1. Factor completely: $9 - 64x^2$

2. Factor completely: $49 - 4x^2$

3. Factor completely: $4x^2 - 121$

4. Factor completely: $80x^2 - 45$

5. Factor completely: $-4x^3 - 12x^2 + 280x$

6. Factor completely: $-2x^2 + 22x - 56$

7. Factor the expression completely: $x^4 + 7x^2 + 10$

8. Factor the expression completely: $x^4 - 3x^2 - 54$

9. Factor the expression completely: $x^4 - 4x^2 - 32$

10. Factor Completely

$$q^5 - q^4 - q^3 + q^2$$

11. Factor Completely

$$-2c^3 + 8c$$

12. Factor Completely

$$4k^4 - 5k^3$$

13. Factor $d^3 + s^3$ completely.

14. Factor $1 - y^3$ completely.

15. Factor $8 + u^3$ completely.

16. Solve for all values of x by factoring.

$$x^2 + 10x = 0$$

17. Solve for all values of x by factoring.

$$x^2 - 23x + 70 = -6x$$

18. Solve for all values of x by factoring.

$$x^2 - 22 = -6$$

19. Factor $x^2 + 8x + 16$

20. Factor $x^2 - 10x + 25$

21. Factor $x^2 - 3x - 18$

22. Factor completely: $4x^2 + 12x - 7$

23. Factor completely: $5x^2 - x - 6$

24. Factor completely: $3x^2 - 13x - 10$

25. Solve the following quadratic equation for all values of x in simplest form.

$$2(x-2)^2 = 2$$

26. Solve the following quadratic equation for all values of x in simplest form.

$$18 - x^2 = 4$$

27. Solve the following quadratic equation for all values of x in simplest form.

$$5(x+2)^2 - 28 = 37$$

28. Solve the equation for all real solutions in simplest form.

$$5a^2 - 20a + 13 = -6$$

29. Solve the equation for all real solutions in simplest form.

$$4x^2 - 12x + 9 = 2x^2$$

30. Solve the equation for all real solutions in simplest form.

$$z^2 + 10z + 19 = 0$$

31. Solve for the roots in *simplest form* by completing the square:

$$x^2 - 10x - 103 = 0$$

32. Solve for the roots in *simplest form* by completing the square:

$$x^2 - 16x + 96 = 0$$

33. Solve for the roots in *simplest form* by completing the square:

$$x^2 + 16x + 48 = 0$$

34. Solve the following system of equations for all three variables.

$$\begin{aligned} x + 3y + 9z &= 4 \\ -x + 8y - 6z &= 4 \\ x + 3y + 3z &= 10 \end{aligned}$$

35. Solve the following system of equations for all three variables.

$$\begin{aligned} -5x + 2y - 6z &= 9 \\ 10x - 2y + 7z &= -9 \\ 4x - 2y + 5z &= -5 \end{aligned}$$

36. Solve the following system of equations for all three variables.

$$-2x + 3y - 4z = 8$$
$$5x - 3y + 5z = -8$$
$$7x - 3y + 3z = 8$$

37. Use the long division method to find the result when $2x^3 + 13x^2 + 10x + 24$ is divided by $x + 6$.

38. Use the long division method to find the result when $6x^3 + 17x^2 + 30x + 27$ is divided by $2x + 3$.

39. Use the long division method to find the result when $3x^3 + 22x^2 + 27x + 4$ is divided by $3x + 4$.

40. Use the long division method to find the result when $6x^3 - 20x^2 + 25x - 18$ is divided by $3x - 4$. If there is a remainder, express the result in the form $q(x) + \frac{r(x)}{b(x)}$.

41. Use the long division method to find the result when $12x^3 + 23x^2 + 15x - 9$ is divided by $3x - 1$. If there is a remainder, express the result in the form $q(x) + \frac{r(x)}{b(x)}$.

42. Use the long division method to find the result when $2x^3 - 8x^2 - 29x + 26$ is divided by $x - 6$. If there is a remainder, express the result in the form $q(x) + \frac{r(x)}{b(x)}$.

43. Fully simplify: $\frac{\frac{1}{9} - \frac{1}{x^2}}{3 + \frac{9}{x}}$

44. Fully simplify: $\frac{\frac{x^2}{5} - x}{\frac{x}{9} + \frac{1}{3}}$

45. Fully simplify: $\frac{\frac{x-3}{10} - \frac{1}{x}}{\frac{1}{5} - \frac{x}{25}}$

46. Perform the following operation and express in simplest form.

$$\frac{x+9}{x-1} \cdot \frac{x^2 - 7x + 6}{x^2 + 3x - 54}$$

47. Perform the following operation and express in simplest form.

$$\frac{x-5}{x-7} \div \frac{x^2 + 2x - 35}{x^2 - 49}$$

48. Perform the following operation and express in simplest form.

$$\frac{x^2}{4x+8} \cdot \frac{x^2 - 4}{x^2 + 6x - 16}$$

49. Perform the operation and combine to one fraction.

$$\frac{x+3}{x^2 - 49} - \frac{7}{x+7}$$

50. Perform the operation and combine to one fraction.

$$\frac{2x+5}{x}+\frac{2x+1}{x+1}$$

51. Perform the operation and combine to one fraction.

$$\frac{2}{x-8}-\frac{3x+2}{8-x}$$

52. Evaluate: $\log_{128} 64$

53. Evaluate: $\log_{64} \frac{1}{2}$

54. Evaluate: $\log_4 8$

55. Solve for x:

$$64^{3x-2}=256^{2x-5}$$

56. Solve for x:

$$16^{3x-2}=256^{3x+2}$$

57. Solve for x:

$$9^{2x+1}=3^{3x+4}$$

58. Solve for a positive value of x.

$$\log_5(x)=3$$

59. Solve for a positive value of x.

$$\log_9(81)=x$$

60. Solve for a positive value of x.

$$\log_x(25)=2$$

61. Write the expression below as a single logarithm in simplest form.

$$\log_b 2+5\log_b 2$$

62. Write the expression below as a single logarithm in simplest form.

$$3\log_b 4-\log_b 4$$

63. Write the expression below as a single logarithm in simplest form.

$$\log_b 6+\log_b 4$$

64. Expand the logarithm fully using the properties of logs. Express the final answer in terms of $\log x$, and $\log y$.

$$\log x^4y^2$$

65. Expand the logarithm fully using the properties of logs. Express the final answer in terms of $\log x$.

$$\log 4x^5$$

66. Expand the logarithm fully using the properties of logs. Express the final answer in terms of $\log x$, and $\log y$.

$$\log \frac{x^5}{y^2}$$