

## Question 1

$$(1) \quad 3 \cdot \left( \frac{5x}{3} - \frac{y}{10} \right)^2 = 3 \left( \frac{25x^2}{9} - \frac{10xy}{30} + \frac{y^2}{100} \right) = \frac{25x^2}{3} - xy + \frac{3y^2}{100}$$

$$(2) \quad x^4 + 2y^6 - (x^2 + 2y^3)^2 = x^4 + 2y^6 - x^4 - 4x^2y^3 - 4y^6 = -2y^6 - 4x^2y^3$$

$$(3) \quad (a^2 - 1)^2 - (3a - b) \cdot a^2 \cdot (3a + b) \\ = a^4 - 2a^2 + 1 - a^2(9a^2 - b^2) \\ = a^4 - 2a^2 + 1 - 9a^4 + a^2b^2 \\ = -8a^4 - 2a^2 + a^2b^2 + 1$$

$$(4) \quad (-2x - 1)(3x + 1) - (1 - 4x)(4x + 1) + 7x \\ = -6x^2 - 2x - 3x - 1 - (1 - 16x^2) + 7x \\ = -6x^2 - 2x - 3x - 1 - 1 + 16x^2 + 7x \\ = 10x^2 + 2x - 2$$

$$(5) \quad (a + 2b - 1)(a + 2b + 1) \\ = (a + 2b)^2 - 1 \\ = a^2 + 4ab + 4b^2 - 1$$

## Question 2

$$(1) \quad 45x^3y^5 + 9xy^5 - 54x^2y^7 = 9xy^5(5x^2 + 1 - 6xy^2)$$

$$(2) \quad 36a^3 - 12a^2 + a = a(36a^2 - 12a + 1) = a(6a - 1)^2$$

$$(3) \quad -\frac{50x^2}{3} + \frac{2a^2}{3} = \frac{2a^2}{3} - \frac{50x^2}{3} = \frac{2}{3}(a^2 - 25x^2) = \frac{2}{3}(a - 5x)(a + 5x)$$

$$(4) \quad -9x^2 + 48xz - 64z^2 = -(3x - 8z)^2$$

$$(5) \quad 49a^2 - (2a + 5)^2 \\ = (7a - 2a - 5)(7a + 2a + 5) \\ = (5a - 5)(9a + 5) \\ = 5(a - 1)(9a + 5)$$

$$(6) \quad (2x - 1)(3x + 1) - x(10x - 5) + (2x - 3)(1 - 2x) \\ = (2x - 1)(3x + 1) - 5x(2x - 1) - (2x - 3)(2x - 1)$$

$$\begin{aligned} &= (2x - 1)(3x + 1 - 5x - 2x + 3) \\ &= (2x - 1)(-4x + 4) \\ &= 4(2x - 1)(-x + 1) \end{aligned}$$

$$\begin{aligned} (7) \quad &(y^2 - 4)(x^2 - 8) + 4(4 - y^2)(x - 3) \\ &= (y^2 - 4)(x^2 - 8) - 4(y^2 - 4)(x - 3) \\ &= (y^2 - 4)(x^2 - 8 - 4x + 12) \\ &= (y^2 - 4)(x^2 - 4x + 4) \\ &= (y - 2)(y + 2)(x - 2)^2 \end{aligned}$$

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