Ch. 7 Skills Review

Advanced Algebra

Name_____

•Classifying Polynomials

Determine if each expression is a polynomial and if so classify by number of terms and by degree.

1) $12x^4 - 2x^2 + \frac{1}{2}$ Quartic Trinomial

2) $\frac{x^4}{11} + \frac{x^2}{8}$ Quartic Binomial

3) $\frac{10}{x^3} + \frac{6}{x^2}$ Not a Polynomial

•Evaluating Polynomials

Evaluate each polynomial.

4) $x^3 - 3x^2 + 4x$ for $x = -2$ -28

5) $-x^4 - x^3 - x^2 + 12$ for $x = 5$ -763

6) $x - 3x + 3x - 9$ for $x = 3$ -6

•Operations with Polynomials

Perform the indicated operation. Write your answer in standard form:

7) $(-2x^3 + 5x^2 - 3x + 7) + (5x^2 + x + 9)$ $3x^3 + 6x^2 - 3x + 16$

8) $(4.1x^3 + 3.5x - 6x^2 - 11) - (3x^2 - 4x + 9)$ $8.1x^3 - 9x^2 + 3.5x - 20$

9) $(3x^5 - 4x^2 + 2x^3) - (4x^4 + 3x^3 - 9x^2 - 7)$ $3x^5 - 4x^4 - x^3 + 5x^2 + 7$

10) $2x^3(-5x^4 + 3x^3 - 2x - 6)$ $-10x^7 + 6x^6 - 4x^4 - 12x^3$

11) $(2x - 3)(x + 4)^2$ $2x^3 + 13x^2 + 8x - 48$

12) $(2x - 1)^3$ $8x^3 - 12x^2 + 6x - 1$

•Dividing Polynomials

Divide and write any remainders in rational form.

13) $x - 3\overline{)x^2 + 9x - 3x}$ $x + 9 + \frac{27}{x-3}$

14) $2x - 3\overline{)2x^3 + 3x^2 - 6x - 3}$ $x^2 + 3x + \frac{3}{2} + \frac{3}{4x-6}$

15) $x - 4\overline{)x^2 - 27x + x^3 + 28}$ $x^2 + 5x - 7$

•Factoring Polynomials

Factor completely.

16) $x^3 - 64x$

$x(x-8)(x+8)$

17) $x^3 + 49x = 14x^2$

$x(x-7)(x-7)$

18) $2x^3 - 22x^2 + 56x$

$2x(x-7)(x-4)$

•Solving Polynomials—(Rational Roots, Zero Product Property, Irrational Roots, Imaginary Roots)

Find all roots. (zeros)

19) $x^3 - 2x^2 - 4x + 8 = 0$

$(-2, 2, 2)$

20) $x^3 + x + 6 = 4x^2$

$(-1, 2, 3)$

21) $x^3 - 9x^2 + 15x - 7 = 0$

$(1, 1, 7)$

Use variable substitution to find all zeros.

22) $x^4 - 14x^2 + 45 = 0$

$\pm 3, \pm\sqrt{5}$

23) $x^4 - 25x^2 + 144 = 0$

$\pm 4, \pm 3$

24) $x^4 + 12 = 13x^2$

$\pm 1, \pm 2\sqrt{3}$

Find all zeros. (Rational, Irrational or complex)

25) $2x^3 - 9x^2 + 7x + 6 = g(x)$

$-\frac{1}{2}, 2, 3$

26) $f(x) = x^4 - 3x^3 - x^2 - 9x - 12$

$-1, 4, \pm i\sqrt{3}$

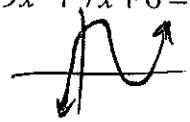
27) $l(x) = x^3 - 3x^2 - 5x + 15$

$\pm\sqrt{5}, 3$

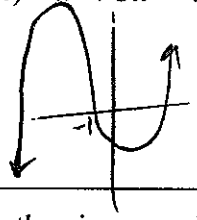
•Graphing Polynomials

Sketch the graph and label all intercepts and max &mins.

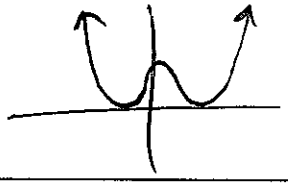
28) $2x^3 - 9x^2 + 7x + 6 = f(x)$



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



30) $g(x) = x^4 - 2x^3 - 3x^2 + 4x + 4$



•Writing Polynomials

Write a polynomial in standard form that meets the given conditions.

31) P is of degree 3;
P(0) = 10; zeros: 5, -1, 2

$x^3 - 6x^2 + 3x + 10$

32) P is of degree 3;
P(0) = -98;
zeros: -1, 7 (multiplicity 2)

$-2x^3 + 26x^2 + 70x - 98$

33) P is of degree 4;
zeros: -2, 2, i
P(0) = -6

$\frac{3}{2}x^4 - \frac{9}{2}x^2 - 6$