Workshop 3 - Chapter 6

Solutions

November 14, 2006

1. Find approximations to two decimal places for the coordinates of the point Z in the figure below. [1]

   See the figure on your worksheet.

   Solution. $(r\cos\theta, r\sin\theta) = (4.94, -15.22)$. □

2. What angle in radians corresponds to the given number of rotations around the unit circle?

   Solution.

   (a) 4 revolutions $= 8\pi$

   (b) -6 revolutions $= -12\pi$

   □

3. If you start at the point $(0, 1)$ on the unit circle and travel counterclockwise through a given angle (in radians), in which quadrant will you be?

   Solution.

   (a) 2 is in quadrant II.

   (b) 6 is in quadrant IV.

   □

4. Without a calculator, match the graphs to the following functions:

   (a) $y = \sin(2t)$
   Solution. This is graph $C(t)$. □

   (b) $y = (\sin t) + 2$
   Solution. This is graph $D(t)$. □

   (c) $y = 2\sin t$
   Solution. This is graph $A(t)$. □

(d) $y = \sin(t + 2)$

Solution. This is graph $B(t)$. □

5. State the amplitude, period, and horizontal shifts for the function. Without a calculator, graph the function on the given interval. [5]

$$y = \cos(2t + \frac{\pi}{4}), \quad -\pi \leq 5 \leq 2\pi$$

Solution. The amplitude is 1. The period is π. the Horizontal shift is $\frac{\pi}{4}$ units to the left. □

6. Find exact values without a calculator.

Solution.

(a) $\cos 540^\circ = -1$

(b) $\sin \frac{7\pi}{6} = \frac{-1}{2}$

(c) $\sin(\frac{-2\pi}{3}) = \frac{-\sqrt{3}}{2}$

□

7. A weight is suspended from the ceiling by a spring. The figure below shows a graph of the distance from the ceiling to the weight, $d = f(t)$, as a function of time. Find a possible formula for $f(t)$.

Solution. $y = 4\sin(2\pi t) + 10$. □

8. Find the exact solution for x where $0 \leq x \leq 2\pi$ for $2\cos x = 1$. [2]

Solution. $x = \frac{\pi}{3}, \frac{5\pi}{3}$ □

9. If $\cos\alpha = \frac{-\sqrt{3}}{5}$ and α is in the third quadrant, find exact values for $\sin\alpha$ and $\tan\alpha$. [2]

Solution. $\sin\alpha = \frac{-\sqrt{22}}{5}$ and $\tan\alpha = \frac{\sqrt{66}}{3}$. □