

Exercise 1

$$\begin{aligned} &= (5x^{2m-1}y^3)^3 - 3(5x^{2m-1}y^3)^2 \cdot 6x^{4m+2}y^{m-2} + 3 \cdot (5x^{2m-1}y^3) \cdot (6x^{4m+2}y^{m-2})^2 - (6x^{4m+2}y^{m-2})^3 \\ &= 125x^{6m-3}y^9 - 3 \cdot 25x^{4m-2}y^6 \cdot 6x^{4m+2}y^{m-2} + 3 \cdot 5x^{2m-1}y^3 \cdot 36x^{8m+4}y^{2m-4} - 216x^{12m+6}y^{3m-6} \\ &= 125x^{6m-3}y^9 - 450x^{8m}y^{m+4} + 540x^{10m+3}y^{2m-1} - 216x^{12m+6}y^{3m-6} \end{aligned}$$

Exercise 2

$$\begin{aligned} 20x^2 + 15x - 8x - 6 - (8x^2 - 6x + 28x - 21) &= 16x^2 + 47 - (4x^2 + 4x - 3x - 3) \\ 20x^2 + 15x - 8x - 6 - 8x^2 + 6x - 28x + 21 &= 16x^2 + 47 - 4x^2 - 4x + 3x + 3 \\ 12x^2 - 15x + 15 &= 12x^2 - x + 50 \\ -14x &= 35 \\ x &= -\frac{5}{2} \\ S &= \left\{-\frac{5}{2}\right\} \end{aligned}$$

Exercise 3

$$\begin{aligned} 48 - (12 - 3x - 4x + x^2) &= x - x^2 \\ 48 - 12 + 3x + 4x - x^2 &= x - x^2 \\ 6x &= -36 \\ x &= -6 \\ S &= \{-6\} \end{aligned}$$

Exercise 4

$$\begin{aligned} &= 2x(x^4 - 81) \\ &= 2x(x^2 + 9)(x^2 - 9) \\ &= 2x(x^2 + 9)(x + 3)(x - 3) \end{aligned}$$

Exercise 5

$$= (5x + 2)^3$$

Exercise 6

$$\begin{aligned} &= (3x^3)^3 - (4y^2)^3 \\ &= (3x^3 - 4y^2)[(3x^3)^2 + 3x^3 \cdot 4y^2 + (4y^2)^2] \\ &= (3x^3 - 4y^2)(9x^6 + 12x^3y^2 + 16y^4) \end{aligned}$$

Exercise 7

$$\begin{aligned} &= (3x)^3 + 2^3 \\ &= (3x + 2)[(3x)^2 - 3x \cdot 2 + (2)^2] \\ &= (3x + 2)(9x^2 - 6x + 4) \end{aligned}$$

Exercise 8

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