Online HW 2: Polynomials

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Polynomials

Problems about polynomials.

Problem 1 *Explain what is meant by a polynomial in a variable x.*

Problem 2 *Indicate the degree of the following polynomials. For expressions that are not polynomials, type NP.*

$3x-3$	?
$\sqrt{x}$	?
x^{15}	?
$1-x-x^2$	?
2^x+x^2	?
$(1+x)(2+x)x$	?
56	?
$2/x$	?

Problem 3 *Given:*

$$3x^7-x^5+x^4-16x^3+27=a_7x^7+a_6x^6+a_5x^5+a_4x^4+a_3x^3+a_2x^2+a_1x^1+a_0$$

Find a_0, a_1, a_2, a_3, a_4, a_5, a_6, a_7.

Answer: $a_0=$?, $a_1=$?, $a_2=$?, $a_3=$?, $a_4=$?, $a_5=$?, $a_6=$?, $a_7=$?.

Problem 4 *Given:*

$$6x^5+a_4x^4-x^2+a_0=a_5x^5-24x^4+a_3x^3+a_2x^2-5$$

Find a_0, a_1, a_2, a_3, a_4, a_5.

Answers: $a_0=$?, $a_1=$?, $a_2=$?, $a_3=$?, $a_4=$?, $a_5=$?.

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Problem 5 *Is it true that polynomials are equal if and only if their coefficients are equal? Explain your reasoning.*

Problem 6 *Is it true that numbers are equal if and only if their digits are equal? Explain your reasoning.*

Problem 7 *Explain how to add two polynomials. Explain, in particular, how "collecting like terms" is an application of the properties of arithmetic.*

Problem 8 *Explain how to multiply two polynomials.*

Problem 9 *Here is an example of the polynomial division algorithm:*

$$\begin{array}{r} x-3 \quad R\ 9x+4 \\ x^2+3x+1\overline{)\,x^3+0x^2+x+1} \\ \underline{x^3+3x^2+x} \\ -3x^2+0x+1 \\ \underline{-3x^2-9x-3} \\ 9x+4 \end{array}$$

Describe how to perform this algorithm:

Problem 10 *Find the quotient and divisor when dividing* x^3+4x^2-1 *by* $x+2$. *Quotient:* $\boxed{?}$; *remainder:* $\boxed{?}$.

Problem 11 *Find the quotient and divisor when dividing* x^3+4x^2-1 *by* x^2+1. *Quotient:* $\boxed{?}$; *remainder:* $\boxed{?}$.

Problem 12 *State the Division Theorem for polynomials. Give some relevant and revealing examples of this theorem in action.*