

Polynomials

* Quick recap of what it means:
{Knowledge from previous grades}

→ degree of polynomial: (highest power of variable)

- $x^1 + 2$ (1st degree)
- $x^2 - 3x + 1$ (2nd)
- $x^3 - 4x^2 + x - 2$ (3rd)

* Remember!!

- roots/zeros → are the x -intercepts.

In Gr 12 we will do Remainder & Factor theorem with polynomials.
{these two theorems will help us
once we start with Cubic functions
as well as factorizing cubic polynomials. }

*The Remainder Theorem:

* Some pre-knowledge before we start : (to make theory "easier")

$$\underset{\substack{\uparrow \\ \text{dividend}}}{7} \div \underset{\substack{\uparrow \\ \text{divisor}}}{2} = \underset{\substack{\downarrow \\ \text{quotient}}}{3} \text{ remainder } \underset{\substack{\downarrow \\ \text{remainder}}}{1}$$

$$\therefore (2 \times 3 + 1) = 7$$

We can divide polynomials in the same way. Using different methods [But more of this later....]

The remainder Theorem states:

- if we divide polynomial $f(x)$ by $(ax - b)$ until remainder doesn't contain x , then remainder is $f(\frac{b}{a})$.

Ok, so enough of the super technical math jargon!!

Let's make this super easy!

→ Remainder Theorem: * Short way to see what remainder will be
(Can be asked as 2 Types of questions.)

- 1) What is remainder?
- 2) If remainder given, find variable in expression/equation

Examples:

- 1) Find the remainder if;
 $f(x) = 5x^3 + 5x^2 + 3x + 2$ is divided
by $m(x) = (x + 2)$

Steps:

- set divisor = 0
- solve for x
- subs x^{above} into $f(x)$
- 'answer' is the remainder.

- 2) Find the remainder if $f(x) = 4x^2 - 2$ is
divided by $g(x) = 3x - 6$

3) Find the remainder if $f(x)$ is divided by $g(x)$ and:

$$f(x) = 2x^2 - 3x + 2$$

$$g(x) = 2x - 1$$

4) When $f(x) = -x^4 + 2x^2 + kx + 5$ is divided by $x - 2$ the remainder is 1. find the value of k .

5) Determine the value of m if $x+2$ divides into $f(x)=3x^3+kx^2-2x+6$ and gives a remainder of 0.

6) if $(x+5)$ is divided into $q(x)=ax^3+bx-6$, it gives a remainder of -96 , and if $(x-1)$ is divided into $q(x)$ it gives a remainder of -12 .
Find the values of a and b .