64 - 65

Evaluating Polynomials

Monomial: a number, variable, or product of numbers and variables

Polynomial: a monomial or sum of monomials

The exponents must all be whole numbers.

Polynomial function:

$$f(x) = a_n x^n + a_{n-1}x^{n-1} + \cdots + a_1 x + a_0$$

$f(x) = 5x^4 - 2x^3 + 6x - 7$

Leading coefficient 5

Degree 4^{th}

Constant Term -7

Type

1 - Linear

2 - Quadratic

3 - Cubic

4 - Quartic

The coefficients must all be real numbers.

Decide whether the function is a polynomial function. If so, write it in standard form and state its degree, type, and leading coefficient.

$h(x) = 21x^3 - \frac{3}{17}x^2 + 8$:

Polynomial
Degree = 3/Cubic
L.C. = 21
Constant = 8

$f(x) =$ [redacted]

Not a polynomial because of the "x" as an exponent on the -5.

$f(x) =$ [redacted]

Degree=2/Quadratic
L.C. = 4
Constant = 3

$f(x) = 8x^3 + 7x^{-4} - 4$

No because of the "-4" as an exponent on the 7x.

Use direct substitution to evaluate $f(x) = 2x^4 - 5x^3 - 8x + 3$ when $x = 4$.

Evaluate when $x=4$: $2x^4 - 5x^3 - 8x + 3$

$2(4)^4 - 5(4)^3 - 8(4) + 3$

$2(256) - 5(64) - 8(4) + 3$

$512 - 320 - 32 + 3$

163

Synthetic substitution:

Evaluate if x = 3

$f(x) = 5x^3 + 3x^2 - 2x + 7$

3	5	3	-2	7
	↓	15	54	156
	5	18	52	163

Use synthetic substitution to evaluate $f(x) = 2x^4 - 3x^3 - 8x + 5$ when $x = 2$.

$2x^4 - 3x^3 - 8x + 5 \quad x = 2$

2	2	-3	0	-8	5
	↓	4	2	4	-8
	2	1	2	-4	-3

Evaluate: $2x^2 + 3x - 5x^4 + 7$ when $x = 1$

$-5x^4 + 0x^3 + 2x^2 + 3x + 7$

1	-5	0	2	3	7
	↓	-5	-5	-3	0
	-5	-5	-3	0	7