

EXERCISE 1: (Remainder & Factor theorems)

1. For each of the following, determine the remainder if
 - 1.1 $f(x) = x^3 + x^2 - 1$ is divided by $2x + 3$
 - 1.2 $g(x) = x^3 + 4x^2 - 11x - 31$ is divided by $x + 5$
 - 1.3 $p(x) = 2x^3 - x^2 + 3x - 8$ is divided by $s(x) = x - 2$
 - 1.4 $h(x) = 8x^4 - 4x^2 - 5$ is divided by $(2x - 1)$
2. Given: $f(x) = x^3 - 2x^2 - 4x + 3$
 - 2.1 Use the remainder theorem and determine the remainder if $f(x)$ is divided by
 - 2.1.1 $x + 1$
 - 2.1.2 $x - 3$
 - 2.2 What may be concluded from the previous two calculations?
3. Prove that $x + 1$ is a factor of $f(x) = x^3 + 5x^2 - 17x - 21$.
4. Given: $g(x) = x^3 + px + 6$
 Determine the value of p if $(2 - x)$ is a factor of g .
5. Given: $p(x) = x^3 + ax^2 + bx + 6$
 - 5.1 If $x - 2$ is a factor of p , show that $2a + b = -7$.
 - 5.2 Hence, determine the values of a and b if it is further given that the remainder is 48 when p is divided by $x - 3$.

Your knowledge of the Remainder and Factor theorems will mainly be used to factorise cubic functions, in order to determine the x – intercepts of the graphs.