

Higher Ink Exercise Block 1 - Polynomials

Calculators should only be used when necessary

1. (a) (i) Show that $(x-2)$ is a factor of $f(x) = 2x^3 - 3x^2 - 3x + 2$. (3)

(ii) Hence factorise $f(x)$ fully. (2)

(b) Solve $2(x^3 + 1) = 3x(x + 1)$. (3)

2. (a) Given that $(x + 2)$ is a factor of $2x^3 + x^2 + kx + 2$, find the value of k . (4)

(b) Hence solve the equation $2x^3 + x^2 + kx + 2 = 0$ when k takes this value. (3)

3. $f(x) = 2x^3 + px^2 + qx + 4$.

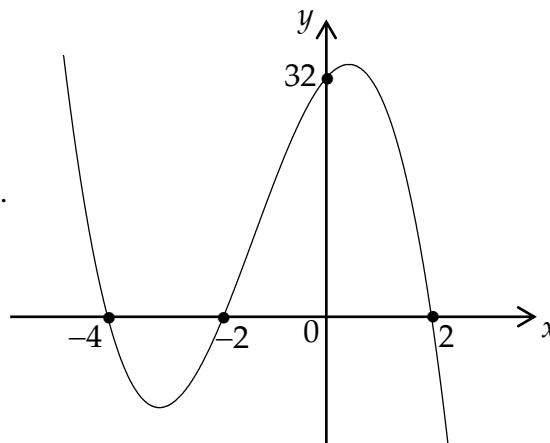
Given that $(x - 2)$ is a factor of $f(x)$, and the remainder when $f(x)$ is divided by $(x + 1)$ is 9, find the values of p and q . (7)

4. (a) Show that $x = 2$ is a solution to the equation $2x^3 + kx^2 - 2kx - 16 = 0$. (3)

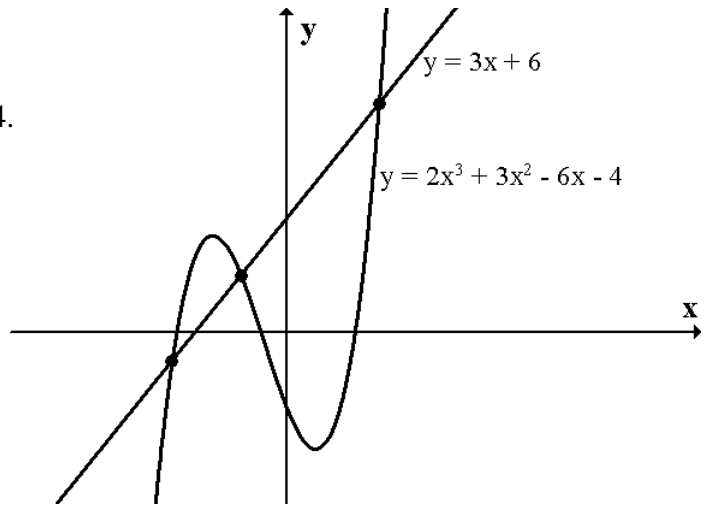
(b) Hence find the range of values of k for which all the roots of this equation are real. (4)

5. The diagram shows part of the graph of a cubic.

What is the equation of this graph? (2)



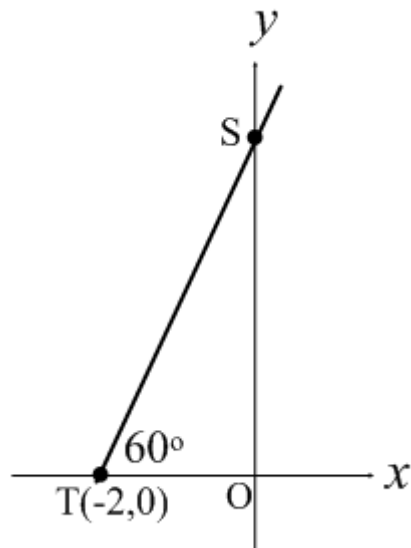
6. A curve has equation $y = 2x^3 + 3x^2 - 6x - 4$.



- (a) Show that the line $y = 3x + 6$ intersects this curve at the point $(2, 12)$. (4)
- (b) Find the other points of intersection of the curve and the line $y = 3x + 6$. (4)

7. With reference to a suitable set of coordinate axes, A and B are the points $(-2, 1, -1)$ and $(1, 3, 2)$ respectively. A, B and C are collinear points and C is positioned such that $BC = 2AB$. Find the coordinates of C. (3)

8. Find the equation of the line ST, where T is the point $(-2, 0)$ and angle STO is 60° (3)



TOTAL = 45 MARKS