CNHS Higher HW Solutions

Week 7 [22/03/19]

Qs 91 – 105

91. Find the two values of *k* for which the quadratic equation $x^2 + (k-3)x + k = 0$ has equal roots.

$(k-3)^2 - 4x1xk = 0$….**k = – 10 , k = 1**

92. Find the quotient and remainder when $2x^4 - 3x^3 - 3x + 1$ is divided by $(x-2)$.

r = 3

93. $f(x) = 6x^3 - 5x^2 - 17x + 6$

(a) Show that $(x-2)$ is a factor of $f(x)$.

(b) Hence express $f(x)$ in its fully factorised form.

(x - 2)(2x + 3)(3x - 1)

94. Factorise fully $f(x) = x^3 - 4x^2 - 7x + 10$.

(x - 5)(x - 1)(x + 2)

95. Given that $(x+1)$ is a factor of $2x^3 + 3x^2 + kx - 6$, find the value of *k*.

k = - 5

96. Show that $(x-2)$ is a factor of $f(x) = x^3 - 6x^2 + 3x + 10$ and hence factorise $f(x)$ fully.

(x – 2)(x – 5)(x + 1)

97. A parabola crosses the *x*-axis at the points (2, 0) and (5, 0).
Given that the parabola also passes through the point (4, 4), find the equation of the parabola.
[You may find it helpful to draw a sketch of the parabola.]

y = - 2 (x – 2)(x – 5)

98. (a) Show that $x = 1$ is a root of $x^3 + 8x^2 + 11x - 20 = 0$.

(b) Hence factorise $x^3 + 8x^2 + 11x - 20$ fully and solve the equation $x^3 + 8x^2 + 11x - 20 = 0$.

x = - 5, x = - 4, x = 1

99. Find the quotient and remainder when $3x^4 - 4x^2 + 2x - 3$ is divided by $(x - 2)$.

$(3x^3 + 6x^2 + 8x + 18)$ r 33

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

(a) Given that $(x - 2)$ is a factor of $f(x)$, write down an equation in p and q.

(b) The remainder when $f(x)$ is divided by $(x + 1)$ is 9.
Write down a second equation in p and q.

(c) Find the values of p and q.

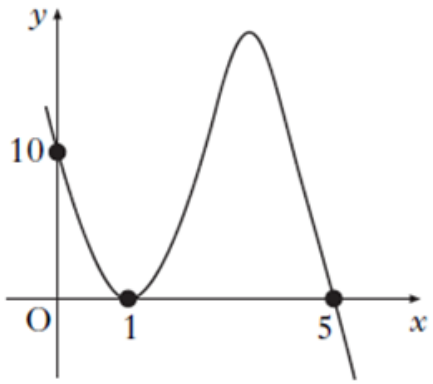
(a) 4p + 2q = - 20 (b) p – q = 7 (c) p = - 1, q = - 8

101. For what value of k does the quadratic equation $kx^2 + (2k + 1)x + k = 0$ have equal roots?

[*Hint*: remember that $b^2 - 4ac = 0$ for equal roots]

k = $\frac{-1}{4}$

102. The graph of a cubic function is shown below.



Find the equation of the graph.

y = k (x-a)(x-b)(x-c)….**y = - 2(x - 1)^2(x - 5)**

103. Solve each quadratic inequality by first sketching the graph of the quadratic.

(a) $x^2 - 2x - 15 < 0$ (b) $6 - x - x^2 < 0$

(a) – 3 < x < 5 **(b) x < - 3 , x > 2**

104. For the cubic polynomial $f(x) = 6x^3 + 7x^2 + ax + b$,

- $(x+1)$ is a factor of $f(x)$
- the remainder when $f(x)$ is divided by $(x-2)$ is 72.

Find the values of *a* and *b*.

a = - 25 **b = - 26**

105. Find: (a) $\int (6x^2 + 2x + 3)dx$ (b) $\int \frac{8}{x^3}dx$ (c) $\int 6\sqrt{x}dx$

(a) $2x^3 + x^2 + 3x + c$ **(b) $\frac{-4}{x^2} + c$** **(c) $4x^{\frac{3}{2}} + c$**