

**A2.A.69: Properties of Graphs of Trigonometric Functions 2: Determine amplitude, period, frequency, and phase shift, given the graph or equation of a periodic function**

- 1 How many full cycles of the function  $y = 3 \sin 2x$  appear in  $\pi$  radians?
  - 1) 1
  - 2) 2
  - 3) 3
  - 4) 4
- 2 What is the period of the function  $y = 5 \sin 3x$ ?
  - 1) 5
  - 2)  $\frac{2\pi}{5}$
  - 3) 3
  - 4)  $\frac{2\pi}{3}$
- 3 What is the period of the graph  $y = \frac{1}{2} \sin 6x$ ?
  - 1)  $\frac{\pi}{6}$
  - 2)  $\frac{\pi}{3}$
  - 3)  $\frac{\pi}{2}$
  - 4)  $6\pi$
- 4 What is the period of the function  $f(\theta) = -2 \cos 3\theta$ ?
  - 1)  $\pi$
  - 2)  $\frac{2\pi}{3}$
  - 3)  $\frac{3\pi}{2}$
  - 4)  $2\pi$
- 5 What is the period of the graph of the equation  $y = \frac{1}{3} \sin 2x$ ?
  - 1)  $\frac{1}{3}$
  - 2) 2
  - 3)  $\pi$
  - 4)  $6\pi$
- 6 What is the period of the graph of the equation  $y = 2 \sin \frac{1}{3} x$ ?
  - 1)  $\frac{2}{3} \pi$
  - 2)  $2\pi$
  - 3)  $6\pi$
  - 4)  $\frac{3\pi}{2}$
- 7 What is the period of  $y = \sin 2x$ ?
  - 1)  $4\pi$
  - 2) 2
  - 3)  $\pi$
  - 4) 4
- 8 What is the period of the function  $y = \frac{1}{2} \sin \left( \frac{x}{3} - \pi \right)$ ?
  - 1)  $\frac{1}{2}$
  - 2)  $\frac{1}{3}$
  - 3)  $\frac{2}{3} \pi$
  - 4)  $6\pi$
- 9 A certain radio wave travels in a path represented by the equation  $y = 5 \sin 2x$ . What is the period of this wave?
  - 1) 5
  - 2) 2
  - 3)  $\pi$
  - 4)  $2\pi$
- 10 A sound wave is modeled by the curve  $y = 3 \sin 4x$ . What is the period of this curve?
  - 1)  $\pi$
  - 2)  $\frac{\pi}{2}$
  - 3) 3
  - 4) 4

- 11 A wave displayed by an oscilloscope is represented by the equation  $y = 3 \sin x$ . What is the period of this function?
- $2\pi$
  - 2
  - 3
  - $3\pi$
- 12 A modulated laser heats a diamond. Its variable temperature, in degrees Celsius, is given by  $f(t) = T \sin at$ . What is the period of the curve?
- $|T|$
  - $\frac{2\pi}{a}$
  - $\frac{1}{a}$
  - $\frac{2a\pi}{a}$
- 13 An object that weighs 2 pounds is suspended in a liquid. When the object is depressed 3 feet from its equilibrium point, it will oscillate according to the formula  $x = 3 \cos(8t)$ , where  $t$  is the number of seconds after the object is released. How many seconds are in the period of oscillation?
- $\frac{\pi}{4}$
  - $\pi$
  - 3
  - $2\pi$
- 14 The Sea Dragon, a pendulum ride at an amusement park, moves from its central position at rest according to the trigonometric function  $P(t) = -10 \sin\left(\frac{\pi}{3} t\right)$ , where  $t$  represents time, in seconds. How many seconds does it take the pendulum to complete one full cycle?
- 5
  - 6
  - 3
  - 10
- 15 The brightness of the star MIRA over time is given by the equation  $y = 2 \sin \frac{\pi}{4} x + 6$ , where  $x$  represents time and  $y$  represents brightness. What is the period of this function, in radian measure?
- 16 What are the amplitude and the period of the graph represented by the equation  $y = -3 \cos \frac{\theta}{3}$ ?
- amplitude:  $-3$ ; period:  $\frac{\pi}{3}$
  - amplitude:  $-3$ ; period:  $6\pi$
  - amplitude: 3; period:  $\frac{\pi}{3}$
  - amplitude: 3; period:  $6\pi$
- 17 Which equation represents a graph that has a period of  $4\pi$ ?
- $y = 3 \sin \frac{1}{2} x$
  - $y = 3 \sin 2x$
  - $y = 3 \sin \frac{1}{4} x$
  - $y = 3 \sin 4x$
- 18 The graph of which equation has amplitude 2 and period  $\pi$ ?
- $y = 2 \cos 2x$
  - $y = \frac{1}{2} \sin 2x$
  - $y = 2 \sin x$
  - $y = 2 \cos \frac{1}{2} x$
- 19 The graph of which function has an amplitude of 2 and a period of  $4\pi$ ?
- $y = 2 \sin \frac{1}{2} x$
  - $y = 2 \sin 4x$
  - $y = 4 \sin \frac{1}{2} x$
  - $y = 4 \sin 2x$

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### Answer Section

1 ANS: 1

$$\frac{2\pi}{2} = \pi$$

$$\frac{\pi}{\pi} = 1$$

REF: 061519a2

2 ANS: 4

REF: 080113b

3 ANS: 2

$$\frac{2\pi}{6} = \frac{\pi}{3}$$

REF: 061413a2

4 ANS: 2

$$\frac{2\pi}{b} = \frac{2\pi}{3}$$

REF: 061111a2

5 ANS: 3

$$\frac{2\pi}{2} = \pi$$

REF: 081519a2

6 ANS: 3

REF: 080615b

7 ANS: 3

REF: 069025siii

8 ANS: 4

$$\frac{2\pi}{b} = \frac{2\pi}{\frac{1}{3}} = 6\pi$$

REF: 061027a2

9 ANS: 3

REF: 080514b

10 ANS: 2

REF: 010606b

11 ANS: 1

REF: 010810b

12 ANS: 2

REF: 060105b

13 ANS: 1

REF: 010204b

14 ANS: 2

REF: 060920b

15 ANS:

8

REF: 010425b

16 ANS: 4

REF: 011627a2

17 ANS: 1

$$\frac{2\pi}{b} = 4\pi$$

$$b = \frac{1}{2}$$

REF: 011425a2

18 ANS: 1

REF: 068425siii

19 ANS: 1

REF: 069634siii