MHF 4U1 Name: _____

More Challenging Questions

1. When $x^3 - kx^2 - 10kx + 25$ is divided by x-2, the remainder is 9. Find the value of k.

2. If $2x^3 - 9x^2 + 13x + k$ is divisible by 2x – 1, then it is also divisible by
(A) x - 2 (B) x – 1 (C) $x + \frac{1}{2}$ (D) $x - \frac{1}{2}$ (E) 2x + 1

3. If one root of the equation $x^3 - 5x^2 + 5x - 1 = 0$ is $2 - \sqrt{3}$, then find the sum of the other two roots.

4. If m, n, and 1 are non-zero roots of the equation $x^3 - mx^2 + nx - 1 = 0$, then find the sum of the roots .

5. The remainder when f(x) = $x^5 - 2x^4 + ax^3 - x^2 + bx - 2$ is divided by x+1 is –7. When f(x) is divided by x - 2, the remainder is 32. Determine the remainder when f(x) is divided by x – 1.

6. (a) For the polynomial f(x) = $ax^3 + bx^2 + cx + d$, the sum of the coefficients is equal to zero. (i.e. a + b + c + d = 0).
Show that the polynomial is divisible by x – 1.
(b) Solve $2x^3 - 3x^2 + 1 = 0$.
(c) Find the sum of the coefficients in the expansion of
g(x) = (x + 2)(x² + 2x + 1)²

7. Find a and b so that the quartic function f(x) = $a^2x^4 + 3x^3 + b^2x^2 + 4abx + 4ab$ leaves a remainder of 10 on division by x + 1 and a remainder of 20 on division by x.

8. An unknown polynomial f(x) of degree 37 yields a remainder of 1 when divided by x – 1, a remainder of 3 when divided by x – 3, a remainder of 21 when divided by x – 5.
Find the remainder when f(x) is divided by (x – 1)(x – 3)(x – 5).

9. If $ax^3 + bx + c$, with $a \neq 0$, $c \neq 0$, has a factor of the form $x^2 + px + 1$, show that $a^2 - c^2 = ab$.

10. Given that the cubic equation $x^3 - 3x^2 + ax + b = 0$ has rational coefficients and has the root $-1 + i\sqrt{3}$, determine the values of a and b.

Answers: 1) 1 2) D 3) $3 + \sqrt{3}$ 4) –1 5) –3 6) b) 1, 1, $\frac{-1}{2}$ c) 48 7) 4 possible solutions 8) $2x^2 - 7x + 6$
10) a= -6, b= -20