Honors Pre-Calculus Summer Packet

This work must be turned in the 2nd time our class meets. You will be given a test on this material the 2nd week of school. You may not use a calculator. You MUST show ALL work!

Simplify each expression.

1. $\left(-4\right)^{2}$

2. -4^{2}

3. 4^{-2}

4. -4^{-2}

5. $\left(5x^{3}\right)^{2}$

6. $\left(-4x^{2}\right)^{-1}$

7. $\left(x^{3}y^{-2}\right)^{-1}$

8. $\dfrac{x^{2}y^{3}}{xy^{5}}$

9. $\dfrac{4x^{-2}\left(yz\right)^{-1}}{2^{2}x^{4}y}$

10. $\left(\dfrac{3x^{-1}}{4y^{-1}}\right)^{-2}$

Add, subtract, or multiply, as indicated. Express your answer as a single polynomial in standard form.

11. $\left(x^{3}+2x^{2}+3\right)+\left(x^{2}-3x+3\right)$

12. $\left(x^{2}-2x-4\right)-\left(x^{3}-2x^{2}-x+2\right)$

13. $4x^{2}\left(x^{4}-2x+3\right)$

14. $\left(2x-4\right)\left(x+2\right)$

15. $\left(2x-5\right)^{2}$

16. $\left(2x-4\right)\left(3x^{3}-4x+2\right)$

Factor each polynomial completely.

17. $x^2 - 49$

18. $4x^2 - 9y^4$

19. $5 - 45x^2$

20. $x^2 + 5x + 6$

21. $x^2 + 5x + 4$

22. $x^2 + 3x - 4$

23. $x^3 + 7x^2 - 30x$

24. 3x + 3

25. $2x^2 - 9x + 10$

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

27. x³ − 7x² + 5x − 35

Use synthetic division to find the quotient and remainder when:

28. $x^3 - x^2 + 2x + 4$ is divided by x - 2

29. $x^5 + 5x^3 - 10$ is divided by x + 1

Reduce each rational expression to lowest terms.

30. $\dfrac{3x + 9}{x^2 - 9}$

31. $\dfrac{2x^2 + 5x - 3}{1 - 2x}$

32. $\dfrac{\dfrac{x^2 + 7x + 6}{x^2 + x - 6}}{\dfrac{x^2 + 5x - 6}{x^2 + 5x + 6}}$

Solve each equation.

33. 2x − 3 = 5

34. 6 − x = 2x + 9

35. 5 − (2x − 1) = 10

36. $\dfrac{2}{y} + \dfrac{4}{y} = 3$

37. $x^2 = 4x$

38. $|3x - 1| = 2$

39. $2x^2 - 5x - 3 = 0$

40. $x^2 - 4x = -2$

41. $x^3 + 4x^2 - x - 4 = 0$

Simplify each expression.

42. $\sqrt{8}$

43. $\sqrt{54}$

44. $\sqrt{16x^5}$

45. $3\sqrt{7} + 2\sqrt{7}$

46. $\left(\sqrt{7} - 2\right)\left(\sqrt{7} + 4\right)$

47. $\left(\sqrt{x} + \sqrt{3}\right)^2$

Rationalize the denominator.

48. $\dfrac{1}{\sqrt{3}}$

49. $\dfrac{-\sqrt{2}}{\sqrt{5}}$

50. $\dfrac{3}{2 - \sqrt{5}}$

Perform the operation indicated.

51. $\dfrac{1}{3} + \dfrac{3}{4}$

52. $\dfrac{x}{5} + \dfrac{x}{3}$

53. $\dfrac{2}{5} - \dfrac{1}{3}$

54. $3 - \dfrac{4}{7}$

55. $\dfrac{2}{5} \cdot \dfrac{1}{4}$

56. $4 \cdot \dfrac{3}{5}$

57. $\dfrac{2}{5} \div \dfrac{1}{4}$

58. $3 \div \dfrac{2}{5}$

59. $\dfrac{\frac{8}{9}}{\frac{3}{16}}$

60. $\dfrac{\frac{y}{5}}{\frac{y^2}{20}}$

Solve using the quadratic formula.

61. $x^2 - 4x + 2 = 0$

62. $4x^2 = 1 - 2x$

Find an equation for the line:

63. containing the points (1, 3) and (-1, 2)

64. x-intercept = -4 and y-intercept = 4

Solve each system of equations.

65. $x + 2y = -7$
    $x + y = -3$

66. $3x - 6y = 2$
    $5x + 4y = 1$

Sketch the graph of each of the following:

67. $y = -x + 3$

68. $x = 3$

69. $2x + 3y = 6$

70. $3y = 2x - 1$