

Pre-Calculus II: Graded Worksheet: Week #1

Due on April 9, 2022 at 11:59pm

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Problem 1

Find a positive angle co-terminal with (and not equal to) $\frac{4\pi}{7}$. The units of answer should be *radians*.
Provide an exact value. [2 points]

Solution 1

The definition of Co-Terminal is: **Two angles with the same terminal side.**

Now, to get two angles with the same terminal side, you have to add 360° to it. Hence, you need to make the other angle do a full rotation around, but still land back in the same spot. Since we have to do this in radians, we'll use the following conversion factor: $2\pi = 360^\circ$. Simply enough, add 2π to $\frac{4\pi}{7}$, and that will be your co-terminal angle:

$$\begin{aligned}\frac{4\pi}{7} + 2\pi &= \frac{4\pi}{7} + \frac{2\pi}{1} \\ &= \frac{4\pi}{7} + \frac{14\pi}{7} \\ &= \boxed{\frac{18\pi}{7}}.\end{aligned}$$

So, here are your co-terminal angles:

$$\frac{4\pi}{7} \quad \frac{18\pi}{7}.$$

Problem 2

Find a negative angle co-terminal with (and not equal to) 85° . (The units if your answer should be *degrees*.)
Provide an exact value. [2 points]

Solution 2

To find a negative co-terminal angle, we subtract 360° because a co-terminal angle are two angles that share the same terminal side.

$$85^\circ - 360^\circ = \boxed{-275^\circ}$$

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Problem 3

In the table below, some angles are given in both degrees and radians. Complete the table by filling in the six missing values. You don't need to show any work. **[3 points]**

θ (degrees)	0°	30°		60°		270°		360°
θ (radians)	0		$\frac{\pi}{4}$		$\frac{4\pi}{3}$		$\frac{11\pi}{6}$	2π

Table 1: Degrees into Radians

Solution 3

θ (degrees)	0°	30°	45°	60°	240°	270°	330°	360°
θ (radians)	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{4\pi}{3}$	$\frac{3\pi}{2}$	$\frac{11\pi}{6}$	2π

Table 2: Complete Degrees into Radians

Problem 4

Convert the angle $\frac{2\pi}{5}$ (in radians) into degrees. Provide an exact value. [2 points]

Solution 4

To do this, we need a conversion factor. I'm going to use: $\pi = 180^\circ$:

$$\begin{aligned}\frac{2\pi}{5} \times \frac{180^\circ}{\pi} &= \frac{2}{5} \times 180^\circ \\ &= \frac{2 \times 180^\circ}{5} \\ &= \boxed{72^\circ}.\end{aligned}$$

Problem 5

What is the length of the arc spanned by an angle of 36° in a circle of radius 15 feet? Provide an exact value. [3 points]

Solution 5

To answer this problem, we need to convert the degrees into radians first:

$$36^\circ \times \frac{\pi}{180^\circ} = \frac{\pi}{5} \text{ rad.}$$

Now, we can use the formula:

$$\begin{aligned} s &= r \times |\theta| \\ &= 15 \times \frac{\pi}{5} \\ &= \boxed{3\pi}. \end{aligned}$$

Problem 6

List the period, midline, and amplitude of the function $y = g(t)$. Note that the following points are on the graph: $(-\frac{\pi}{4}, 2)$, $(\frac{\pi}{12}, -10)$, $(\frac{5\pi}{12}, 2)$ and $(\frac{3\pi}{4}, -10)$. [3 points]

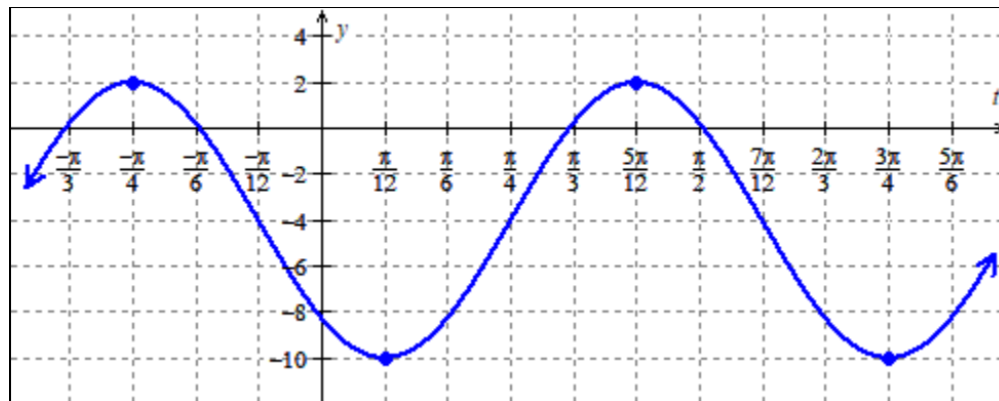


Figure 1

Solution 6

Period

I like to think of the period as the distance between either the maximum value and the minimum value. So, just subtract the maximum value from the one next to it, or do it with the minimum value. (I'm using the maximum):

$$\frac{5\pi}{12} - (-\frac{\pi}{4}) = \frac{2\pi}{3}.$$

Midline

The formula for finding the midline is:

$$\begin{aligned} y &= \frac{f_{\max} + f_{\min}}{2} \\ &= \frac{2 + (-10)}{2} \\ &= \frac{8}{2} \\ &= \boxed{4} \end{aligned}$$

Amplitude

The amplitude is the distance between the maximum value and the midline value or the function's minimum value and the midline value.

From the graph, we can see that it takes 6 units to go from the minimum and maximum value to the midline.