Chapter 5 Review Worksheet

Simplify the expression. Evaluate all powers with numerical bases. NO DECIMALS.

1.) $(x^{-2}y^5)^2$

2.) $(3x^4y^{-2})^{-3}$

3.) $\dfrac{2x^{-6}y^5}{16x^3y^{-2}}$

4.) $\dfrac{\left(3m^{-2}n^4\right)^{-3}}{9m^3n^{-3}} \cdot \dfrac{m^{-6}}{n^8}$

5.) $\dfrac{5a^3}{(10b)^2} \cdot \dfrac{b^{-5}a^2}{a^7b^0}$

6.) $(2x^{-2}y^7)(12x^{-6}y^{-3})$

Decide whether the function is a polynomial function. If so, write it in standard form and state its degree, type, and leading coefficient. If it is not a polynomial, explain why.

7.) $f(x) = x^4 - \frac{1}{4}x^2 + 3$

8.) $h(x) = 5x^2 + 3x^{-1} - x$

9.) $g(x) = x + 2^x - 0.6x^5$

10.) $j(x) = 7x - \sqrt{3} + \pi x^2$

Evaluate the function for the given value of *x* using <u>both</u> direct and synthetic substitution.

11.) $g(x) = 2x^4 - 5x^3 - 4x + 8$ when $x = 3$

12.) $f(x) = x^5 - 2x^3 + 15$ when $x = 4$

Describe the end behavior of the graph of the polynomial function by completing the statements. (Hint: Sketch a general picture of the graph to help).

13.) $f(x) = -8x^{10} + 21x^3$

$f(x) \rightarrow$ _____ as $x \rightarrow -\infty$

$f(x) \rightarrow$ _____ as $x \rightarrow +\infty$

14.) $f(x) = 12x^{15} - 2x^{14} + 8x^7 + 99$

$f(x) \rightarrow$ _____ as $x \rightarrow -\infty$

$f(x) \rightarrow$ _____ as $x \rightarrow +\infty$

15.) $f(x) = -x^5 + 1$

$f(x) \rightarrow$ _____ as $x \rightarrow -\infty$

$f(x) \rightarrow$ _____ as $x \rightarrow +\infty$

16.) $f(x) = \frac{1}{2}x^6 + 8x^3 - 11x^2 + 19$

$f(x) \rightarrow$ _____ as $x \rightarrow -\infty$

$f(x) \rightarrow$ _____ as $x \rightarrow +\infty$

Perform the indicated operation.

17.) $(5x^3 - x + 3) + (x^3 - 9x^2 + 4x)$

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

19.) $(x - 6)(5x^2 + x - 8)$

20.) $(x - 4)(x + 7)(5x - 1)$

Factor the polynomial completely.

21.) $64x^3 - 8$

22.) $2x^5 - 12x^3 + 10x$

23.) $2x^3 - 7x^2 - 8x + 28$

24.) $27g^3 + 343$

Find the real-number solutions of the equation (Start by factoring).

25.) $16g^4 - 625 = 0$

26.) $16x^3 - 44x^2 - 42x = 0$

27.) A shipping box is shaped like a rectangular prism. It has a total volume of 96 cubic inches. The height is two inches less than the width and the length is eight inches longer than the width.

    a.) Write a polynomial equation in standard form that represents the volume of the box.

    b.) Solve the polynomial equation from part a. What are the dimensions of the box?

28.) You have 240 cubic inches of clay with which to make a sculpture shaped like a rectangular prism. You want the width to be 4 inches less than the length and the height to be 2 inches more than 3 times the length. What should the dimensions of the box be?