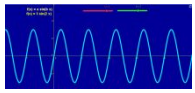
# Student activity on graphs of $y = a\cos bx$ 

***Use in connection with the following file*** $f(x) = a\cos bx$ ***(angle measure in radians) on the Student's CD.***

1. Drag the sliders so that a=1 and *b*=1.
   Write down the period and range of $f(x) = \cos x$
   (i) Period =
   (ii) Range =

2. Drag **slider a** to vary the value of *a.* What is the effect of changing variable *a* on the function $f(x) = a\cos bx$ ?

3. Drag the **slider a** to vary the value of *a*, keeping *b* =1 and fill in the following table.

| *a* | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Range of f(x) | | | | |

4. Drag the **slider a** to vary the value of *a*, keeping *b* =1 and fill in the following table.

| *a* | -1 | -2 | -3 | -4 |
|---|---|---|---|---|
| Range of f(x) | | | | |

You may wish to check your answer to Q2 having answered Q3 and Q4.

5. Drag the **slider b** to vary the value of *b*, keeping *a* constant. What is the effect of varying *b* on the function $f(x) = a\cos bx$ ?

6. Drag the **slider b** to vary the value of *b*, keeping *a* constant at e.g. *a* =2 and fill in the following table.

| *b* | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Period of f(x) | | | | |

7. Drag the **slider b** to vary the value of *b*, keeping *a* constant at e.g. *a* =2 and fill in the following table.

| *b* | -1 | -2 | -3 | -4 |
|---|---|---|---|---|
| Period of f(x) | | | | |
| | | | | |

8. Fill in the table below:

| Function | Range | Period |
|---|---|---|
| $y = 3\cos x$ | | |
| $y = \cos 4x$ | | |
| $y = 5\cos 3x$ | | |
| $y = 2\cos 2x$ | | |

9. Given $y = a\cos bx$, write down the range and period of this function in terms of *a* and *b*.

   Range =

   Period =

10. Fill in the last column in the table below, in the form $y = a\cos bx$, for *a* and *b*, given the range and period of each function

| Range | Period | $y = a\cos bx$ |
|---|---|---|
| $[-1,1]$ | $\pi$ | |
| $[-3,3]$ | $\frac{2\pi}{3}$ | |
| $[-5,5]$ | $\pi$ | |
| $[-4,4]$ | $\frac{\pi}{4}$ | |

11. Given that the period of $f(x) = a\cos bx$ is $\pi$ radians and the range is $[-2,2]$ sketch a graph of the function on the graph paper provided below for the domain $0 \le x \le 4\pi$