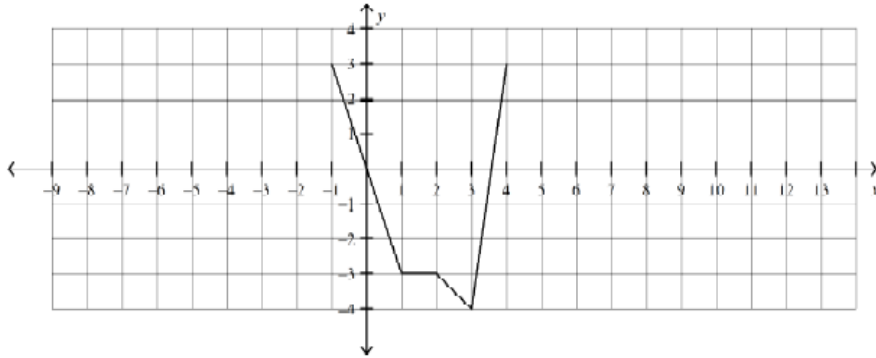
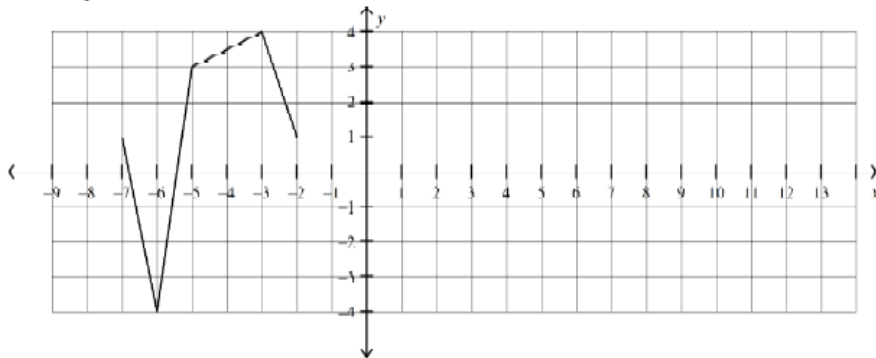


Periodic Functions

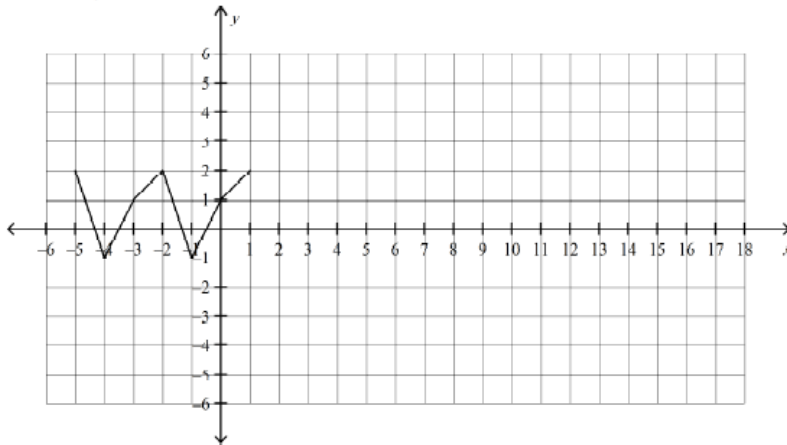
1. One cycle of the graph of a periodic function is shown below. State the period and amplitude.



2. One cycle of the graph of a periodic function is shown below. Extend the graph of the function for one more cycle.



3. For the given periodic relation, state the value of $f(45)$ assuming the relation continues in the same manner.



Answers

1. ANS:

From the graph we see that the function ranges between $y = -4$ and $y = 3$, thus the amplitude is

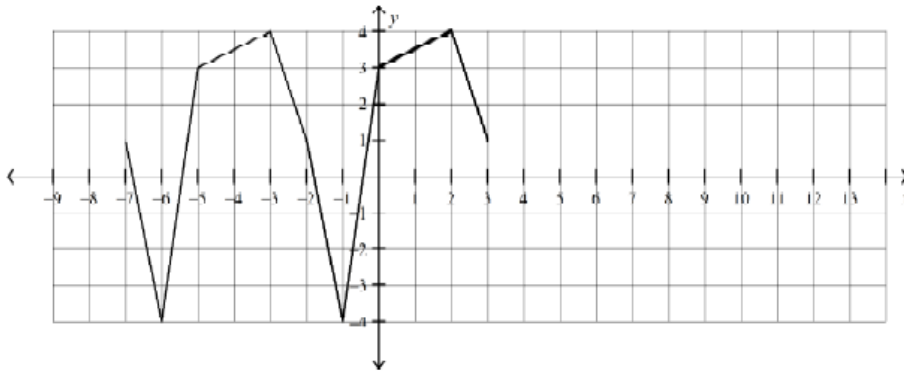
$$\frac{3 - (-4)}{2} = 3.5.$$

From the graph we see that one cycle starts at $x = -1$ and ends at $x = 4$, thus the period is $4 - (-1) = 5$.

[Jan. 03, 3M, A6]

PTS: 1

2. ANS:



[Jan. 03, 3M, A6]

PTS: 1

3. ANS:

Clearly the first (second) cycle starts at $x = -5$ ($x = -2$) and ends at $x = -2$ ($x = 1$) so the period is $-2 - (-5) = 3$ ($1 - (-2) = 3$)

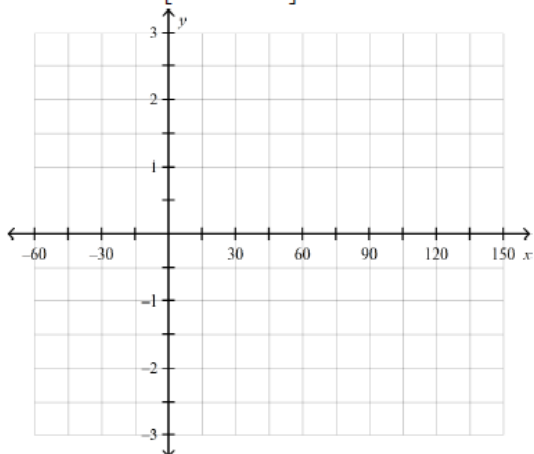
When you divide 45 by the period, 3, you get 15 with a remainder of 0. Thus $f(45) = f(0) = 1$.

[Backup 03, 3M, A2] [Backup 03, 3U, A2]

PTS: 1

4. Given the function $g(x) = 0.5f[0.25(x + 540)] + 1$, with a parent function $f(x) = \sin(x)$,
- (a) list the *transformations*, in the correct order and using appropriate terminology. (b) list the *key features* of the transformed function using appropriate terminology.

5. Graph $y = 2 \sin[-3(x + 45)] + 1$.



6. Determine an equation for a cosine function that has a period of 1800° , and amplitude of 3, a vertical shift of 3, and a phase shift of -225° .

7. Determine an equation for a cosine function that has a period of 1440° , and amplitude of 2, a vertical shift of -1 , and a phase shift of -720° .

8. Determine a sinusoidal equation that satisfies the given data.

x	y
-45°	5
-15°	6
15°	5
45°	4
75°	5
105°	6
135°	5

Answers

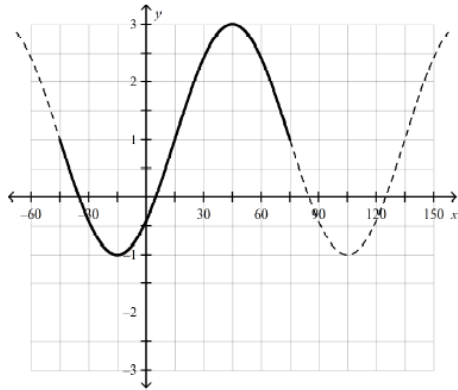
4. ANS:

vertical compression by 2
horizontal stretch by 4
shift left by 540
shift up by 1

amplitude = 0.5
period = 1440°
axis of curve: $y = 1$
phase shift = -540°

PTS: 1

5. ANS:



PTS: 1

6. ANS:

$$y = 3 \cos [0.2(x + 225)] + 3$$

Parent: $y = \cos(x)$

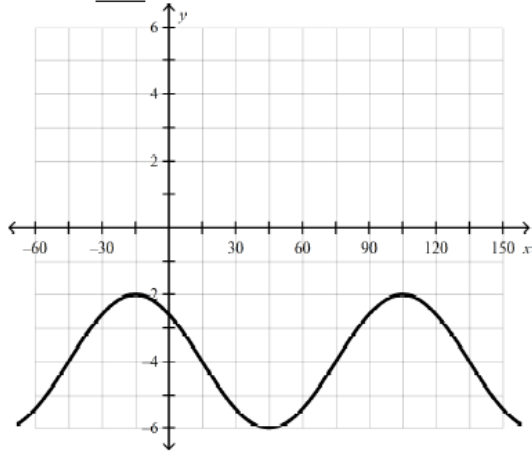
PTS: 1

7. Determine an equation for a cosine function that has a period of 1440° , and amplitude of 2, a vertical shift of -1 , and a phase shift of -720° .

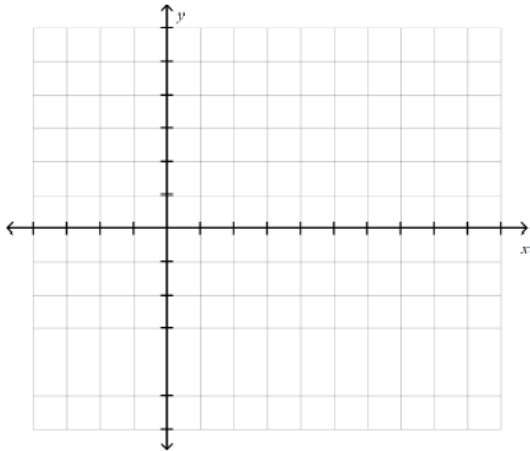
8. Determine a sinusoidal equation that satisfies the given data.

x	y
-45°	5
-15°	6
15°	5
45°	4
75°	5
105°	6
135°	5

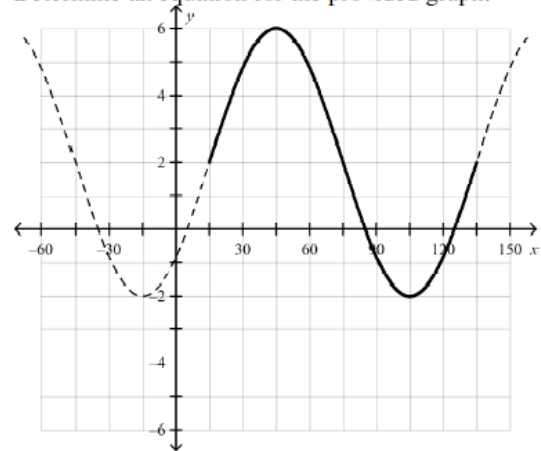
9. For the provided graph, determine 2 different sine equations and 2 different cosine equations. At least one of your answers must include a vertical reflection.



10. Choose an appropriate scale and graph one full period of $y = 3 \cos[5(x - 18)] - 3$, then state domain and range for the single period of your graph.



11. Determine an equation for the provided graph.



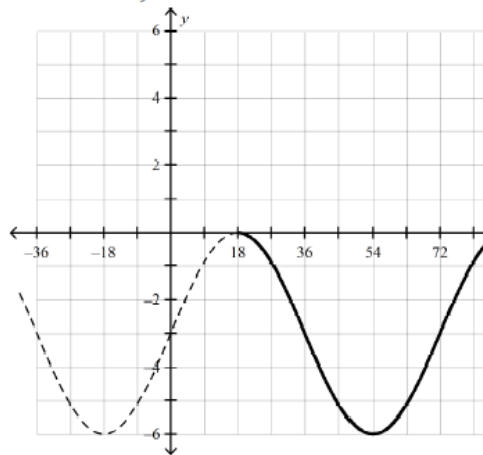
Answers

9. ANS:
amplitude = 2
period = 120°
axis of curve: $y = -4$
phase shift = -45°

PTS: 1

10. ANS:
 $D = \{x \mid x \in \mathbb{R}, 18^\circ \leq x \leq 90^\circ\}$ $R = \{y \mid y \in \mathbb{R}, -6 \leq y \leq 0\}$

amplitude = 3
period = 72°
axis of curve: $y = -3$
phase shift = 18°



PTS: 1

11. ANS:
Graph $y = 4 \sin[3(x - 15)] + 2$

PTS: 1