
EXERCISE – 3C

Answer.1. $x^2 + 11x + 30$

$$\begin{aligned}x^2 + 11x + 30 &= x^2 + 5x + 6x + 30 \\ &= x(x + 5) + 6(x + 5) \\ &= (x + 5)(x + 6)\end{aligned}$$

Answer.2. $x^2 + 18x + 32$

$$\begin{aligned}x^2 + 18x + 32 &= x^2 + 16x + 2x + 32 \\ &= x(x + 16) + 2(x + 16) \\ &= (x + 16)(x + 2)\end{aligned}$$

Answer.3. $x^2 + 20x - 69$

$$\begin{aligned}x^2 + 20x - 69 &= x^2 + 23x - 3x - 69 \\ &= x(x + 23) - 3(x + 23) \\ &= (x + 23)(x - 3)\end{aligned}$$

Answer.4. $x^2 + 19x - 150$

$$\begin{aligned}x^2 + 19x - 150 &= x^2 + 25x - 6x - 150 \\ &= x(x + 25) - 6(x + 25) \\ &= (x + 25)(x - 6)\end{aligned}$$

Answer.5. $x^2 + 7x - 98$

$$\begin{aligned}x^2 + 7x - 98 &= x^2 + 14x - 7x - 98 \\ &= x(x + 14) - 7(x + 14) \\ &= (x + 14)(x - 7)\end{aligned}$$

Answer.6. $x^2 + 2\sqrt{3}x - 24$

$$\begin{aligned}x^2 + 2\sqrt{3}x - 24 &= x^2 + 4\sqrt{3}x - 2\sqrt{3}x - 24 \\ &= x(x + 4\sqrt{3}) - 2\sqrt{3}(x + 4\sqrt{3}) \\ &= (x + 4\sqrt{3})(x - 2\sqrt{3})\end{aligned}$$

Answer.7. $x^2 - 21x + 90$

$$\begin{aligned}x^2 - 21x + 90 &= x^2 - 15x - 6x + 90 \\ &= x(x - 15) - 6(x - 15) \\ &= (x - 15)(x - 6)\end{aligned}$$

Answer.8. $x^2 - 22x + 120$

$$\begin{aligned}x^2 - 22x + 120 &= x^2 - 12x - 10x + 120 \\ &= x(x - 12) - 10(x - 12) \\ &= (x - 12)(x - 10)\end{aligned}$$

Answer.9. $x^2 - 4x + 3$

$$\begin{aligned}x^2 - 4x + 3 &= x^2 - 3x - x + 3 \\ &= x(x - 3) - 1(x - 3) \\ &= (x - 3)(x - 1)\end{aligned}$$

Answer.10. $x^2 + 7\sqrt{6}x + 60$

$$\begin{aligned}x^2 + 7\sqrt{6}x + 60 &= x^2 + 5\sqrt{6}x + 2\sqrt{6}x + 60 \\ &= x(x + 5\sqrt{6}) + 2\sqrt{6}(x + 5\sqrt{6}) \\ &= (x + 5\sqrt{6})(x + 2\sqrt{6})\end{aligned}$$

Answer.11. $x^2 + 3\sqrt{3}x + 6$

$$\begin{aligned}
 x^2 + 3\sqrt{3}x + 6 &= x^2 + 2\sqrt{3}x + \sqrt{3}x + 6 \\
 &= x(x + 2\sqrt{3}) + \sqrt{3}(x + 2\sqrt{3}) \\
 &= (x + 2\sqrt{3})(x + \sqrt{3})
 \end{aligned}$$

Answer.12. $x^2 + 6\sqrt{6}x + 48$

$$\begin{aligned}
 x^2 + 6\sqrt{6}x + 48 &= x^2 + 4\sqrt{6}x + 2\sqrt{6}x + 48 \\
 &= x(x + 4\sqrt{6}) + 2\sqrt{6}(x + 4\sqrt{6}) \\
 &= (x + 4\sqrt{6})(x + 2\sqrt{6})
 \end{aligned}$$

Answer.13. $x^2 + 5\sqrt{5}x + 30$

$$\begin{aligned}
 x^2 + 5\sqrt{5}x + 30 &= x^2 + 3\sqrt{5}x + 2\sqrt{5}x + 30 \\
 &= x(x + 3\sqrt{5}) + 2\sqrt{5}(x + 3\sqrt{5}) \\
 &= (x + 3\sqrt{5})(x + 2\sqrt{5})
 \end{aligned}$$

Answer.14. $x^2 - 24x - 180$

$$\begin{aligned}
 x^2 - 24x - 180 &= x^2 - 30x + 6x - 180 \\
 &= x(x - 30) + 6(x - 30) \\
 &= (x - 30)(x + 6)
 \end{aligned}$$

Answer.15. $x^2 - 32x - 105$

$$\begin{aligned}
 x^2 - 32x - 105 &= x^2 - 35x + 3x - 105 \\
 &= x(x - 35) + 3(x - 35) \\
 &= (x - 35)(x + 3)
 \end{aligned}$$

Answer.16. $x^2 - 11x - 80$

$$\begin{aligned}
 x^2 - 11x - 80 &= x^2 - 16x + 5x - 80 \\
 &= x(x - 16) + 5(x - 16) \\
 &= (x - 16)(x + 5)
 \end{aligned}$$

Answer.17. $6 - x - x^2$

$$\begin{aligned}
 6 - x - x^2 &= -x^2 - 3x + 2x + 6 \\
 &= -x(x + 3) + 2(x + 3) \\
 &= (-x + 2)(x + 3) \\
 &= (2 - x)(x + 3)
 \end{aligned}$$

Answer.18. $x^2 - \sqrt{3}x - 6$

$$\begin{aligned}
 x^2 - \sqrt{3}x - 6 &= x^2 - 2\sqrt{3}x + \sqrt{3}x - 6 \\
 &= x(x - 2\sqrt{3}) + \sqrt{3}(x - 2\sqrt{3}) \\
 &= (x - 2\sqrt{3})(x + \sqrt{3})
 \end{aligned}$$

Answer.19. $40 + 3x - x^2$

$$\begin{aligned}
 40 + 3x - x^2 &= -x^2 + 8x - 5x + 40 \\
 &= -x(x - 8) - 5(x - 8) \\
 &= (x - 8)(-x - 5) \\
 &= (8 - x)(x + 5)
 \end{aligned}$$

Answer.20. $x^2 - 26x + 133$

$$\begin{aligned}x^2 - 26x + 133 &= x^2 - 19x - 7x + 133 \\ &= x(x - 19) - 7(x - 19) \\ &= (x - 19)(x - 7)\end{aligned}$$

Answer.21. $x^2 - 2\sqrt{3}x - 24$

$$\begin{aligned}x^2 - 2\sqrt{3}x - 24 &= x^2 - 4\sqrt{3}x + 2\sqrt{3}x - 24 \\ &= x(x - 4\sqrt{3}) + 2\sqrt{3}(x - 4\sqrt{3}) \\ &= (x - 4\sqrt{3})(x + 2\sqrt{3})\end{aligned}$$

Answer.22. $x^2 - 3\sqrt{5}x - 20$

$$\begin{aligned}x^2 - 3\sqrt{5}x - 20 &= x^2 - 4\sqrt{5}x + \sqrt{5}x - 20 \\ &= x(x - 4\sqrt{5}) + \sqrt{5}(x - 4\sqrt{5}) \\ &= (x - 4\sqrt{5})(x + \sqrt{5})\end{aligned}$$

Answer.23. $x^2 + \sqrt{2}x - 24$

$$\begin{aligned}x^2 + \sqrt{2}x - 24 &= x^2 + 4\sqrt{2}x - 3\sqrt{2}x - 24 \\ &= x(x + 4\sqrt{2}) - 3\sqrt{2}(x + 4\sqrt{2}) \\ &= (x + 4\sqrt{2})(x - 3\sqrt{2})\end{aligned}$$

Answer.24. $x^2 - 2\sqrt{2}x - 30$

$$\begin{aligned}x^2 - 2\sqrt{2}x - 30 &= x^2 - 5\sqrt{2}x + 3\sqrt{2}x - 30 \\ &= x(x - 5\sqrt{2}) + 3\sqrt{2}(x - 5\sqrt{2}) \\ &= (x - 5\sqrt{2})(x + 3\sqrt{2})\end{aligned}$$

Answer.25. $x^2 - x - 156$

$$\begin{aligned}x^2 - x - 156 &= x^2 - 13x + 12x + 156 \\ &= x(x - 13) + 12(x - 13) \\ &= (x - 13)(x + 12)\end{aligned}$$

Answer.26. $x^2 - 32x - 105$

$$\begin{aligned}x^2 - 32x - 105 &= x^2 - 35x + 3x - 105 \\ &= x(x - 35) + 3(x - 35) \\ &= (x - 35)(x + 3)\end{aligned}$$

Answer.27. $9x^2 + 18x + 8$

$$\begin{aligned}9x^2 + 18x + 8 &= 9x^2 + 12x + 6x + 8 \\ &= 3x(3x + 4) + 2(3x + 4) \\ &= (3x + 4)(3x + 2)\end{aligned}$$

Answer.28. $6x^2 + 17x + 12$

$$\begin{aligned}6x^2 + 17x + 12 &= 6x^2 + 9x + 8x + 12 \\ &= 3x(2x + 3) + 4(2x + 3) \\ &= (2x + 3)(3x + 4)\end{aligned}$$

Answer.29. $18x^2 + 3x - 10$

$$\begin{aligned}18x^2 + 3x - 10 &= 18x^2 + 15x - 12x - 10 \\ &= 3x(6x + 5) - 2(6x + 5) \\ &= (6x + 5)(3x - 2)\end{aligned}$$

Answer.30. $2x^2 + 11x - 21$

$$\begin{aligned}
 2x^2 + 11x - 21 &= 2x^2 + 14x - 3x - 21 \\
 &= 2x(x + 7) - 3(x + 7) \\
 &= (x + 7)(2x - 3)
 \end{aligned}$$

Answer.31. $15x^2 + 2x - 8$

$$\begin{aligned}
 15x^2 + 2x - 8 &= 15x^2 + 12x - 10x - 8 \\
 &= 3x(5x + 4) - 2(5x + 4) \\
 &= (5x + 4)(3x - 2)
 \end{aligned}$$

Answer.32. $21x^2 + 5x - 6$

$$\begin{aligned}
 21x^2 + 5x - 6 &= 21x^2 + 14x - 9x - 6 \\
 &= 7x(3x + 2) - 3(3x + 2) \\
 &= (3x + 2)(7x - 3)
 \end{aligned}$$

Answer.33. $24x^2 - 41x + 12$

$$\begin{aligned}
 24x^2 - 41x + 12 &= 24x^2 - 32x - 9x + 12 \\
 &= 8x(3x - 4) - 3(3x - 4) \\
 &= (3x - 4)(8x - 3)
 \end{aligned}$$

Answer.34. $3x^2 - 14x + 8$

$$\begin{aligned}
 3x^2 - 14x + 8 &= 3x^2 - 12x - 2x + 8 \\
 &= 3x(x - 4) - 2(x - 4) \\
 &= (x - 4)(3x - 2)
 \end{aligned}$$

Answer.35. $2x^2 + 3x - 90$

$$\begin{aligned}
 2x^2 + 3x - 90 &= 2x^2 + 15x - 12x - 90 \\
 &= x(2x + 15) - 6(2x + 15) \\
 &= (2x + 15)(x - 6)
 \end{aligned}$$

Answer.36. $\sqrt{5}x^2 + 2x - 3\sqrt{5}$

$$\begin{aligned}
 \sqrt{5}x^2 + 2x - 3\sqrt{5} &= \sqrt{5}x^2 + 5x - 3x - 3\sqrt{5} \\
 &= \sqrt{5}x(x + \sqrt{5}) - 3(x + \sqrt{5}) \\
 &= (x + \sqrt{5})(\sqrt{5}x - 3)
 \end{aligned}$$

Answer.37. $2\sqrt{3}x^2 + x - 5\sqrt{3}$

$$\begin{aligned}
 2\sqrt{3}x^2 + x - 5\sqrt{3} &= 2\sqrt{3}x^2 + 6x - 5x - 5\sqrt{3} \\
 &= 2\sqrt{3}x(x + \sqrt{3}) - 5(x + \sqrt{3}) \\
 &= (x + \sqrt{3})(2\sqrt{3}x - 5)
 \end{aligned}$$

Answer.38. $7x^2 + 2\sqrt{14}x + 2$

$$\begin{aligned}
 7x^2 + 2\sqrt{14}x + 2 &= 7x^2 + \sqrt{14}x + \sqrt{14}x + 2 \\
 &= \sqrt{7}x(\sqrt{7}x + \sqrt{2}) + \sqrt{2}(\sqrt{7}x + \sqrt{2}) \\
 &= (\sqrt{7}x + \sqrt{2})(\sqrt{7}x + \sqrt{2})
 \end{aligned}$$

Answer.39. $6\sqrt{3}x^2 - 47x + 5\sqrt{3}$

$$\begin{aligned}
 6\sqrt{3}x^2 - 47x + 5\sqrt{3} &= 6\sqrt{3}x^2 - 45x - 2x + 5\sqrt{3} \\
 &= 3\sqrt{3}x(2x - 5\sqrt{3}) - 1(2x - 5\sqrt{3}) \\
 &= (2x - 5\sqrt{3})(3\sqrt{3}x - 1)
 \end{aligned}$$

Answer.40. $5\sqrt{5}x^2 + 20x + 3\sqrt{5}$

$$\begin{aligned}
 5\sqrt{5}x^2 + 20x + 3\sqrt{5} &= 5\sqrt{5}x^2 + 15x + 5x + 3\sqrt{5} \\
 &= 5x(\sqrt{5}x + 3) + \sqrt{5}(\sqrt{5}x + 3) \\
 &= (\sqrt{5}x + 3)(5x + \sqrt{5})
 \end{aligned}$$

Answer.41. $\sqrt{3}x^2 + 10x + 8\sqrt{3}$

$$\begin{aligned}
 \sqrt{3}x^2 + 10x + 8\sqrt{3} &= \sqrt{3}x^2 + 6x + 4x + 8\sqrt{3} \\
 &= \sqrt{3}x(x + 2\sqrt{3}) + 4(x + 2\sqrt{3}) \\
 &= (x + 2\sqrt{3})(\sqrt{3}x + 4)
 \end{aligned}$$

Answer.42. $\sqrt{2}x^2 + 3x + \sqrt{2}$

$$\begin{aligned}
 \sqrt{2}x^2 + 3x + \sqrt{2} &= \sqrt{2}x^2 + 2x + x + \sqrt{2} \\
 &= \sqrt{2}x(x + \sqrt{2}) + 1(x + \sqrt{2}) \\
 &= (x + \sqrt{2})(\sqrt{2}x + 1)
 \end{aligned}$$

Answer.43. $2x^2 + 3\sqrt{3}x + 3$

$$\begin{aligned}
 2x^2 + 3\sqrt{3}x + 3 &= 2x^2 + 2\sqrt{3}x + \sqrt{3}x + 3 \\
 &= 2x(x + \sqrt{3}) + \sqrt{3}(x + \sqrt{3}) \\
 &= (x + \sqrt{3})(2x + \sqrt{3})
 \end{aligned}$$

Answer.44. $15x^2 - x - 28$

$$\begin{aligned}
 15x^2 - x - 28 &= 15x^2 - 21x + 20x - 28 \\
 &= 3x(5x - 7) + 4(5x - 7) \\
 &= (5x - 7)(3x + 4)
 \end{aligned}$$

Answer.45. $6x^2 - 5x - 21$

$$\begin{aligned}
 6x^2 - 5x - 21 &= 6x^2 - 14x + 9x - 21 \\
 &= 2x(3x - 7) + 3(3x - 7) \\
 &= (3x - 7)(2x + 3)
 \end{aligned}$$

Answer.46. $2x^2 - 7x - 15$

$$\begin{aligned}
 2x^2 - 7x - 15 &= 2x^2 - 10x + 3x - 15 \\
 &= 2x(x - 5) + 3(x - 5) \\
 &= (x - 5)(2x + 3)
 \end{aligned}$$

Answer.47. $5x^2 - 16x - 21$

$$\begin{aligned}
 5x^2 - 16x - 21 &= 5x^2 - 21x + 5x - 21 \\
 &= x(5x - 21) + 1(5x - 21) \\
 &= (5x - 21)(x + 1)
 \end{aligned}$$

Answer.48. $6x^2 - 11x - 35$

$$\begin{aligned}
 6x^2 - 11x - 35 &= 6x^2 - 21x + 10x - 35 \\
 &= 3x(2x - 7) + 5(2x - 7) \\
 &= (2x - 7)(3x + 5)
 \end{aligned}$$

Answer.49. $9x^2 - 3x - 20$

$$\begin{aligned}
 9x^2 - 3x - 20 &= 9x^2 - 15x + 12x - 20 \\
 &= 3x(3x - 5) + 4(3x - 5) \\
 &= (3x - 5)(3x + 4)
 \end{aligned}$$

Answer.50. $10x^2 - 9x - 7$

$$\begin{aligned}
 10x^2 - 9x - 7 &= 10x^2 - 14x + 5x - 7 \\
 &= 2x(5x - 7) + 1(5x - 7)
 \end{aligned}$$

$$= (5x - 7)(2x + 1)$$

Answer.51. $x^2 - 2x + \frac{7}{16}$

$$\begin{aligned} x^2 - 2x + \frac{7}{16} &= \frac{16x^2 - 32x + 7}{16} \\ &= \frac{16x^2 - 28x - 4x + 7}{16} \\ &= \frac{4x(4x - 7) - 1(4x - 7)}{16} \\ &= \frac{(4x - 7)(4x - 1)}{16} \\ &= \left(\frac{4x - 7}{16}\right)(4x - 1) \\ &= \left(\frac{x}{4} - \frac{7}{16}\right)(4x - 1) \end{aligned}$$

Answer.52. $\frac{1}{3}x^2 - 2x - 9$

$$\begin{aligned} \frac{1}{3}x^2 - 2x - 9 &= \frac{x^2 - 6x - 27}{3} \\ &= \frac{x^2 - 9x + 3x - 27}{3} \\ &= \frac{x(x - 9) + 3(x - 9)}{3} \\ &= \frac{(x - 9)(x + 3)}{3} \\ &= \left(\frac{x + 3}{3}\right)(x - 9) \\ &= \left(1 + \frac{x}{3}\right)(x - 9) \end{aligned}$$

Answer.53. $x^2 + \frac{12}{35}x + \frac{1}{35}$

$$\begin{aligned} x^2 + \frac{12}{35}x + \frac{1}{35} &= \frac{35x^2 + 12x + 1}{35} \\ &= \frac{35x^2 + 7x + 5x + 1}{35} \\ &= \frac{7x(5x + 1) + 1(5x + 1)}{35} \\ &= \frac{(5x + 1)(7x + 1)}{35} \\ &= (5x + 1)\left(\frac{7x + 1}{35}\right) \\ &= (5x + 1)\left(\frac{x}{5} + \frac{1}{35}\right) \end{aligned}$$

Answer.54. $21x^2 - 2x + \frac{1}{21}$

$$\begin{aligned} 21x^2 - 2x + \frac{1}{21} &= 21x^2 - x - x + \frac{1}{21} \\ &= 21x\left(x - \frac{1}{21}\right) - 1\left(x - \frac{1}{21}\right) \\ &= \left(x - \frac{1}{21}\right)(21x - 1) \end{aligned}$$

Answer.55. $\frac{3}{2}x^2 + 16x + 10$

$$\begin{aligned} \frac{3}{2}x^2 + 16x + 10 &= \frac{3}{2}x^2 + x + 15x + 10 \\ &= \frac{x}{2}(3x + 2) + 5(3x + 2) \\ &= (3x + 2)\left(\frac{x}{2} + 5\right) \end{aligned}$$

Answer.56. $\frac{2}{3}x^2 - \frac{17}{3}x - 28$

$$\begin{aligned} \frac{2}{3}x^2 - \frac{17}{3}x - 28 &= \frac{2x^2 - 17x - 84}{3} \\ &= \frac{2x^2 - 24x + 7x - 84}{3} \\ &= \frac{2x(x - 12) + 7(x - 12)}{3} \\ &= \frac{(x - 12)(2x + 7)}{3} \\ &= \left(\frac{x - 12}{3}\right)(2x + 7) \\ &= \left(\frac{x}{3} - \frac{1}{4}\right)(2x + 7) \end{aligned}$$

Answer.57. $\frac{3}{5}x^2 - \frac{19}{5}x + 4$

$$\begin{aligned} \frac{3}{5}x^2 - \frac{19}{5}x + 4 &= \frac{3x^2 - 19x + 20}{5} \\ &= \frac{3x^2 - 15x - 4x + 20}{5} \\ &= \frac{3x(x - 5) - 4(x - 5)}{5} \\ &= \frac{(x - 5)(3x - 4)}{5} \\ &= \left(\frac{x - 5}{5}\right)(3x - 4) \\ &= \left(\frac{x}{5} - 1\right)(3x - 4) \end{aligned}$$

Answer.58. $2x^2 - x + \frac{1}{8}$

$$\begin{aligned} 2x^2 - x + \frac{1}{8} &= \frac{16x^2 - 8x + 1}{8} \\ &= \frac{16x^2 - 4x - 4x + 1}{8} \\ &= \frac{4x(4x - 1) - 1(4x - 1)}{8} \\ &= \left(\frac{4x - 1}{8}\right)(4x - 1) \\ &= \left(\frac{x}{2} - \frac{1}{8}\right)(4x - 1) \end{aligned}$$

Answer.59. $2(x + y)^2 - 9(x + y) - 5$

Let $(x + y) = a$

$$\begin{aligned} 2(x + y)^2 - 9(x + y) - 5 &= 2a^2 - 9a - 5 \\ &= 2a^2 - 10a + a - 5 \\ &= 2a(a - 5) + 1(a - 5) \\ &= (a - 5)(2a + 1) \end{aligned}$$

$$\begin{aligned} \therefore 2(x + y)^2 - 9(x + y) - 5 &= (x + y - 5)\{2(x + y) + 1\} && [\because a = (x + y)] \\ &= (x + y - 5)(2x + 2y + 1) \end{aligned}$$

Answer.60. $9(2a - b)^2 - 4(2a - b) - 13$

Let $(2a - b) = p$

$$\begin{aligned} 9(2a - b)^2 - 4(2a - b) - 13 &= 9p^2 - 4p - 13 \\ &= 9p^2 - 13p + 9p - 13 \\ &= p(9p - 13) + 1(9p - 13) \\ &= (9p - 13)(p + 1) \end{aligned}$$

$$\begin{aligned} \therefore 9(2a - b)^2 - 4(2a - b) - 13 &= \{9(2a - b) - 13\}\{(2a - b) + 1\} && [\because p = (2a - b)] \\ &= (18a - 9b - 13)(2a - b + 1) \end{aligned}$$

Answer.61. $7(x - 2y)^2 - 25(x - 2y) + 12$

$$\begin{aligned}
 \text{Let } (x - 2y) &= a \\
 7(x - 2y)^2 - 25(x - 2y) + 12 &= 7a^2 - 25a + 12 \\
 &= 7a^2 - 21a - 4a + 12 \\
 &= 7a(a - 3) - 4(a - 3) \\
 &= (a - 3)(7a - 4) \\
 \therefore 7(x - 2y)^2 - 25(x - 2y) + 12 &= (x - 2y - 3)\{7(x - 2y) - 4\} & [\because a = (x - 2y)] \\
 &= (x - 2y - 3)(7x - 14y - 4)
 \end{aligned}$$

Answer.62. $10\left(3x + \frac{1}{x}\right)^2 - \left(3x + \frac{1}{x}\right) - 3$

$$\begin{aligned}
 \text{Let } \left(3x + \frac{1}{x}\right) &= a \\
 10\left(3x + \frac{1}{x}\right)^2 - \left(3x + \frac{1}{x}\right) - 3 &= 10a^2 - a - 3 \\
 &= 10a^2 - 6a + 5a - 3 \\
 &= 2a(5a - 3) + 1(5a - 3) \\
 &= (5a - 3)(2a + 1) \\
 \therefore 10\left(3x + \frac{1}{x}\right)^2 - \left(3x + \frac{1}{x}\right) - 3 &= \left\{5\left(3x + \frac{1}{x}\right) - 3\right\}\left\{2\left(3x + \frac{1}{x}\right) + 1\right\} [\because a = \left(3x + \frac{1}{x}\right)] \\
 &= \left(15x + \frac{5}{x} - 3\right)\left(6x + \frac{2}{x} + 1\right)
 \end{aligned}$$

Answer.63. $6\left(2x - \frac{3}{x}\right)^2 + 7\left(2x - \frac{3}{x}\right) - 20$

$$\begin{aligned}
 \text{Let } \left(2x - \frac{3}{x}\right) &= a \\
 6\left(2x - \frac{3}{x}\right)^2 + 7\left(2x - \frac{3}{x}\right) - 20 &= 6a^2 + 7a - 20 \\
 &= 6a^2 + 15a - 8a - 20 \\
 &= 3a(2a + 5) - 4(2a + 5) \\
 &= (2a + 5)(3a - 4) \\
 \therefore 6\left(2x - \frac{3}{x}\right)^2 + 7\left(2x - \frac{3}{x}\right) - 20 &= \left\{2\left(2x - \frac{3}{x}\right) + 5\right\}\left\{3\left(2x - \frac{3}{x}\right) - 4\right\} [\because a = \left(2x - \frac{3}{x}\right)] \\
 &= \left(4x - \frac{6}{x} + 5\right)\left(6x - \frac{9}{x} - 4\right)
 \end{aligned}$$

Answer.64. $(a + 2b)^2 + 101(a + 2b) + 100$

$$\begin{aligned}
 \text{Let } (a + 2b) &= p \\
 (a + 2b)^2 + 101(a + 2b) + 100 &= p^2 + 101p + 100 \\
 &= p^2 + 100p + p + 100 \\
 &= p(p + 100) + 1(p + 100) \\
 &= (p + 100)(p + 1) \\
 \therefore (a + 2b)^2 + 101(a + 2b) + 100 &= \{(a + 2b) + 100\}\{(a + 2b) + 1\} & [\because p = (a + 2b)] \\
 &= (a + 2b + 100)(a + 2b + 1)
 \end{aligned}$$

Answer.65. $4x^4 + 7x^2 - 2$

$$\begin{aligned}
 \text{Let } x^2 &= y \\
 4x^4 + 7x^2 - 2 &= 4y^2 + 7y - 2 \\
 &= 4y^2 + 8y - y - 2 \\
 &= 4y(y + 2) - 1(y + 2) \\
 &= (y + 2)(4y - 1) \\
 \therefore 4x^4 + 7x^2 - 2 &= (x^2 + 2)(4x^2 - 1) \\
 &= (x^2 + 2)\{(2x)^2 - 1^2\} \\
 &= (x^2 + 2)(2x - 1)(2x + 1)
 \end{aligned}$$

Answer.66. $\{(999)^2 - 1\}$

$$\begin{aligned} \{(999)^2 - 1\} &= \{(999)^2 - (1)^2\} \\ &= (999 - 1)(999 + 1) \\ &= 998 \times 1000 \\ &= 998000 \end{aligned}$$