

Name _____ Class _____ Date Alg 2

Lesson 5-1

Write each polynomial in standard form. Then classify it by degree and by number of terms.

1. $a^2 + 4a - 5a^2 - a$

2. $3x - \frac{1}{3} - 5x$

3. $3n^2 + n^3 - n - 3 - 3n^3$

Determine the end behavior of the graph of each polynomial function.

4. $y = x^2 - 2x + 3$

5. $y = x^3 - 2x$

6. $y = -7x^5 + 3x^3 - 2x$

Lesson 5-2

Write each polynomial in factored form. Check by multiplication.

7. $x^3 + 5x$

8. $x^3 + x^2 - 6x$

9. $6x^3 - 7x^2 - 3x$

Write a polynomial function in standard form with the given zeros.

10. $x = 3, 2, -1$

11. $x = 1, 1, 2$

12. $x = -2, -1, 1$

Find the zeros of each function. State the multiplicity of multiple zeros.

13. $y = (x - 2)(x + 4)$

14. $y = x(x + 1)(x + 5)$

15. $y = x^2(x + 1)$

16. $y = (x - 3)(x - 4)^2$

Lesson 5-3

Find the real or imaginary solutions of each equation by factoring.

17. $x^3 + 27 = 0$

18. $8x^3 = 125$

19. $9 = 4x^2 - 16$

$$20. x^2 + 400 = 40x$$

$$21. 0 = 4x^2 + 28x + 49$$

$$22. -9x^4 = -48x^2 + 64$$

Solve each equation.

$$23. t^3 - 3t^2 - 10t = 0$$

$$24. 4m^3 + m^2 - m + 5 = 0$$

$$25. t^3 - 6t^2 + 12t - 8 = 0$$

$$26. 2c^3 - 7c^2 - 4c = 0$$

$$27. w^4 - 13w^2 + 36 = 0$$

$$28. x^3 + 2x^2 - 13x + 10 = 0$$

Lesson 5-4

Use synthetic division to determine whether each binomial is a factor of

$$x^3 - 5x^2 - 2x + 24.$$

$$29. x + 2$$

$$30. x - 3$$

$$31. x + 4$$

Divide.

$$32. (x^3 - 3x^2 + 2) \div (x - 1)$$

$$33. (x^3 - x^2 - 6x) \div (x - 3)$$

Lesson 5-5

Find the roots of each polynomial equation.

34. $x^3 + 2x^2 + 3x + 6 = 0$

35. $x^3 - 3x^2 + 4x - 12 = 0$

36. $3x^4 + 11x^3 + 14x^2 + 7x + 1 = 0$

37. $3x^4 - x^3 - 22x^2 + 24x = 0$

Lesson 5-6

Find all the zeros of each function.

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

39. $g(x) = 3x^3 - 3x^2 + x - 1$

40. $h(x) = x^4 - 5x^3 - 8x + 40$

41. $f(x) = 2x^4 - 12x^3 + 21x^2 + 2x - 33$

Lesson 5-7

Use the Binomial Theorem to expand each binomial.

42. $(x - 1)^3$

43. $(3x + 2)^4$

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Lesson 6-1

Simplify each radical expression. Use absolute value symbols as needed.

1. $\sqrt{36x^4}$

2. $\sqrt{c^{80}d^{50}}$

3. $\sqrt[4]{81x^{12}}$

4. $\sqrt[4]{m^{18}n^8}$

5. $\sqrt[3]{27y^{15}}$

6. $\sqrt[5]{-243r^{20}}$

Lesson 6-2

Multiply or divide and simplify. Assume that all variables are positive.

7. $\sqrt{3x^4} \cdot \sqrt{24x^3}$

8. $\sqrt[3]{4} \cdot \sqrt[3]{18}$

9. $\sqrt{5a^3} \cdot \sqrt{20a}$

10. $\frac{\sqrt{80}}{\sqrt{5}}$

11. $\frac{\sqrt{18x^5y}}{\sqrt{2x}}$

12. $\frac{\sqrt[3]{640w^3z^8}}{\sqrt[3]{5wz^4}}$

Lesson 6-3

Simplify.

13. $2\sqrt{7} + 3\sqrt{7}$

14. $\sqrt{32} + \sqrt{8}$

15. $\sqrt{7x} + \sqrt{28x}$

16. $3\sqrt{18} + 2\sqrt{72}$

17. $\sqrt{27} + \sqrt{48}$

18. $8\sqrt{45} - 3\sqrt{80}$

19. $(2 + \sqrt{5})(3 + \sqrt{5})$

20. $(6 - \sqrt{7})(1 - \sqrt{7})$

21. $(\sqrt{10} + 3)^2$

22. $(3\sqrt{5} - 2)(3\sqrt{5} + 2)$

23. $\frac{5}{2 - \sqrt{3}}$

24. $\frac{4 - 3\sqrt{7}}{1 + 2\sqrt{7}}$

Lesson 6-4

Write each expression in simplest form. Assume that all variables are positive.

25. $81^{\frac{1}{2}}$

26. $36^{\frac{1}{4}} \cdot 36^{\frac{1}{4}}$

27. $\left(x^{-\frac{4}{3}}y^{\frac{3}{5}}\right)^{15}$

28. $\left(x^{\frac{1}{4}}y^{-\frac{3}{8}}\right)^{16}$

29. $\left(-27x^{-9}y^6\right)^{\frac{1}{3}}$

30. $\left(-32x^{-10}y^{15}\right)^{\frac{1}{5}}$

31. $\left(\frac{16x^{14}}{81y^{18}}\right)^{\frac{1}{2}}$

32. $\sqrt{5} \cdot \sqrt[3]{5}$

33. $\frac{\sqrt[6]{x^2}}{\sqrt[3]{x^5}}$

Lesson 6-5

Solve. Check for extraneous solutions.

34. $\sqrt{13x-10} = 3x$

35. $\sqrt{x+20} = x$

36. $(4x-12)^{\frac{1}{2}} + 3 = x$

37. $(7x)^{\frac{1}{3}} = (5x+2)^{\frac{1}{3}}$

38. $\sqrt{x-2} - \sqrt{2x+3} = -2$

39. $\sqrt{10x} - 2\sqrt{5x-25} = 0$

Lesson 6-6

Let $f(x) = 3x^2$ and $g(x) = 2 - 5x$. Perform each function operation.

40. $f(x) - g(x)$

41. $f(x) \cdot g(x)$

42. $\frac{f(x)}{g(x)}$

Let $f(x) = x^2$ and $g(x) = 3x + 1$. Evaluate each expression.

43. $(f \circ g)(x)$

44. $(g \circ f)(x)$

Lesson 6-7

For each function f , find f^{-1} and the domain and range of f and f^{-1} . Determine whether f^{-1} is a function.

45. $f(x) = 6x + 1$

46. $f(x) = \sqrt{x + 4}$

47. $f(x) = 3x^2 + 1$

Lesson 6-8

Graph each function.

48. $y = \sqrt{x}$

49. $y = \sqrt{x} - 1$

50. $y = \sqrt{x} + 3$

51. $y = \sqrt{x + 3}$

52. $y = \sqrt[3]{x + 1}$

53. $y = \sqrt[3]{x - 2} - 3$