Regents Exam Questions F.IF.C.7: Graphing Trigonometric Functions 2 www.jmap.org

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- 1 How many full cycles of the function $y = 3 \sin 2x$ appear in π 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) 6π

- 4 What is the period of the function $f(\theta) = -2\cos 3\theta$? 1) π 2) $\frac{2\pi}{3}$ 3) $\frac{3\pi}{2}$ 4) 2π
- 5 What is the period of the graph of the equation $y = \frac{1}{3}\sin 2x$? 1) $\frac{1}{3}$ 2) 2 3) π 4) 6π
- 6 What is the period of the graph of the equation $y = 2\sin\frac{1}{3}x$?
 - 1) $\frac{2}{3}\pi$ 2) 2π 3) 6π 4) $\frac{3\pi}{2}$
- 7 What is the period of $y = \sin 2x$? 1) 4π 2) 2 3) π 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) 6π

9 Given the equation $S(x) = 1.7 \sin(bx) + 12$, where the period of S(x) is 12, what is the value of *b*? 1) $\frac{\pi}{6}$ 2) 24π 3) $\frac{\pi}{12}$ 4) 6π

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- 10 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) π 4) 2π
- 11 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

12 A wave displayed by an oscilloscope is represented by the equation $y = 3 \sin x$. What is the period of this function?

1)
$$2\pi$$
 2) 2 3) 3 4) 3π

- 13 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?
 - 1) |T| 2) $\frac{2\pi}{a}$ 3) $\frac{1}{a}$ 4) $\frac{2a\pi}{a}$
- 14 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?
 - 1) $\frac{\pi}{4}$ 2) π 3) 3 4) 2π
- 15 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? 1) 5 2) 6 3) 3 4) 10
- 16 The height above ground for a person riding a Ferris wheel after *t* seconds is modeled by $h(t) = 150 \sin\left(\frac{\pi}{45}t + 67.5\right) + 160$ feet. How many seconds does it take to go from the bottom of the wheel to the top of the wheel? 1) 10 2) 45 3) 90 4) 150
- 17 The graph of which function has a period of 3?

1)
$$y = -7\sin\left(\frac{2\pi}{3}x\right) - 5$$
 2) $y = -7\sin\left(\frac{3\pi}{2}x\right) + 9$ 3) $y = -7\sin(3x) - 5$ 4) $y = 3\sin(\pi x) + 9$

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18 The height, above ground, of a Ferris wheel car can be modeled by the function $h(t) = -103.5 \cos\left(\frac{2\pi t}{5}\right) + 108.5$

where h is measured in feet and t is measured in minutes. State the period of the function and describe what the period represents in this context.

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- 19 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?
- 20 The graph below represents the height above the ground, h, in inches, of a point on a triathlete's bike wheel during a training ride in terms of time, t, in seconds.



Identify the period of the graph and describe what the period represents in this context.

21 Visible light can be represented by sinusoidal waves. Three visible light waves are shown in the graph below. The midline of each wave is labeled ℓ .



Based on the graph, which light wave has the longest period? Justify your answer.

F.IF.C.7: Graphing Trigonometric Functions 2 Answer Section

1 ANS: 1 $\frac{2\pi}{2} = \pi$ $\frac{\pi}{\pi} = 1$ REF: 061519a2 2 ANS: 4 period = $\frac{2\pi}{b} = \frac{2\pi}{3}$ 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 $period = \frac{2\pi}{b} = \frac{2\pi}{\frac{1}{2}} = 6\pi$ 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: 1

$$\frac{2\pi}{b} = 12$$

$$12b = 2\pi$$

$$b = \frac{\pi}{6}$$
10 ANS: 3
period = $\frac{2\pi}{b} = \frac{2\pi}{2} = \pi$
REF: 080514b
11 ANS: 2
period = $\frac{2\pi}{b} = \frac{2\pi}{4} = \frac{\pi}{2}$
REF: 010606b
12 ANS: 1
period = $\frac{2\pi}{b} = \frac{2\pi}{1} = 2\pi$
REF: 010810b
13 ANS: 2
period = $\frac{2\pi}{b} = \frac{2\pi}{a}$
REF: 010810b
14 ANS: 1
period = $\frac{2\pi}{b} = \frac{2\pi}{a}$
REF: 010204b
15 ANS: 2
period = $\frac{2\pi}{b} = \frac{2\pi}{\pi} = 6$
REF: 060920b

16 ANS: 2
$$P = \frac{2\pi}{\frac{\pi}{45}} = 90$$

REF: 081822aii

17 ANS: 1 $B = \frac{2\pi}{2\pi}$

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

REF: 082413aii 18 ANS: $\frac{2\pi}{\frac{2\pi}{5}} = 5$ The wheel rotates every 5 minutes.

REF: 062429aii

19 ANS:

8. period =
$$\frac{2\pi}{b} = \frac{2\pi}{\frac{\pi}{4}} = 8$$
.

REF: 010425b

20 ANS: period is $\frac{2}{3}$. The wheel rotates once every $\frac{2}{3}$ second.

REF: 061728aii

21 ANS:

Light wave C. The periods for A, B, and C are 280, 220 and 320.

REF: 012030aii