°	-2
360°	-1



→ vertically expanded by factor of 2
→ shifted down 1 unit