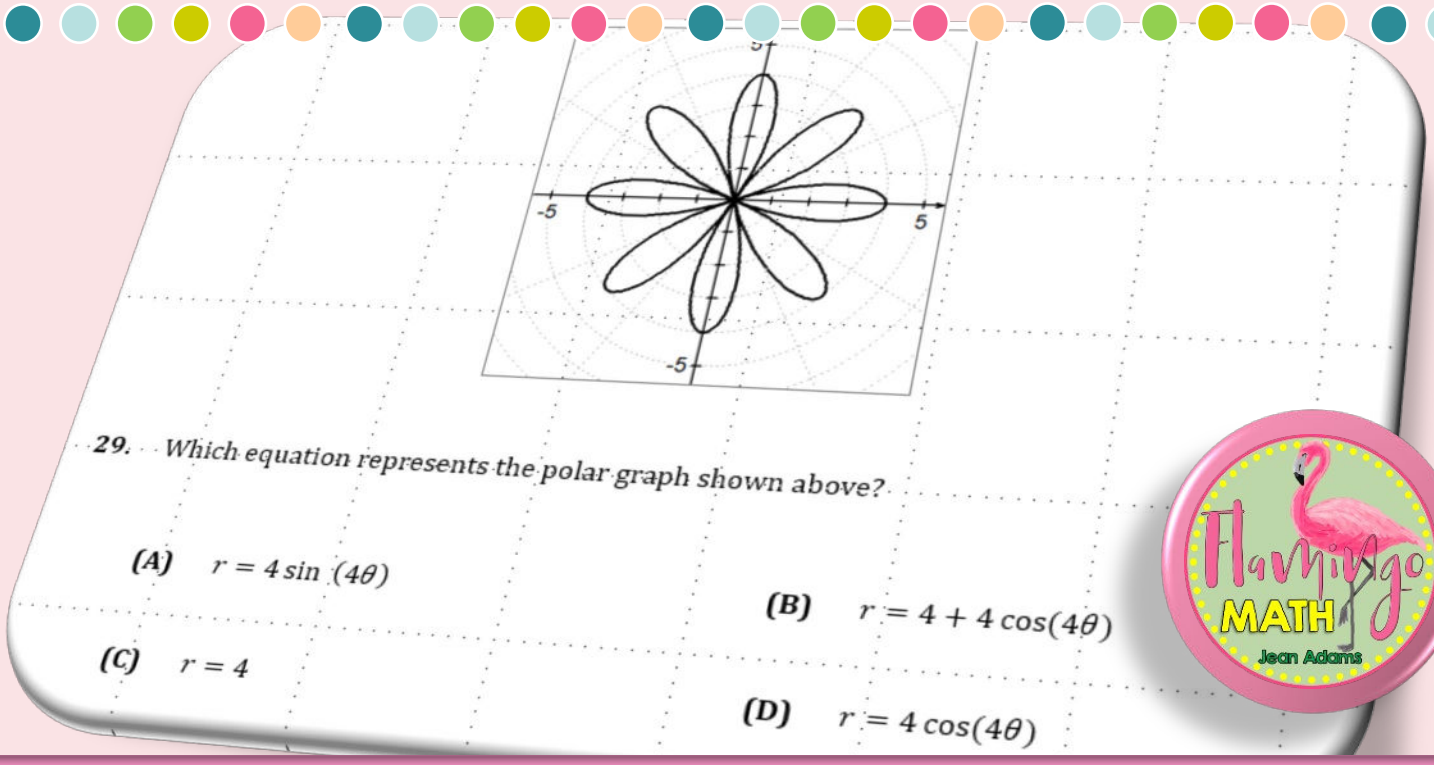
AP® Precalculus

Trigonometric and Polar Functions

Multiple Choice Monday



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AP Precalculus Review
Unit 3 Multiple Choice Practice Sets

This **AP Precalculus Review** is made for your AP Precalculus students to gain proficiency in preparation for the AP Precalculus Exam for questions covering topics and learning objectives for ***Unit 3: Trigonometric and Polar Functions.*** You will find a **set of 40 questions** and also includes an answer key.

Students will practice the following skills:

[3.1] Periodic Phenomena
[3.2] Sine, Cosine, and Tangent
[3.3] Sine and Cosine Function Values
[3.4] Sine and Cosine Function Graphs
[3.5] Sinusoidal Functions
[3.6] Sinusoidal Function Transformations
[3.7] Sinusoidal Function Context and Data Modeling
[3.8] The Tangent Function
[3.9] Inverse Trigonometric Functions
[3.10] Trigonometric Equations and Inequalities
[3.11] The Secant, Cosecant, and Cotangent Functions
[3.12] Equivalent Representations of Trigonometric Functions
[3.13] Trigonometry and Polar Coordinates
[3.14] Polar Function Graphs
[3.15] Rates of Change in Polar Functions

Teaching Suggestions:

- Use the set as a group activity or station rotation in preparation for the exam.
- Use as a homework assignment during Test Prep
- Use as warm-up exercises during the year to keep content current

Note: **This is the editable version of the Multiple Choice Monday Trigonometric & Polar Functions Google Edition.**

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AP Precalculus Review
Unit 3 Multiple Choice Practice Set

AP Precalculus Name _____

Unit 3 Multiple Choice Questions

Time (seconds)	0	8	16	24	32
Wind speed	16	40	64	40	16

1. An experiment at a science laboratory generates waves based on wind speed. The following data is collected for 32 seconds. Let V represent the wind speed in feet per second and let t represent the time in seconds. Write a sine equation that describes the wave.

(A) $V = 64\sin\left(\frac{\pi}{16}(t-8)\right) + 16$

(B) $V = 24\sin\left(\frac{\pi}{16}(t-8)\right) + 40$

(C) $V = 48\sin\left(32\left(t-\frac{1}{2}\right)\right) + 24$

(D) $V = 64\sin\left(32\left(t-\frac{1}{2}\right)\right) + 16$

2. Which equation represents the graph shown below?

(A) $y = 2$ s

$y = 2$

$y =$

$y = 3$

(A) Horizontal shift $\frac{\pi}{2}$ units

(B) Horizontal dilation by a factor of 2

(C) Reflection through the x axis

(D) Vertical dilation by a factor of 3

15. For what values of x does $y = \cot(x)$ have a vertical asymptote on the interval $[-2\pi, 2\pi]$?

(A) $-2, -1, 0, 1, 2$

(B) $\frac{3\pi}{2}, \frac{\pi}{2}, \frac{\pi}{2}, \frac{3\pi}{2}$

(C) $2\pi, \pi, 0, \pi, 2\pi$

(D) None

16. Factor and simplify. $\cos^2(x) - \sin^2(x)\cos^2(x)$

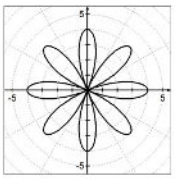
(A) $2\cos(x)$ (B)

(C) $\cos^4$

8. Given the rectangular coordinates, $(4\sqrt{3}, 4)$, covert to polar coordinates.

(A) $\left(8, \frac{\pi}{3}\right)$ (B) $\left(4, \frac{\pi}{6}\right)$

(C) $\left(8, \frac{\pi}{6}\right)$ (D) $\left(4, \frac{\pi}{3}\right)$



29. Which equation represents the polar graph shown a

(A) $r = 4\sin(4\theta)$ (B) 4 $\cos(4\theta)$

(D) $\cos(4\theta)$

30. Find solutions in the interval $[0, 2\pi)$, $\csc(x) + 2 = 0$

(A) $\frac{4\pi}{3}, \frac{5\pi}{3}$ (B) $\frac{\pi}{3}, \frac{2\pi}{3}$

(C) $\frac{\pi}{6}, \frac{5\pi}{6}$ (D) $\frac{7\pi}{6}, \frac{11\pi}{6}$

7. Brian finds that the current flowing through a circuit at time t is $I = 120\sin(75\pi t)$. What is the period and amplitude of the current?

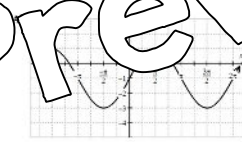
(A) Period: 75π seconds; Amplitude: $\frac{2}{25}$

(B) Period: $\frac{2}{75}$ seconds; Amplitude: 120

(C) Period: $\frac{1}{450}$ seconds; Amplitude: 450

(D) Period: $\frac{\pi}{120}$ seconds; Amplitude: 75

8. Graph $y = 2\cos\left(x + \frac{\pi}{2}\right)$



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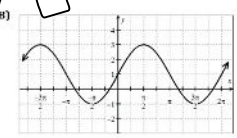

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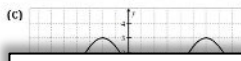

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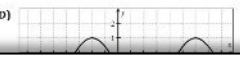
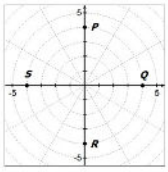


9.



25. Determine which point on the polar graph above is represented by the given polar coordinates of $\left(-4, -\frac{\pi}{2}\right)$.

(A) P (B)

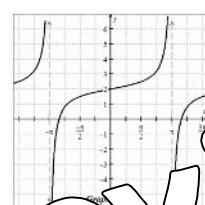
(C) R S

26. Find another representation of the given polar coordinate for the given conditions. $\left(4, \frac{\pi}{6}\right)$, $r < 0$, $-2\pi < \theta < 0$

(A) $\left(-4, -\frac{11\pi}{6}\right)$ (B) $\left(-4, -\frac{13\pi}{6}\right)$

(C) $\left(-4, -\frac{7\pi}{6}\right)$ (D) $\left(-4, -\frac{5\pi}{6}\right)$

27. For the polar coordinates, $\left(7, \frac{3\pi}{4}\right)$ convert to rectangular coordinates.



36. of the function f is in the ne. Which of the following statements is correct?

For $-\pi <$, the graph of f is decreasing at an increasing rate.

(B) For $-\pi < x < 0$, the graph of f is decreasing at a decreasing rate.

(C) For $-\pi < x < 0$, the graph of f is increasing at an increasing rate.

(D) For $-\pi < x < 0$, the graph of f is increasing at a decreasing rate.

37. The point P is at the intersection of an angle β in standard position and a circle with a radius of 1. The coordinates of P are $(0.87, 0.32)$. If f is the function $f(\theta) = \tan\theta$, what is the value of $f(\beta)$?

(A) 0.32 (B) 0.368

(C) 0.87 (D) 2.719

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