ANSWERS

Math 36

Test 2 (Ch. 3 & 4) Pretest Addendum
Sections 4.3 and 4.5, Identify the Function

Identify the function, that fits the graph, either $f(x) = A\sin(Bx)$ or $f(x) = A\cos(Bx)$.

Read these guidlines first:

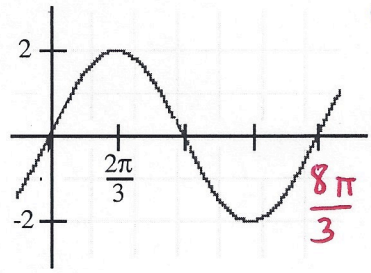
a) It is easy to recognize the value of A, the amplitude, but we must also recognize whether it is positive or negative (reflected graph).

b) It is fairly easy to recognize the function itself, either sine or cosine. If the y-intercept is (0, 0), the function is sine; if it is a maximum or minimum, the function is cosine.

c) the value of B is the most challenging to find. We use this formula: $B = \frac{2\pi}{\text{period}}$.

For these graphs, the period is at the fourth marked x-value. If this value is not already given, then we must multiply appropriately to find it; then we can find B.

1.



a) $A = +2$: amplitude = 2 and it is not a reflected graph.

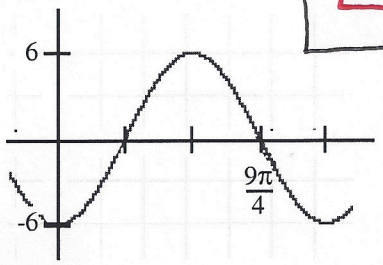
b) It is a sine function.

c) we are given the $\frac{1}{4}$-period $\frac{2\pi}{3}$. multiply this by 4 to find the full period:

$4 \cdot \frac{2\pi}{3} = \frac{8\pi}{3} \rightarrow B = \frac{2\pi}{\frac{8\pi}{3}} = \frac{2\pi}{1} \cdot \frac{3}{8\pi} = \frac{3}{4}$

1. $f(x) = 2\sin\left(\frac{3}{4}x\right)$

2.



a) amplitude is 6 and the graph is reflected: $A = -6$

b) It is cosine

c) we are given the $\frac{3}{4}$-per. multiply this by $\frac{4}{3}$ to find the full period:

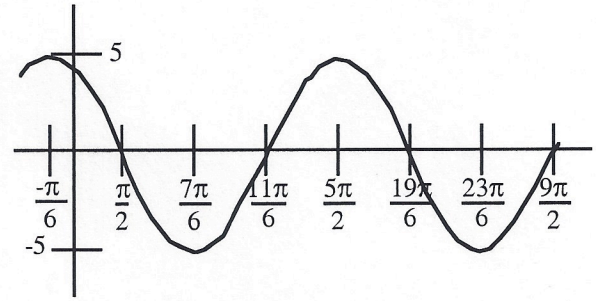
$\frac{4}{3} \cdot \frac{9\pi}{4} = 3\pi \rightarrow B = \frac{2\pi}{3\pi} = \frac{2}{3}$

2. $f(x) = -6\cos\left(\frac{2}{3}x\right)$

Sec. 4.5: when the graph is shifted horizontally, we can't assume that any of the x-axis values is the period. Instead, we must find the difference (subtraction) between (i) two consecutive maxima, (ii) two consecutive minima, or (iii) non-consecutive zeros.

Given the graph **A**, at right, answer each of these:

A



3. What is the period of this function?

Consecutive maxima:

$\frac{5\pi}{2} - \left(\frac{-\pi}{6}\right)$

$= \frac{15\pi}{6} + \frac{\pi}{6}$

$= \frac{16\pi}{6} = \frac{8\pi}{3}$

consecutive minima:

$\frac{23\pi}{6} - \frac{7\pi}{6}$

$= \frac{16\pi}{6}$

$= \frac{8\pi}{3}$

non-consecutive zeros:

$\frac{19\pi}{6} - \frac{\pi}{2}$

$= \frac{19\pi}{6} - \frac{3\pi}{6}$

$= \frac{16\pi}{6} = \frac{8\pi}{3}$

4. What is the value of B?

clearly, no matter which difference we use, the period is $\frac{8\pi}{3}$. use this to find B.

$B = \frac{2\pi}{\frac{8\pi}{3}} = \frac{2\pi}{1} \cdot \frac{3}{8\pi} = \frac{6\pi}{8\pi} = \frac{3}{4}$

Given graph **A**, above, identify the function as it starts at each of the following x-values; use either $f(x) = A\sin(Bx + C)$ or $f(x) = A\cos(Bx + C)$.

a) The value of A is either +5 or -5, depending on the function.

b) The value of B is now known: $B = \frac{3}{4}$

c) the function depends on the value of the given x, in #5 and #6, at right.

d) To find C, we set the argument = 0 and replace the values of x and B and solve to find C. start with $Bx + C = 0$

5. $x = -\frac{\pi}{6}$

at $x = -\frac{\pi}{6}$, this is a positive cosine function shifted to the left.

a) $A = +5$

b) $B = \frac{3}{4}$

c) cosine

d) $Bx + C = 0$

$\frac{3}{4} \cdot -\frac{\pi}{6} + C = 0$

$-\frac{\pi}{8} + C = 0$

$C = \frac{\pi}{8}$

$f(x) = 5\cos\left(\frac{3}{4}x + \frac{\pi}{8}\right)$

6. $x = \frac{\pi}{2}$

At $x = \frac{\pi}{2}$, this is a negative sine function shifted to the right.

a) $A = -5$ b) $B = \frac{3}{4}$ c) sine

d) $Bx + C = 0$

$\frac{3}{4} \cdot \frac{\pi}{2} + C = 0$

$\frac{3\pi}{8} + C = 0$

$C = -\frac{3\pi}{8}$

$f(x) = -5\sin\left(\frac{3}{4}x - \frac{3\pi}{8}\right)$