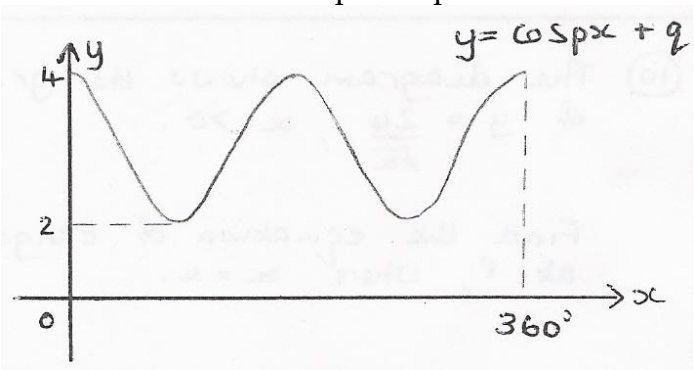
Duncanrig Secondary School – Mathematics Department

HIGHER MATHS HOME EXERCISE 6

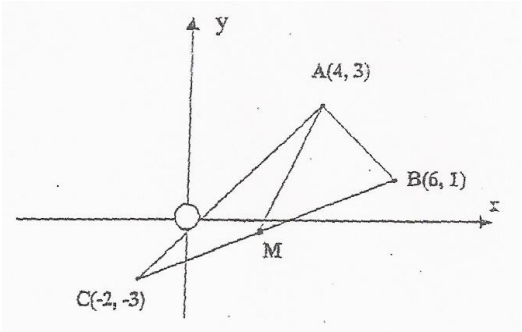
1. The graph shown in the diagram has equation of the form y = cospx + q.
What are the values of p and q?



2. Find the equation of the line through the point (–1, 4) which is parallel to the line with equation $3x - y + 2 = 0$.

3. What is the solution to $6 - x - x^2 < 0$?

4. A triangle ABC has vertices A(4, 3), B(6,1) and C(–2, –3) as shown in the diagram. Find the equation of AM, the median from A.



5. A function f is defined by the formula $f(x) = 2x^3 - 7x^2 + 9$ where x is a real number.
(a) Show that (x – 3) is a factor of f(x), and hence factorise f(x) fully.
(b) Find the coordinates of the points where the curve with equation y = f(x) crosses the x- and y- axes.

6. Find the value of k which results in the equation $kx^2 + 2kx - 1 = 0$ having equal roots, given that $k \neq 0$?

PTO

7. Triangle PQR has vertices (2,3) , (-3,-2) and (3,0) respectively.

(a) Find the equations of the perpendicular bisectors of sides RQ and PR .

(b) Find the coordinates of the point T , the point of intersection of these two bisectors.

(c) Show that P , T and Q are collinear.

8. When $f(x) = 2x^4 - x^3 + px^2 + qx + 12$ is divided by (x-2), the remainder is 114. One factor of f(x) is (x+ 1). Find p and q.

9. Solve the following trigonometric equations,

(a) $3\cos 3x^\circ - 1 = 0$, for $0 \le x < 180^\circ$

(b) $\sqrt{6}\sin 2\theta - \sqrt{3} = 0$, for $0 \le \theta < 2\pi$

10. Show that the line $y = 2x + 1$ does not intersect the parabola $y = x^2 + 3x + 4$.