Name _____ Date _____

4.1 Extra Practice

In Exercises 1–4, determine whether the function is a polynomial function. If so, write it in standard form and state its degree, type, and leading coefficient.

1. $f(x) = 2x^2 - 3x^4 + 6x + 1$

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

3. $g(x) = \sqrt{15}x + \sqrt{5}$

4. $p(x) = -2\sqrt{3} + 3x - 2x^2$

In Exercises 5 and 6, evaluate the function for the given value of *x*.

5. $h(x) = -x^3 - 2x^2 - 3x + 4; x = 2$

6. $g(x) = x^4 - 32x^2 + 256; x = -4$

In Exercises 7 and 8, describe the end behavior of the function.

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

8. $f(x) = \frac{4}{5}x^2 + 6x + 3x^5 - 3x^3 - 2$

In Exercises 9 and 10, graph the polynomial function.

9. $p(x) = 16 - x^4$

10. $g(x) = x^2 + 3x^5 - x$

11. Sketch a graph of the polynomial function f with the following characteristics.

- f is increasing when $x < -1$ and $0 < x < 1$.
- f is decreasing when $-1 < x < 0$ and $x > 1$.
- $f(x) < 0$ for all real numbers.

Use the graph to describe the degree and leading coefficient of f.

12. A cubic polynomial function g has a leading coefficient of -3 and a constant term of 7. When $g(-2) = 67$ and $g(1) = 13$, what is $g(6)$? Explain your reasoning.

Name _____ Date _____

4.2 Extra Practice

In Exercises 1–4, find the sum or difference.

1. $(-4x^2 - 6x + 18) + (-x^2 + 7x + 8)$

2. $(6x^2 - 12x + 48) - (-x^2 + 24x - 63)$

3. $(-11x^4 - x^3 - 3x^2 + 10x - 2) - (-11x^4 + 5x^2 - 7x + 13)$

4. $(7x^3 - 9x^5 + 2x - 7 + x^2) + (-3x^3 + 12 - 5x^2 + 6x^5)$

In Exercises 5–12, find the product.

5. $2x^2(2x^3 - x^2 + 3x - 5)$

6. $(x^4 - 10x^2 + 25)(3x^2 - 6x - 1)$

7. $(x + 1)(x - 2)(x + 6)$

8. $(2x - 3)(6 - x)(4 - 5x)$

9. $(3y - 8)(3y + 8)$

10. $(9m + 5)^2$

11. $(2v - 1)^3$

12. $(ab + 7)^3$

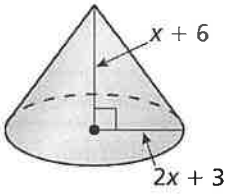
In Exercises 13 and 14, use Pascal's Triangle to expand the binomial.

13. $(4t - 2)^4$

14. $(g + 6)^5$

15. A city is planning a new sports park. The total area (in square feet) of the park is modeled by the expression $9x^2 + 4x - 5$. The area of the park designated for soccer fields is modeled by the expression $2x^2 - 5x + 3$. Write an expression that models the area of the park that is not designated for soccer fields.

16. Write an expression for the volume of the cone as a polynomial in standard form.



Name_____ Date_____

4.3 Extra Practice

In Exercises 1–4, divide using long division.

1. $(x^2 + 6x + 12) \div (x - 3)$

2. $(x^3 - 4x^2) \div (x^2 - 16)$

3. $(4x^3 + 13x^2 + 27x + 6) \div (4x + 1)$

4. $(x^4 + 2x^3 + 5x^2 + 3x) \div (x^2 - x)$

In Exercises 5–8, divide using synthetic division.

5. $(x^2 - 10x + 2) \div (x - 2)$

6. $(x^3 + 4x^2 + 6x + 4) \div (x + 2)$

7. $(2x^3 - 54) \div (x + 3)$

8. $(2x^4 - 11x^3 + 11x^2 + 4x + 4) \div (x - 4)$

In Exercises 9–12, match the equivalent expressions. Justify your answers.

9. $(x^2 - x - 8) \div (x - 4)$

10. $(x^2 - x + 8) \div (x - 4)$

11. $(x^2 + x - 8) \div (x - 4)$

12. $(x^2 + x + 8) \div (x - 4)$

A. $x + 3 + \frac{4}{x - 4}$

B. $x + 5 + \frac{12}{x - 4}$

C. $x + 5 + \frac{28}{x - 4}$

D. $x + 3 + \frac{20}{x - 4}$

In Exercises 13–16, use synthetic division to evaluate the function for the indicated value of *x*.

13. $f(x) = -3x^3 + 4x^2 - 17x - 6; x = 2$

14. $f(x) = -x^4 + x^2 + 4; x = -1$

15. $f(x) = x^3 - 10x^2 + 31x - 30; x = -5$

16. $f(x) = x^3 + 8x + 27; x = 3$

17. What is the value of k such that $(-x^4 + 5x^2 + kx - 8) \div (x - 4)$ has a remainder of 0?