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. Answers will be posted after work has been collected.

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. $\left(x^3y^{-2}\right)^{-1}$
8. $\dfrac{x^2y^3}{xy^5}$
9. $\dfrac{4x^{-2}\left(yz\right)^{-1}}{2^2x^4y}$
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. x^3-3x^2+2x-6

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

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

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

Solve each equation.

33. $2x - 3 = 5$

34. $6 - x = 2x + 9$

35. $5 - (2x - 1) = 10$

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

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. $\frac{1}{\sqrt{3}}$

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

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

Perform the operation indicated.

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

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

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

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

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

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

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

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

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

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

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