



Name: _____ () Class: _____ Date: _____

Topical Revision Worksheet 4

Topic: Polynomials

Question 1 [2008 EOY, Q11]	marks
(i) (a) Show that $2x+1$ is a factor of $2x^3+x^2-8x-4$. Answer: Sub $x = -\frac{1}{2}$: 0	[1]
(i) (b) Solve for x if $2x^3+x^2-8x-4=0$. Answer: $x = -\frac{1}{2}$ or ± 2	[4]
(ii) The expression $4x^3-20x^2+px+12$ leaves a remainder of $-10x+q$ when divided by $2x^2-3x+1$. Find the values of p and q. Answer: $q = 19$ and $p = 13$	[5]
Question 2 [2010 EOY, Q12]	marks
(a) Solve for x when $6x^3+7x^2-14x-8=0$. Answer: $x = -2$ or $x = -\frac{1}{2}$ or $\frac{4}{3}$	[3]
(b) It is given that $12x^3+ax^2+15x+b \equiv (2x^2+5x-3)Q(x)+158x-83$ where $Q(x)$ is a polynomial. (i) State the degree of $Q(x)$. Answer: Degree of $Q(x)$ is 1 as it is linear	[1]
(ii) Find the values of a and b. Answer: $a = -20$ and $b = -8$	[3]
Question 3 [2011 EOY, Q11]	marks
(i) Given that $f(x) = x^3 - 2\sqrt{3}x^2 + 2(A-x)$ has a factor $(x+\sqrt{2})$ and the other two roots of the equation $f(x)=0$ are $\sqrt{2}$ and k. Find the value of A and of k. Answer: $A = 2\sqrt{3}$, $k = 2\sqrt{3}$	[4]
(ii) Solve the equation $3x^3 = 2x^2 + 7x + 2$. Answer: $x = 2, -\frac{1}{3}, -1$	[4]

Question 4 [2012 EOY, Q8]	marks
The cubic polynomial $f(x)$ is such that the coefficient of x^3 is 2 and the roots of $f(x)=0$ are $-1, 2k$ and k^2. It is given that $f(x)$ has a remainder of 168 when divided by $x-2$. (i) Show that $k^3 - k^2 - 2k - 12 = 0$. Answer: $f(x) = 2(x+1)(x-2k)(x-k^2)$ $f(2) = 2(3)(2-2k)(2-k^2) = 168$	[3]
(ii) Hence find a value for k and show that there are no other real values of k which satisfy this equation. Answer: By trial and error, $k = 3$ $k^2 + 2k + 4 = (k+1)^2 + 3 > 0$	[4]
(iii) Use your answer to part (ii) to solve the equation $12e^{-3x} + 2e^{-2x} + e^{-x} - 1 = 0$. Answer: $x = \ln 3$	[2]
Question 5 [2013 EOY, Q5]	marks
Given that $x^2 + x - 6$ is a factor of $2x^4 + x^3 - ax^2 + bx + a + b = 1$, find the value of a and of b. Answer: $a = 16$ and $b = 3$	[4]
Question 6 [2014 EOY, Q7]	Marks
(i) Solve the equation $2x^3 = 5x^2 - x - 2$. Answer: $x = 1, -\frac{1}{2}$ or 2	[4]
(ii) Find the remainder when $(x-3)^{200} - (x-2)^{100}$ is divided by $x^2 - 5x + 6$. Answer: $-2x + 5$.	[4]
Question 7 [2015 EOY, Q9]	Marks
(i) Solve for x when $2(e^{3x} + 2) = e^x(7e^x + 5)$. Answer: $x = -\ln 2$ or $\ln 4$	[5]
(ii) Given that $f(x) = 8x^4 + px^3 - 30x^2 + x + q$, where p and q are unknown constants, leaves a remainder of 2 when divided by $x-2$ and a remainder of 9 when divided by $2x+3$, find the values of p and q and hence find the remainder when $f(x)$ is divided by $2x^2 - x - 6$. Answer: $p = -4$ and $q = 24$, $6 - 2x$	[6]