1. $6u^3 - 16u + 5$

2. $(2t^3 - 9t^2 - 11t) - (4t^2 - 3t) = 2t^3 - 9t^2 - 11t - 4t^2 + 3t = 2t^3 - 13t^2 - 8t$

3a. $6r^2 + 19r - 7$

3b. $(4p - 3q)(4p - 3q) = 16p^2 - 24pq + 9q^2$

3c. $6w^3 - 10w^2 - 4w - 9w^2 + 15w + 6 = 6w^3 - 19w^2 + 11w + 6$

4a. Apply long division to get $(x + 3) - \dfrac{8}{x + 8}$, as shown below.

$$
\require{enclose}
\begin{array}{r}
x + 3 \\
x + 8 \overline{\smash{)}\ x^2 + 11x + 16} \\
\underline{-x^2 - 8x } \\
3x + 16 \\
\underline{-3x - 24} \\
-8
\end{array}
$$

4b. Apply long division to get $(4z^2 + 12z + 4) - \dfrac{17z + 9}{z^2 - z + 2}$, as shown below.

$$
\begin{array}{r}
4z^2 + 12z + 4 \\
z^2 - z + 2 \overline{\smash{)}\ 4z^4 + 8z^3 + 3z - 1} \\
\underline{-4z^4 + 4z^3 - 8z^2 } \\
12z^3 - 8z^2 + 3z \\
\underline{-12z^3 + 12z^2 - 24z } \\
4z^2 - 21z - 1 \\
\underline{-4z^2 + 4z - 8} \\
-17z - 9
\end{array}
$$

5a. $8m(3m^2 - 2)$

5b. $3yz^3(5y^2 + 9yz - 12z^2)$

6a. $x(m + q) + y(m + q) = (m + q)(x + y)$

6b. $a^2(2a + 1) - 7(2a + 1) = (2a + 1)(a^2 - 7)$

7a. $(4k + 7)(2k + 5)$

7b. $-2(6c^2 + 5c - 21) = -2(3c + 7)(2c - 3)$

7c. $4(16h^4 - r^4) = 4[(4h^2)^2 - (r^2)^2] = 4(4h^2 - r^2)(4h^2 + r^2) = 4(2h - r)(2h + r)(4h^2 + r^2)$

7d. $(5x)^3 - 6^3 = (5x - 6)[(5x)^2 + (5x)(6) + 6^2] = (5x - 6)(25x^2 + 30x + 36)$

7e. $[(2v + n) - (2v - n)][(2v + n) + (2v - n)] = 2n \cdot 4v = 8nv$

8a. $x^2 - x - 12 = 0 \ \Rightarrow\ (x - 4)(x + 3) = 0 \ \Rightarrow\ x - 4 = 0 \ \text{or} \ x + 3 = 0 \ \Rightarrow\ x = 4 \ \text{or} \ x = -3 \ \Rightarrow\ \{-3, 4\}$ is the solution set.

8b. $y^2 + 6y - 16 = -21 \ \Rightarrow\ y^2 + 6y + 5 = 0 \ \Rightarrow\ (y + 5)(y + 1) = 0 \ \Rightarrow\ y + 5 = 0 \ \text{or} \ y + 1 = 0 \ \Rightarrow$ $y = -5 \ \text{or} \ y = -1 \ \Rightarrow\ \{-5, -1\}$ is the solution set.

8c. $z^3 - 6z^2 + 8z = 0 \ \Rightarrow\ z(z - 2)(z - 4) = 0 \ \Rightarrow\ z = 0, 2, 4 \ \Rightarrow\ \{0, 2, 4\}$ is the solution set.