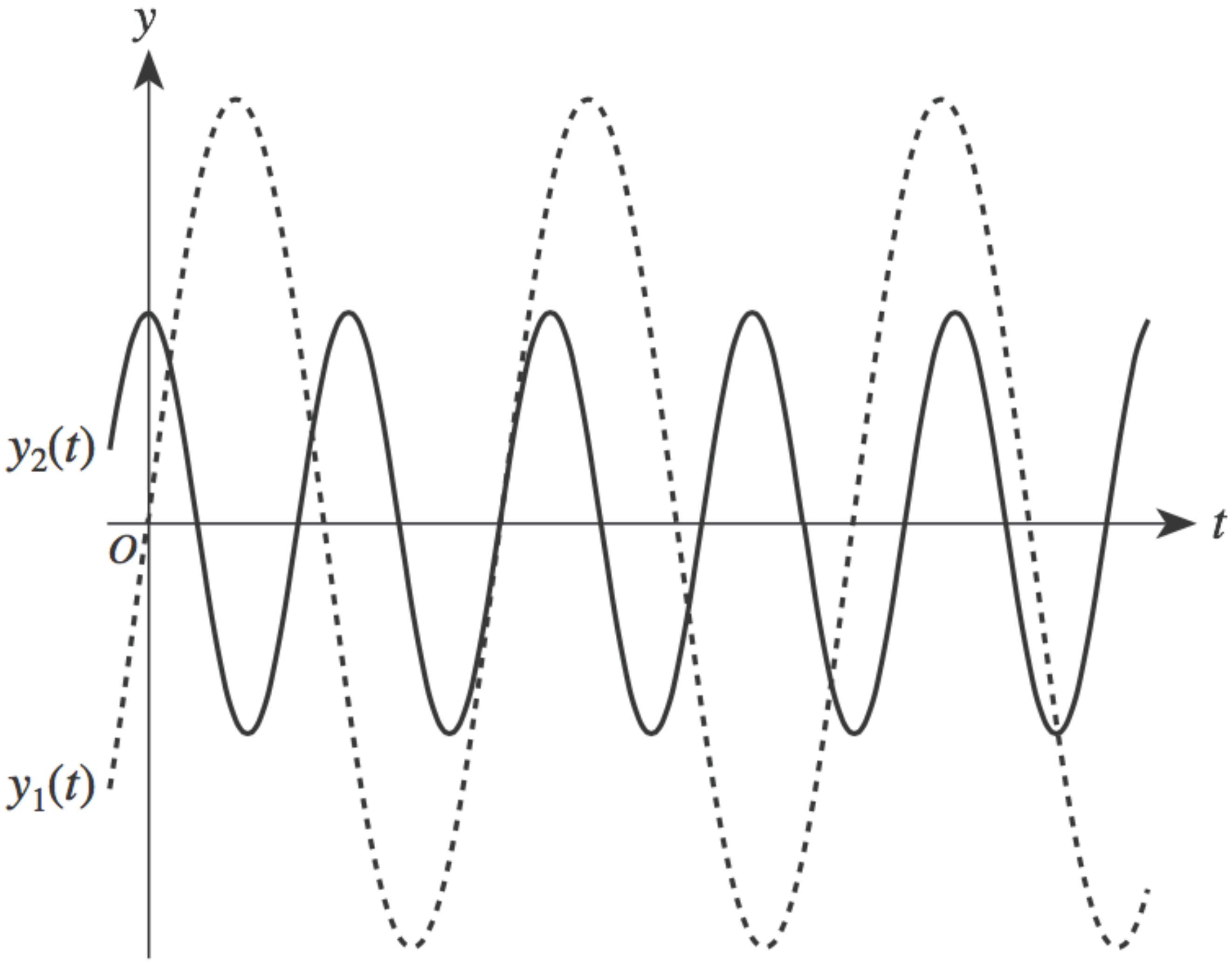
55. The equations of the 2 graphs shown below are $y_1(t) = a_1 \sin(b_1 t)$ and $y_2(t) = a_2 \cos(b_2 t)$, where the constants b_1 and b_2 are both positive real numbers.



Which of the following statements is true of the constants a_1 and a_2 ?

A. $0 < a_1 < a_2$

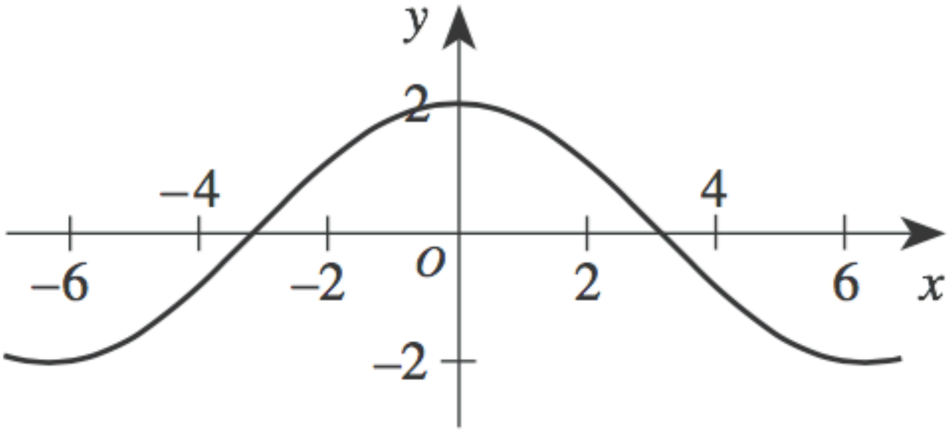
B. $0 < a_2 < a_1$

C. $a_1 < 0 < a_2$

D. $a_1 < a_2 < 0$

E. $a_2 < a_1 < 0$

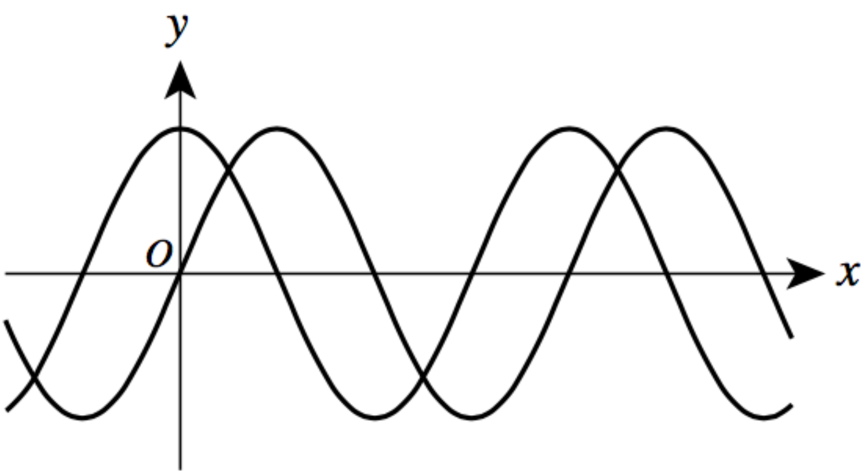
50. The graph of the trigonometric function $y = 2\cos\left(\frac{1}{2}x\right)$ is shown below.



The function is:

F. even (that is, $f(x) = f(-x)$ for all x).
G. odd (that is, $f(-x) = -f(x)$ for all x).
H. neither even nor odd.
J. the inverse of a cotangent function.
K. undefined at $x = \pi$.

57. The functions $y = \sin x$ and $y = \sin(x + a) + b$, for constants a and b, are graphed in the standard (x,y) coordinate plane below. The functions have the same maximum value. One of the following statements about the values of a and b is true. Which statement is it?



A. $a < 0$ and $b = 0$
B. $a < 0$ and $b > 0$
C. $a = 0$ and $b > 0$
D. $a > 0$ and $b < 0$
E. $a > 0$ and $b > 0$

STOP! DO NOT

71. What is the minimum value of 9cos x?

a. 9

b. 0

c. –90

d. –2

e. –9

56. Which of the following trigonometric functions has an amplitude of 2 ?

(Note: The *amplitude* of a trigonometric function is $\frac{1}{2}$ the nonnegative difference between the maximum and minimum values of the function.)

F. $f(x) = 2 \sin x$

G. $f(x) = 2 \tan x$ — Tangent graphs Don't have Amplitudes

H. $f(x) = \sin\left(\frac{1}{2}x\right)$

J. $f(x) = \cos 2x$

K. $f(x) = \frac{1}{2}\cos x$

Advanced Trigonometry

STANDARD form

$Y = A \begin{smallmatrix}\text{sin or}\\ \text{cos}\end{smallmatrix} (Bx - C) + D$

$|A|$ is the Amplitude

B = Period or duration of X values

C = change of degrees or radians. L/R change in position

D = up or down change in position

57. Which of the following is an equivalent expression for r in terms of S and t whenever r, S, and t are all distinct and $S = \frac{rt-3}{\ldots}$?

Which of the following represents a cosine function with a range of 39 to 83?

Possible Answers:

$f(x) = 44cos(2x) + 39$

$f(x) = 44cos(39x)$

$f(x) = 22cos(61x)$

$f(x) = 22cos(5x) + 61$

$f(x) = 12cos(5x) + 83$

Correct answer:

$f(x) = 22cos(5x) + 61$

Explanation:

The range of a cosine wave is altered by the coefficient placed in front of the base equation. So, if you have $f(x) = 12cos(x)$, this means that the highest point on the wave will be at 12 and the lowest at -12; however, if you then begin to shift the equation vertically by adding values, as in, $f(x) = 12cos(x) + 1$, then you need to account for said shift. This would make the minimum value to be -11 and the maximum value to be 13.

For our question, the range of values covers $83 - (39) = 44$. This range is accomplished by having either 22 or -22 as your coefficient. (-22 merely flips the equation over the x-axis. The range "spread" remains the same.) We need to make the upper value to be 83 instead of 22. To do this, you will need to add $83 - 22$, or 61, to 22. This requires an upward shift of 61. An example of performing a shift like this is:

$$f(x) = cos(x) + 61$$

Among the possible answers, the one that works is:

$$f(x) = 22cos(5x) + 61$$

The $5x$ parameter does not matter, as it only alters the frequency of the function.

Example Question #154 : Trigonometry

Which of the following functions has a range of $[-12, -8]$?

Possible Answers:

$f(x) = 2cos(3x - 3) - 10$

$f(x) = 2cos(x + 1) + 10$

$f(x) = cos(2x) - 5$

$f(x) = 2cos(-x - 5) + 2$

None of these functions has the specified range.

Correct answer:

$f(x) = 2cos(3x - 3) - 10$

Explanation:

The range of the function represents the spread of possible answers you can get for $f(x)$, given all values of x. In this case, the ordinary range for a cosine function is $[-1, 1]$, since the largest value that cosine can solve to is 1 (for a cosine of $0/2\pi/360°$ or a multiple of one of those values), and the smallest value cosine can solve to is -1 (for a cosine of $\pi/180°$ or a multiple of one of those values).

One fast way to match a range to a function is to look for the function which has a vertical shift equal to the mean of the range values. In other words, for the standard trigonometric function $f(x) = acos(bx - c) + d$, where d represents the vertical shift, $d = \frac{range_{max} + range_{min}}{2}$.

In this case, since our range is $[-12, -8]$, we expect our d to be $\frac{-8 - 12}{2} = -10$.

Of the answer choices, only $f(x) = 2cos(3x - 3) - 10$has $d = -10$, so we know this is our correct choice.

Example Question #153 : Trigonometry

Which of the following functions has a range of $[7, 9]$?

Possible Answers:

$f(x) = 8cos(x + 1) - 2$

$f(x) = cos(x + 8)$

None of these formulas has the specified range.

$f(x) = -2cos(3x) - 8$

$f(x) = cos(3x + 7) + 8$

Correct answer:

$f(x) = cos(3x + 7) + 8$

Explanation:

The range of the function represents the spread of possible answers you can get for $f(x)$, given all values of x. In this case, the ordinary range for a cosine function is $[-1, 1]$, since the largest value that cosine can solve to is 1 (for a cosine of $0/2\pi/360^{\circ}$ or a multiple of one of those values), and the smallest value cosine can solve to is -1 (for a cosine of $\pi/180^{\circ}$ or a multiple of one of those values).

One fast way to match a range to a function is to look for the function which has a vertical shift equal to the mean of the range values. In other words, for the standard trigonometric function $f(x) = acos(bx - c) + d$, where d represents the vertical shift, $d = \frac{range_{max} + range_{min}}{2}$.

In this case, since our range is $[7, 9]$, we expect our d to be $\frac{7+9}{2} = 8$.

Of the answer choices, only $f(x) = cos(3x + 7) + 8$ has $d = 8$, so we know this is our correct choice.

What is the range of the function $f(x) = 7cos(5x) - 2$?

Possible Answers:

$[-9, 5]$

There is no range that fits this function.

$(-\infty, \infty)$

$[-21, -7]$

$[-37, 33]$

Correct answer:

$[-9, 5]$

Explanation:

The range of the function represents the spread of possible answers you can get for $f(x)$, given all values of x. In this case, the ordinary range for a cosine function is $[-1, 1]$, since the largest value that cosine can solve to is 1 (for a cosine of $0/2\pi/360°$ or a multiple of one of those values), and the smallest value cosine can solve to is -1 (for a cosine of $\pi/180°$ or a multiple of one of those values).

However, in this case our final answer is first multiplied by 7, then decreased by 2 after the cosine is applied to x. Multiplying the initial $[-1, 1]$ range by 7 results in a new range of $[-7.7]$. Next, subtracting 2 from this range gives us a new range of $[-9, 5]$.

Note that the $cos(5x)$ does not change our range. This is because, irrespective of other multipliers, a cosine operation can only return values between -1 and 1. To think of this a different way, $cos(5x)$ will give us the same returns as $cos(x)$, only we will move around the unit circle five times as much before finding our answer.

Thus, our final range is $[-9, 5]$.

A function with period P will repeat its solutions in intervals of length P.

What is the period of the function $f(x) = cos(x) + 3$?

Possible Answers:

2

3

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

3π

2π

Correct answer:

2π

Explanation:

For a trigonometric function $f(x) = acos(bx - c) + d$, the period P is equal to $\frac{2\pi}{b}$. So, for $f(x) = cos(x) + 3$, $P = \frac{2\pi}{1} = 2\pi$.

A function with period P will repeat its solutions in intervals of length P.

What is the period of the function $f(x) = 3cos(4\pi x - 4) - 2$?

Possible Answers:

2π

$\frac{1}{2}$

$\frac{\pi}{2}$

$8\pi^2$

4π

Correct answer:

$\frac{1}{2}$

Explanation:

For a trigonometric function $f(x) = acos(bx - c) + d$, the period P is equal to $\frac{2\pi}{b}$. So, for $f(x) = 3cos(4\pi x - 4) - 2$, $P = \frac{2\pi}{4\pi} = \frac{1}{2}$.

A function with period P will repeat its solutions in intervals of length P.

What is the period of the function $f(x) = 2cos(\frac{1}{2}\pi x)$?

Possible Answers:

1

4

2π

4π

π

Correct answer:

4

Explanation:

For a trigonometric function $f(x) = acos(bx - c) + d$, the period P is equal to $\frac{2\pi}{b}$. So, for $f(x) = 2cos(\frac{1}{2}\pi x)$, $P = \frac{2\pi}{\frac{1}{2}\pi} = 4$.

Which of the following represents a cosine function with a range of -30 to -12?

Possible Answers:

$f(x) = 9cos(22x) - 21$

$f(x) = 4cos(9x) - 12$

$f(x) = 18cos(2x) - 30$

$f(x) = cos(18x) - 30$

$f(x) = cos(x) - 30$

Correct answer:

$f(x) = 9cos(22x) - 21$

Explanation:

The range of a cosine wave is altered by the coefficient placed in front of the base equation. So, if you have $f(x) = 12cos(x)$, this means that the highest point on the wave will be at 12 and the lowest at -12; however, if you then begin to shift the equation vertically by adding values, as in, $f(x) = 12cos(x) + 1$, then you need to account for said shift. This would make the minimum value to be -11 and the maximum value to be 13.

For our question, the range of values covers $|-30-(-12)| = |-30+12| = 18$. This range is accomplished by having either 9 or -9 as your coefficient. (-9 merely flips the equation over the x-axis. The range "spread" remains the same.) We need to make the upper value to be -12 instead of 9. To do this, you will need to subtract $9 + 12$, or 21, from 9. This requires an downward shift of 21. An example of performing a shift like this is:

$f(x) = cos(x) - 21$

Among the possible answers, the one that works is:

$f(x) = 9cos(22x) - 21$

The $22x$ parameter does not matter, as it only alters the frequency of the function.

What is the range of the trigonometric function defined by $S(t) = -3\sin(1.5t)$?

Possible Answers:

$[-1.5, 1.5]$

$[-3, 1.5]$

$[-3, 3]$

$[1.5, 3]$

$[0, 3]$

Correct answer:

$[-3, 3]$

Explanation:

The range of a sine or cosine function spans from the negative amplitude to the positive amplitutde. The amplutide is given by $|a|$ in the equation $S(t) = a\sin(bt)$. Thus the range for our function is $[-3, 3]$

What is the range of the given trigonometric equation:

$f(t) = \cos(-3t)$

Possible Answers:

$[-3, 3]$

$(-\infty, \infty)$

$[0, 3]$

$[0, \infty)$

$[-1, 1]$

Correct answer:

$[-1, 1]$

Explanation:

For the sine and cosine funcitons, the range is equal to the negative amplitude to the positive amplitude.

The amplitude is found by taking $|a|$ from the general equation:

$f(t) = a\cos(bt)$.

We see in our equation that $a = 1 \rightarrow |a| = 1$

(when no coefficient is written, it is a 1).

Thus we get that the amplitude is $[-1, 1]$

A function with period P will repeat on intervals of length P, and these intervals are referred to as periods.

Find the period of the function

$cos\,(2x)$.

Possible Answers:

π

2

$\pi + 2$

2π

Correct answer:

π

Explanation:

For the function

$cos(Ax)$

the period is equal to

$$\frac{2\pi}{A}$$

or in this case

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

which reduces to π .

What is the domain of the function $f(x) = 8cos(3x)$ **?**

Possible Answers:

$(-\infty, infty)$

$[-24\pi, 24\pi]$

$(-24\infty, 24\infty)$

$[-24, 24]$

Correct answer:

$(-\infty, infty)$

Explanation:

The *domain* of a function refers to all possible values of x for which an answer can be obtained. Cosine, as a function, cycles endlessly between -1 and 1 (subject to modifiers of the amplitude). Because there is no real number value that can be inserted into x in this case which does not produce a value betwe -1 and 1, the domain of cosine is effectively infinite.

Note that in this case, neither the $3x$ nor the 8 on the outside affect the domain of the function. They *do* affect the amplitude, which means the value for range will change, but there is no such thing as "three times infinity" nor "three times negative infinity", so the effective domain remains infinite.

What is the domain of $y = cos(\theta) - 3$ **?**

Possible Answers:

$(-\infty, \infty)$

$(-\infty, -3]$

$(-\infty, -3)$

$[-3, 3]$

Does not exist.

Correct answer:

$(-\infty, \infty)$

Explanation:

The domain of a function is referring to the x values that can be plugged into the function and produce a value.

The domain of the parent function $cos(\theta)$ has a domain from negative infinity to positive infinity.

The -3 term only shifts the function down three units, which will not affect the domain of the cosine graph.

Therefore, the answer is $(-\infty, \infty)$.

Given a function $y = 2cos(\theta) + 6$, what is a valid domain?

Possible Answers:

$(2, 6)$

$[2, 6]$

$(0, \infty)$

$[0, \infty)$

$(-\infty, \infty)$

Correct answer:

$(-\infty, \infty)$

Explanation:

The function $y = 2cos(\theta) + 6$ is related to the parent function $y = cos(\theta)$.

The domain of the parent function is $(-\infty, \infty)$. The values 2 and 6 will not affect the domain of the curve.

The answer is $(-\infty, \infty)$.

What is the domain of the following trigonometric equation:

$f(t) = -2\cos(12t)$

Possible Answers:

$[-2\pi, 2\pi]$

$[-12, 12]$

$(-\infty, \infty)$

$[2, 12]$

$[-2, 2]$

Correct answer:

$(-\infty, \infty)$

Explanation:

For sine and cosine, they can take any for t, thus the domain is all real numbers or:

$(-\infty, \infty)$

A sine function has a period of 2, a y-intercept of 0, an amplitude of 2 and no phase shift. These describe which of these equations?

Possible Answers:

$f(x) = 2sin(\pi x)$

$f(x) = 2sin(\pi x) + 1$

$f(x) = 2sin(x)$

$f(x) = 2sin(2\pi x)$

$f(x) = sin(\pi x)$

Correct answer:

$f(x) = 2sin(\pi x)$

Explanation:

Looking at this form of a sine function:

$f(x) = asin(bx + c) + d$

We can draw the following conclusions:

$a = 2$ because the amplitude is specified as 2.
$b = \pi$ because of the specified period of 2 since $\frac{2\pi}{\pi} = 2$.
$c = 0$ because the problem specifies there is no phase shift.
$d = 0$ because the y-intercept of a sine function with no phase shift is 0.

Bearing these in mind, $f(x) = 2sin(\pi x)$ is the only function that fits all four of those.

Which of the following statements is (are) true:

I. The domain of the tangent function is all real numbers

II. The range of the sine function is all real numbers

III. The periods of the tangent, sine, and cosine functions are the same.

Possible Answers:

I and II only

I only

II and III only

none of the above

II only

Correct answer:

II only

Explanation:

The domain of the tangent function does not include any values of x that are odd multiples of $\pi/2$.

The range of the sine function is from [-1, 1].

The period of the tangent function is π, whereas the period for both sine and cosine is 2π.

Which of the following represents a sine wave with a range of $-5 \leq y \leq 5$?

Possible Answers:

$f(x) = 5sin(3x)$

$f(x) = sin(x) + 5$

$f(x) = sin(5x)$

$f(x) = 5sin(x) + 3$

$f(x) = 5sin(x) + 5$

Correct answer:

$f(x) = 5sin(3x)$

Explanation:

The range of a sine wave is altered by the coefficient placed in front of the base equation. So, if you have $f(x) = 5sin(x)$, this means that the highest point on the wave will be at 5 and the lowest at -5. However, if you then begin to shift the equation vertically by adding values, as in, $f(x) = 5sin(x) + 5$, then you need to account for said shift. This would make the minimum value to be 0 and the maximum value to be 10. For our question, then, it is fine to use $f(x) = 5sin(3x)$. The $3x$ for the function parameter only alters the period of the equation, making its waves "thinner."

Which of the following sine waves has a range of -3 to 11?

Possible Answers:

$f(x) = -7sin(2x) + 4$

$f(x) = 7sin(4x)$

$f(x) = 7sin(2x) + 11$

$f(x) = 11sin(2x)$

$f(x) = 3sin(7x) + 4$

Correct answer:

$f(x) = -7sin(2x) + 4$

Explanation:

The range of a sine wave is altered by the coefficient placed in front of the base equation. So, if you have $f(x) = 7sin(x)$, this means that the highest point on the wave will be at 7 and the lowest at -7; however, if you then begin to shift the equation vertically by adding values, as in, $f(x) = 7sin(x) + 1$, then you need to account for said shift. This would make the minimum value to be -6 and the maximum value to be 8.

For our question, the range of values covers $11 - (-3) = 11 + 3 = 14$. This range is accomplished by having either 7 or -7 as your coefficient. (-7 merely flips the equation over the x-axis. The range "spread" remains the same.) We need to make the upper value to be 11 instead of 7. To do this, you will need to add 4 to 7. This requires an upward shift of 4. An example of performing a shift like this is:

$f(x) = sin(x) + 4$

Among the possible answers, the one that works is:

$f(x) = -7sin(2x) + 4$

The $2x$ parameter does not matter, as it only alters the frequency of the function.

What is the range of the trigonometric function given by the equation:

$s(t) = -5\sin(2t)$

Possible Answers:

$[-5, 5]$

$[5, 0]$

$(-5, 5)$

$[-\infty, \infty]$

$[-2, 2]$

Correct answer:

$[-5, 5]$

Explanation:

The range of the sine and cosine functions are the closed interval from the negative amplitude and the positive amplitude. The amplitude is given by the coefficient, a in the following general equation:

$f(t) = a\sin(bt)$. Thus we see the range is:

$[-5, 5]$

What is the range of the following trigonometric equation:
$f(t) = -3\sin(2t)$?

Possible Answers:

$[-3, 3]$

$[0, 3]$

$[-2, 2]$

$[-3, 0]$

$[-3, 2]$

Correct answer:

$[-3, 3]$

Explanation:

The range of a sine or cosine function spans from the negative amplitude to the positive amplitude. The amplitude is a in the general formula:
$f(t) = a\sin(bt)$
Thus we see amplitude of our function is -3 and so the range is:

$[-3, 3]$

What is the period of 2sin(4Θ)?

Possible Answers:

None of the answers are correct

4

2

2π

$\frac{\pi}{2}$

Correct answer:

$\frac{\pi}{2}$

Explanation:

The period of sinΘ is 2Π, so we set the new angle equal to the base period of 2Π and solve for Θ.

So 4Θ = 2Π and Θ = Π/2.

A function with period P will repeat on intervals of length P, and these intervals are referred to as periods.

Find the period of

$sin\left(\pi x\right)$.

Possible Answers:

2

2π

4π

π

Correct answer:

2

Explanation:

For the function

$sin\left(Ax\right)$

the period is equal to

$$\frac{2\pi}{A}$$

in this case

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

which reduces to 2.

A function with period P will repeat on intervals of length P, and these intervals are referred to as periods.

Find the period of the function

$$\sin\left(\frac{1}{2}x\right).$$

Possible Answers:

π

4π

4

$\frac{1}{2}$

Correct answer:

4π

Explanation:

For the function

$$sin\,(Ax)$$

the period is equal to

$$\frac{2\pi}{A}$$

in this case

$$\frac{2\pi}{\frac{1}{2}} = 2\pi \cdot \frac{2}{1}$$

which reduces to 4π.

What is the period of the function $f(t) = -2\sin(4t)$?

Possible Answers:

2π

$\frac{\pi}{2}$

-2

4

$-\pi$

Correct answer:

$\frac{\pi}{2}$

Explanation:

To find the period of Sine and Cosine functions you use the formula:

$\frac{2\pi}{|b|}$ where b comes from $f(t) = a\sin(bt)$. Looking at our formula you see b is 4 so

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

What is the period of the given trigonometric function:

$c(t) = 3\sin(-2t)$ **. Leave your answer in terms of** π **, simplify all fractions.**

Possible Answers:

$-\frac{\pi}{2}$

π

$\frac{\pi}{3}$

$\frac{\pi}{2}$

$-\pi$

Correct answer:

π

Explanation:

To find the period of a sine, cosine, cosecant, or secant funciton use the formula:

$\omega = \frac{2\pi}{|b|}$ where b comes from the general formula: $c(t) = a\sin(bt)$. We see that for our equation $|b| = 2$ and so the period is π when you reduce the fraction.

Find the period of the following formula:

$f(x) = 2\sin(4\theta)$

Possible Answers:

2π

$\frac{\pi}{2}$

π

$\frac{1}{\pi}$

$\frac{2}{\pi}$

Correct answer:

$\frac{\pi}{2}$

Explanation:

To find period, simply remember the following formula:

$$\text{period} = \frac{2\pi}{B}$$

where B is the coefficient in front of x. Thus,

$$\text{period} = \frac{2\pi}{4} = \frac{\pi}{2}$$

Find the domain of the function: $y = -9\sin(5\theta - 3) - 3$

Possible Answers:

$(-\infty, \infty)$

$\left(-\frac{5}{3}, \frac{2\pi}{5}\right)$

$\left(-\frac{2\pi}{5}, \infty\right)$

$\left[-\frac{2\pi}{5}, \frac{2\pi}{5}\right]$

$\left(-\frac{2\pi}{5}, \frac{2\pi}{5}\right)$

Correct answer:

$(-\infty, \infty)$

Explanation:

The function $y = -9\sin(5\theta - 3) - 3$ is related to the parent function $y = \sin(\theta)$, which has a domain of $(-\infty. \infty)$.

The value of theta for $y = -9\sin(5\theta - 3) - 3$ has no restriction and is valid for all real numbers.

The answer is $(-\infty, \infty)$.

What is the domain of the given trigonometric function:

$z(t) = 2\sin(-2t)$

Possible Answers:

$[0, \infty]$

$[-\pi, \pi]$

$[-2, 2]$

$[-2, 0]$

$(-\infty, \infty)$

Correct answer:

$(-\infty, \infty)$

Explanation:

For both Sine and Cosine, since there are no asymptotes like Tangent and Cotangent functions, the function can take in any value for t. Thus the domain is:

$(-\infty, \infty)$

What is the period of the following tangent function?

$f(x) = 3tan(5x) + 4$

Possible Answers:

3π

$\frac{\pi}{5}$

3

$\frac{2\pi}{5}$

$\frac{\pi}{4}$

Correct answer:

$\frac{\pi}{5}$

Explanation:

The period of the tangent function defined in its standard form $f(x) = tan(x)$ has a period of π. When you multiply the argument of the trigonometric function by a constant, you shorten its period of repetition. (Think of it like this: You pass through more iterations for each value x that you use.) If you have $f(x) = tan(5x)$, this has one fifth of the period of the standard tangent function. In the equation given, none of the other details matter regarding the period. They alter other aspects of the equation (its "width," its location, etc.). The period is altered only by the parameter. Thus, the period of this function is $\frac{1}{5}$ of π, or $\frac{\pi}{5}$.

What is the period of the following tangent function?

$f(x) = 3tan(5x) + 4$

Possible Answers:

3π

$\frac{\pi}{5}$

3

$\frac{2\pi}{5}$

$\frac{\pi}{4}$

Correct answer:

$\frac{\pi}{5}$

Explanation:

The period of the tangent function defined in its standard form $f(x) = tan(x)$ has a period of π. When you multiply the argument of the trigonometric function by a constant, you shorten its period of repetition. (Think of it like this: You pass through more iterations for each value x that you use.) If you have $f(x) = tan(5x)$, this has one fifth of the period of the standard tangent function. In the equation given, none of the other details matter regarding the period. They alter other aspects of the equation (its "width," its location, etc.). The period is altered only by the parameter. Thus, the period of this function is $\frac{1}{5}$ of π, or $\frac{\pi}{5}$.

What is the period of the following trigonometric equation:
$h(t) = 4\tan(-3t)$

Possible Answers:

$-\frac{\pi}{3}$

$\frac{\pi}{2}$

4π

2π

$\frac{\pi}{3}$

Correct answer:

$\frac{\pi}{3}$

Explanation:

For tangent and cotangent the period is given by the formula:

$\omega = \frac{\pi}{|b|}$ where b comes from $h(t) = a\tan(bt)$.

Thus we see from our equation $b = -3$ and so

$\omega = \frac{\pi}{|-3|} = \frac{\pi}{3}$.

What is the period of the trigonometric function given by:
$h(t) = -4\tan(-3t)$ **?**

Possible Answers:

$\frac{\pi}{4}$

$\frac{\pi}{3}$

$-\frac{2\pi}{3}$

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

$-\frac{\pi}{3}$

Correct answer:

$\frac{\pi}{3}$

Explanation:

To find the period of a tangent funciton use the following formula:

$\omega = \frac{\pi}{|b|}$ where b comes from $f(t) = a\tan(bt)$.

thus we get that $b = -3$ so $\omega = \frac{\pi}{|3|} = \frac{\pi}{3}$

What is the period of the following trigonometric function:

$m(t) = -3\cot(-2t)$

Possible Answers:

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

$\omega = \frac{\pi}{3}$

$\omega = \pi$

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

$\omega = -\pi$

Correct answer:

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

Explanation:

To find the period of a tangent or cotangent function use the following formula:

$$\omega = \frac{\pi}{|b|}$$

from the general tirogonometric formula:

$$m(t) = a\cot(bt)$$

Since we have,

$$m(t) = -3\cot(-2t)$$

we have

$$|b| = |-2| = 2.$$

Thus we get that

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

What is domain of the function $\tan(\theta)$ from the interval $[-\pi, \pi]$?

Possible Answers:

$\left[-\pi, \frac{-\pi}{2}\right) \cup \left(\frac{\pi}{2}, \pi\right]$

$\left(-\pi, \frac{-\pi}{2}\right) \cup \left(\frac{\pi}{2}, \pi\right)$

$\left[-\pi, \frac{-\pi}{2}\right) \cup \left(\frac{-\pi}{2}, \frac{\pi}{2}\right) \cup \left(\frac{\pi}{2}, \pi\right]$

$\left[-\pi, \frac{-\pi}{2}\right] \cup \left[\frac{\pi}{2}, \pi\right]$

$\left[-\pi, \frac{-\pi}{2}\right] \cup \left[\frac{-\pi}{2}, \frac{\pi}{2}\right] \cup \left[\frac{\pi}{2}, \pi\right]$

Correct answer:

$\left[-\pi, \frac{-\pi}{2}\right) \cup \left(\frac{-\pi}{2}, \frac{\pi}{2}\right) \cup \left(\frac{\pi}{2}, \pi\right]$

Explanation:

Rewrite the tangent function in terms of cosine and sine.

$$\tan(\theta) = \frac{\sin(\theta)}{\cos(\theta)}$$

Since the denominator cannot be zero, evaluate all values of theta where $\cos(\theta) = 0$ on the interval $[-\pi, \pi]$.

$$\theta = -\frac{\pi}{2}, \frac{\pi}{2}$$

These values of theta are asymptotes and will not exist on the tangent curve. They will not be included in the domain and parentheses will be used in the interval notation.

The correct solution is $\left[-\pi, \frac{-\pi}{2}\right) \cup \left(\frac{-\pi}{2}, \frac{\pi}{2}\right) \cup \left(\frac{\pi}{2}, \pi\right]$.

Where does the domain NOT exist for $y = 2tan(x - \frac{\pi}{2}) + 3$**?**

Possible Answers:

$x = 3\pi + \frac{\pi}{2}k, \text{ for k any integer}$

$x = \pi + \pi k, \text{ for k any integer}$

$x = 2\pi + 2\pi k, \text{ for k any integer}$

$x = 2\pi + \frac{\pi}{2}k, \text{ for k any integer}$

$x = \pi + 2\pi k, \text{ for k any integer}$

Correct answer:

$x = \pi + \pi k, \text{ for k any integer}$

Explanation:

The domain for the parent function of tangent does not exist for:

$x = \frac{\pi}{2} + \pi k, \text{ for k any integer.}$

The amplitude and the vertical shift will not affect the domain or the period of the graph.

The $x - \frac{\pi}{2}$ tells us that the graph will shift right $\frac{\pi}{2}$ units.

Therefore, the asymptotes will be located at:

$x = \frac{\pi}{2} + \pi k + \frac{\pi}{2}, \text{ for k any integer.}$

The locations of the asymptotes are:

$x = \pi + \pi k, \text{ for k any integer}$

Find the domain of $y = tan(x - \frac{3\pi}{4})$. Assume k is for all real numbers.

Possible Answers:

$x = \frac{5\pi}{4} \pm \pi k$

$\text{Everywhere except: } x = \frac{5\pi}{4} \pm \pi k$

$\text{Everywhere except: } x = \frac{5\pi}{4} \pm \frac{\pi}{2} k$

$x = \frac{3\pi}{4} \pm \pi k$

$\text{Everywhere except: } x = \frac{3\pi}{4} \pm \pi k$

Correct answer:

$\text{Everywhere except: } x = \frac{5\pi}{4} \pm \pi k$

Explanation:

The domain of $tan(x)$ does not exist at $\frac{\pi}{2} \pm \pi k$, for k is an integer.

The ends of every period approaches to either positive or negative infinity. Notice that for this problem, the entire graph shifts to the right $\frac{3\pi}{4}$ units. This means that the asymptotes would also shift right by the same distance.

The asymptotes will exist at:

$x = \frac{\pi}{2} \pm \pi k + \frac{3\pi}{4} = \frac{5\pi}{4} \pm \pi k$

Therefore, the domain of $y = tan(x - \frac{3\pi}{4})$ will exist anywhere EXCEPT:

$\frac{5\pi}{4} \pm \pi k$

Find the range of: $y = 2\tan(\theta) + 15$

Possible Answers:

$(15, \infty)$

$[15, \infty)$

$[7.5, \infty)$

$(-\infty, \infty)$

$(7.5, \infty)$

Correct answer:

$(-\infty, \infty)$

Explanation:

The function $y = 2\tan(\theta) + 15$ is related to $y = \tan(\theta)$. The range of the tangent function is $(-\infty, \infty)$.

The range of $y = 2\tan(\theta) + 15$ is unaffected by the amplitude and the y-intercept. Therefore, the answer is $(-\infty, \infty)$.

What is the range of the trigonometric fuction defined by:
$f(t) = -2\tan(3t)$ **?**

Possible Answers:

$\mathbb{R}$

$\mathbb{Z}$

$\mathbb{N}$

$[-2, 2]$

$[-1, 1]$

Correct answer:

$\mathbb{R}$

Explanation:

For tangent and cotangent functions, the range is always all real numbers.

What is the range of the given trigonometric function:

$n(t) = 4\cot(2t)$

Possible Answers:

$[-4, 0]$

$[-4, 4]$

$(-\infty, \infty)$

$[0, 2]$

$[-2, 2]$

Correct answer:

$(-\infty, \infty)$

Explanation:

The range of a function is every value that the funciton's results take. For tangent and cotangent, the function spans from $(-\infty, \infty)$ and so the range is:

$(-\infty, \infty)$

Which of the following equations represents a tangent function with a period that is 0.25π radians?

Possible Answers:

$f(x) = 4tan(x) - 15$

$f(x) = 3tan(4x) - 15$

$f(x) = tan(0.25x)$

$f(x) = 4tan(x) - 4$

$f(x) = 0.25tan(x)$

Correct answer:

$f(x) = 3tan(4x) - 15$

Explanation:

The standard period of a tangent function is π radians. In other words, it completes its entire cycle of values in that many radians. To alter the period of the function, you need to alter the value of the parameter of the trigonometric function. You multiply the parameter by the number of periods that would complete in π radians. With a period of 0.25π, you are quadrupling your method. Therefore, you will have a function of the form:

$f(x) = a * tan(4x) + b$

Since a and b do not alter the period, these can be anything.

Therefore, among your options, $f(x) = 3tan(4x) - 15$ is correct.