

1. Graph the functions $y = \tan x$ and $y = \sin x$ on the same axes over the interval $\{-2\pi \leq x \leq 2\pi\}$.

- a. How many full sine curves are present over this domain?
- b. For how many values of x does $\tan x = \sin x$?
- c. In which quadrant(s) are both $y = \tan x$ and $y = \sin x$ positive? Both negative?



1.

2. As angle x increases from $\frac{3\pi}{2}$ to 2π , which of the following is true?

- (1) $\sin x$ decreases from 0 to -1
- (2) $\cos x$ decreases from 0 to -1
- (3) $\cos x$ increases from 0 to 1
- (4) $\sin x$ increases from 0 to 1

3. The function $f(x) = -3\cos 2x$ reaches its minimum value when x , expressed in radians, equals

- (1) -3
- (2) $\frac{\pi}{2}$
- (3) $\frac{\pi}{4}$
- (4) π

2.

4. State the amplitude, frequency, and period of the function $y = -4\sin \frac{2}{5}x$.

5. 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) $\frac{2a\pi}{a}$

3.

4.

5.

6. The amount, A , in grams, of a 32 gram serving of caffeine remaining in the body after t hours is given by the formula: $A = 9(1.6)^t$. Find, to the nearest tenth of an hour, how long it takes for one-fourth of the caffeine dose to leave the body.

6.

7. The number of goldfish in an aquarium is represented by $\frac{x}{x+2}$ and the number of guppies is represented by $\frac{2}{x^2-x-6}$. Express, as a single fraction in simplest form, the total number of fish in the aquarium.

7.

8. If the product of the roots of a quadratic equation is $-\frac{1}{4}$ and the sum of the roots of the same quadratic equation is $\frac{5}{2}$, the equation may be which of the following?

- (1) $2x^2 - 5x = \frac{1}{2}$ (3) $4x^2 - 1 = 0$
(2) $5x = 1 + 2x^2$ (4) $4x^2 = 5x + 1$

8.

9. Solve for all values of x : $\log_3(2x-1) + \log_3(x+7) = 3$

9.
