

Unit 3B Graphing Sine Cosine Graphs
Review for Test

Name Key
Date _____

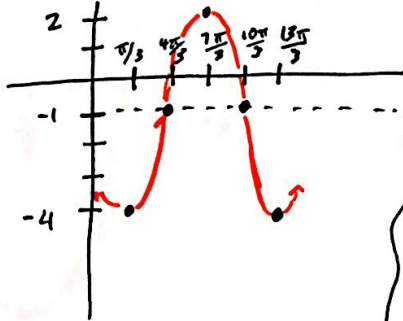
Graph each

1. $y = -3\cos\left(\frac{x}{2} - \frac{\pi}{6}\right) - 1$

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

A: 3
Per: $\frac{2\pi}{\frac{1}{2}} = 4\pi$
PS: $\frac{\pi}{3}$
VS: -1

| θ | $f(\theta)$ |
|-------------------|-------------|
| $\frac{\pi}{3}$ | -4 |
| $\frac{4\pi}{3}$ | -1 |
| $\frac{7\pi}{3}$ | 2 |
| $\frac{10\pi}{3}$ | -1 |
| $\frac{13\pi}{3}$ | -4 |

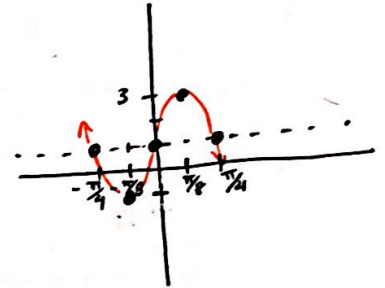


2. $y = 1 - 2\sin(4x + \pi)$

$y = -2\sin\left[4\left(x + \frac{\pi}{4}\right)\right] + 1$

A: 2
Per: $\frac{2\pi}{4} = \frac{\pi}{2}$
PS: $-\frac{\pi}{4}$
VS: 1

| θ | $f(\theta)$ |
|------------------|-------------|
| $-\frac{\pi}{4}$ | 1 |
| $-\frac{\pi}{8}$ | -1 |
| 0 | 3 |
| $\frac{\pi}{8}$ | -1 |
| $\frac{\pi}{4}$ | 1 |

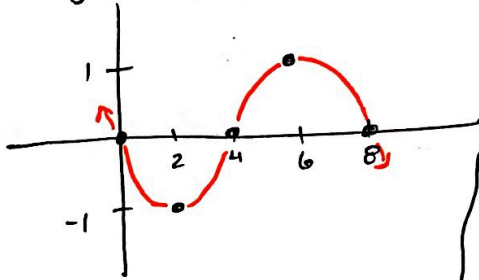


3. $y = -\sin\frac{\pi x}{4}$

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

A: 1
Per: $\frac{2\pi}{\frac{\pi}{4}} = 8$
PS: none
VS: none

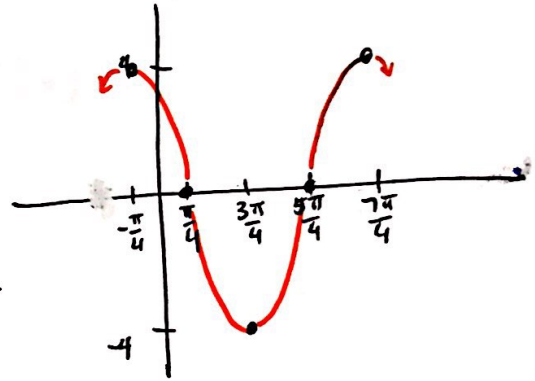
| θ | $f(\theta)$ |
|----------|-------------|
| 0 | 0 |
| 2 | -1 |
| 4 | 0 |
| 6 | 1 |
| 8 | 0 |



4. $y = 4\cos\left(x + \frac{\pi}{4}\right)$

A: 4
Per: $\frac{2\pi}{1} = 2\pi$
PS: $-\frac{\pi}{4}$
VS: none

| θ | $f(\theta)$ |
|------------------|-------------|
| $-\frac{\pi}{4}$ | 4 |
| $\frac{\pi}{4}$ | 0 |
| $\frac{3\pi}{4}$ | -4 |
| $\frac{5\pi}{4}$ | 0 |
| $\frac{7\pi}{4}$ | 4 |

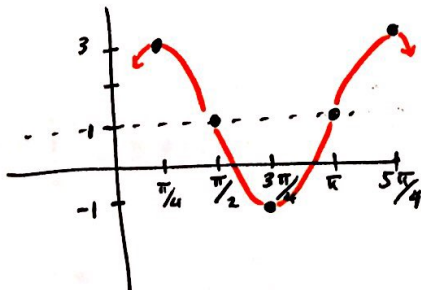


5. $y = 1 + 2\cos 2\left(x - \frac{\pi}{4}\right)$

$y = 2\cos\left[2\left(x - \frac{\pi}{4}\right)\right] + 1$

A: 2
per: $\frac{2\pi}{2} = \pi$
PS: $\frac{\pi}{4}$
VS: 1

| θ | $f(\theta)$ |
|------------------|-------------|
| $\frac{\pi}{4}$ | 3 |
| $\frac{\pi}{2}$ | 1 |
| $\frac{3\pi}{4}$ | -1 |
| π | 1 |
| $\frac{5\pi}{4}$ | 3 |

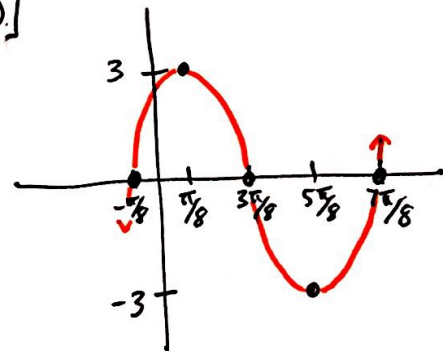


6. $y = 3\sin\left(2x + \frac{\pi}{8}\right)$

$y = 3\sin\left[2\left(x + \frac{\pi}{8}\right)\right]$

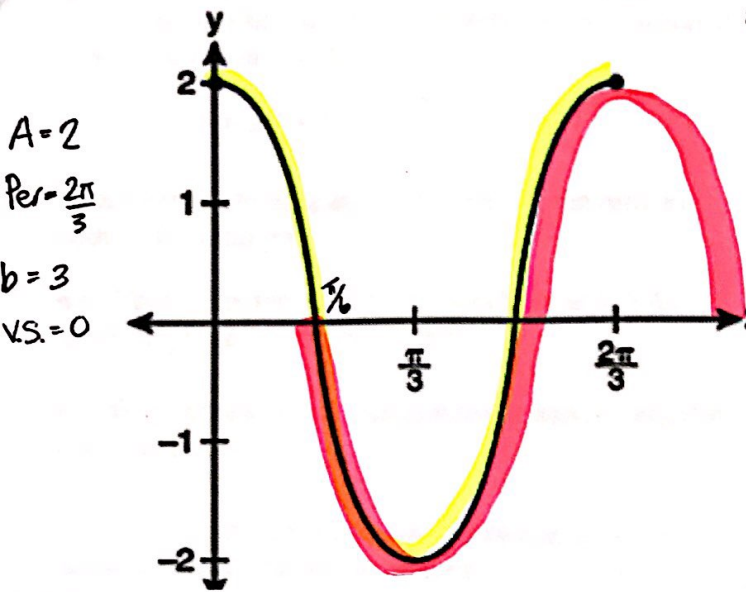
A: 3
per: $\frac{2\pi}{2} = \pi$
PS: $-\frac{\pi}{8}$
VS: none

| θ | $f(\theta)$ |
|------------------|-------------|
| $-\frac{\pi}{8}$ | 0 |
| $\frac{\pi}{8}$ | 3 |
| $\frac{3\pi}{8}$ | 0 |
| $\frac{5\pi}{8}$ | -3 |
| $\frac{7\pi}{8}$ | 0 |



Determine a sine and a cosine equation for the following graphs.

7.)

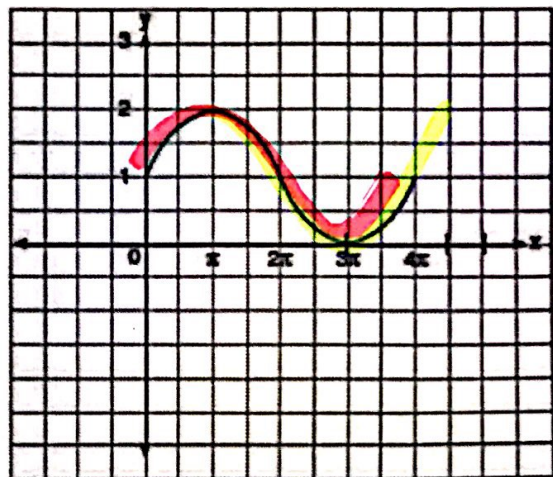


$A=2$
 $Per = \frac{2\pi}{3}$
 $b=3$
 $VS=0$

● $y = 2 \cos 3x$

● $y = -2 \sin \left[3 \left(x - \frac{\pi}{6} \right) \right]$

8.)

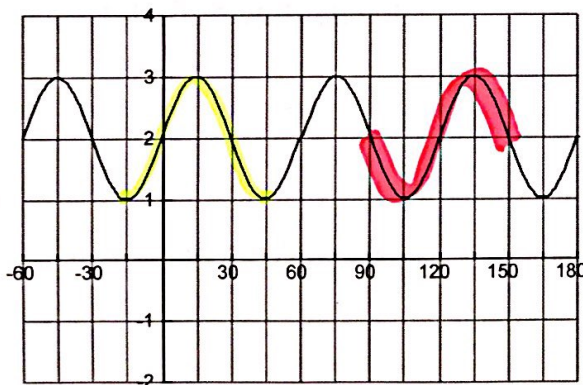


$A=1$
 $Per = 4\pi$
 $b = \frac{1}{2}$
 $VS = 1$

● $y = \cos \left[\frac{1}{2} (x - \pi) \right] + 1$

● $y = \sin \left(\frac{1}{2} x \right) + 1$

9.)



$A=1$
 $Per = 60$
 $b = \frac{\pi}{30}$
 $VS = 2$

● $y = -\cos \left[\frac{\pi}{30} (x + 15) \right] + 2$

● $y = -\sin \left[\frac{\pi}{30} (x - 90) \right] + 2$

10. The temperature in an office is controlled by an electronic thermostat. The temperatures vary according to the sinusoidal function:

$$y = 19 + 6\sin\left(\frac{\pi}{12}(x-11)\right)$$

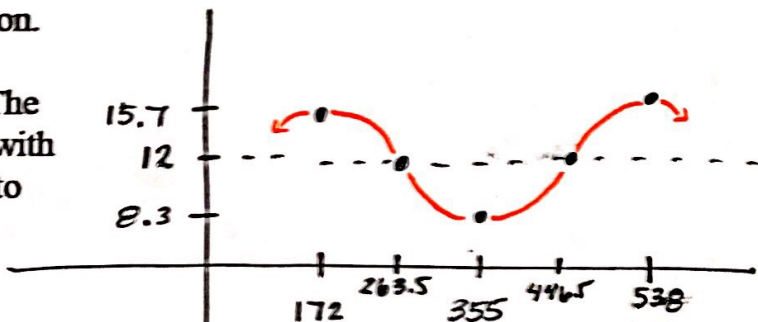
where y is the temperature ($^{\circ}\text{C}$) and x is the time in hours past midnight.

a.) What is the temperature in the office at 9 A.M. when employees come to work? $x=9 \quad y=16^{\circ}$

b.) What are the maximum and minimum temperatures in the office? $\max = \text{midline} + \text{amp} = 19 + 6 = 25^{\circ}$
 $\min = \text{midline} - \text{amp} = 19 - 6 = 13^{\circ}$

c.) How much time has passed between successive periods of minimum temperatures? $\text{Per} = \frac{2\pi}{\frac{\pi}{12}} = 24 \text{ hours}$

11. The number of hours of daylight measured in one year in Ellenville can be modeled by a sinusoidal function. During 2006, (not a leap year), the longest day occurred on June 21 with 15.7 hours of daylight. The shortest day of the year occurred on December 21 with 8.3 hours of daylight. Write a sinusoidal equation to model the hours of daylight in Ellenville.



Graph the Equation.

$A = 3.7$
 $\text{Per} = 366$
 $b = \frac{\pi}{183}$
 $\text{PS} = 172$
 $\text{VS} = 12$

$$y = 3.7 \cos\left[\frac{\pi}{183}(x-172)\right] + 12$$

* June 21 is the 172nd day of the year
 * Dec 21 is the 355th day of the year

Write a sine function given the following characteristics

12.

| Amplitude | Period | Phase Shift | Vertical Shift | Equation |
|-----------|---|-----------------|----------------|---|
| 4 | 3π $b = \frac{2\pi}{3\pi} = \frac{2}{3}$ | $\frac{\pi}{2}$ | -4 | $y = 4\sin\left[\frac{2}{3}\left(x - \frac{\pi}{2}\right)\right] - 4$ |
| 3 | 4 $b = \frac{2\pi}{4} = \frac{\pi}{2}$ | -1 | $\frac{1}{2}$ | $y = 3\sin\left[\frac{\pi}{2}(x+1)\right] + \frac{1}{2}$ |