

Answers

$$\#47) a) 125x^3 + 64y^3z^6$$

$$= (5x + 4yz^2)(25x^2 - 20xyz + 16y^2z^4)$$

$$b) 8x^3 - (3y+2)^3$$

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

$$= (2x - 3y - 2)(4x^2 + 6xy + 4x + 9y^2 + 12y + 4)$$

$$c) x^{\frac{5}{2}} + x^{\frac{3}{2}}$$

$$= x^{\frac{3}{2}}(x+1)$$

$$d) -20x^{\frac{3}{4}} + 4x^{\frac{1}{4}}$$

$$= -4x^{\frac{3}{4}}(5-x)$$

$$\frac{1}{4} - \left(-\frac{3}{4}\right) \\ \frac{1}{4} + \frac{3}{4}$$

$$e) 12x^{\frac{2}{3}} - 18x^{\frac{1}{3}}$$

$$= 6x^{\frac{2}{3}}(2-3x)$$

$$\frac{1}{3} - \left(-\frac{2}{3}\right) \\ \frac{1}{3} + \frac{2}{3}$$

$$f) (x^2-3)^{\frac{3}{2}} + (x^2-3)^{\frac{1}{2}}$$

$$\frac{3}{2} - \frac{1}{2}$$

$$= (x^2-3)^{\frac{1}{2}} [1 + (x^2-3)]$$

$$= (x^2-3)^{\frac{1}{2}} (1 + x^2 - 6x^2 + 9)$$

$$= (x^2-3)^{\frac{1}{2}} (x^2 - 6x^2 + 10)$$

$$g) (x+2)^{\frac{3}{2}} - (x+2)^{\frac{1}{2}}$$

$$= (x+2)^{\frac{1}{2}} ((x+2) - 1)$$

$$= (x+2)^{\frac{1}{2}} (x+1)$$

$$h) (x^2+2)^{-\frac{5}{3}} + (x^2+2)^{-\frac{1}{3}}$$

$$= (x^2+2)^{-\frac{5}{3}} [1 + (x^2+2)]$$

$$= \frac{1}{(x^2+2)^{\frac{5}{3}}} + \frac{1}{(x^2+2)^{\frac{1}{3}}}$$

$$= \frac{1}{(x^2+2)^{\frac{5}{3}}} + \frac{(x^2+2)^{\frac{2}{3}}}{(x^2+2)^{\frac{5}{3}}}$$

$$= (x^2+2)^{-\frac{5}{3}} (x^2+3)$$

$$e) (x+4)^{-\frac{1}{2}} - (x+4)^{-\frac{3}{2}}$$

$$= (x+4)^{-\frac{1}{2}} ((x+4) - 1)$$

$$= \frac{1}{\sqrt{x+4}} - \frac{1}{2\sqrt{x+4}}$$

$$= \frac{2}{2\sqrt{x+4}} - \frac{1}{2\sqrt{x+4}}$$

$$= (x+4)^{-\frac{1}{2}} (x+3)$$

$$j) (5x-1)^{\frac{1}{2}} - \frac{1}{3}(5x-1)^{\frac{3}{2}}$$

$$= \frac{1}{3}(5x-1)^{\frac{1}{2}} (3 - (5x-1))$$

$$= \frac{1}{3}(5x-1)^{\frac{1}{2}} (3-5x+1)$$

$$= \frac{1}{3}(5x-1)^{\frac{1}{2}} (4-5x) \text{ or } -\frac{1}{3}(5x-1)^{\frac{1}{2}} (5x-4) \checkmark$$

$$k) 2x(3x-5)^{\frac{1}{2}} - \frac{4}{3}x^2(3x-5)^{-\frac{1}{2}}$$

$$= \frac{2x}{3}(3x-5)^{\frac{1}{2}} (3(3x-5) - 2x)$$

$$= \frac{2x}{3}(3x-5)^{\frac{1}{2}} (9x-15-2x)$$

$$= \frac{2x}{3}(3x-5)^{\frac{1}{2}} (7x-15) \checkmark$$

$$2x = \frac{2}{3}x$$

$$2 = \frac{3}{2}$$

$$\frac{1}{2} = \left(\frac{1}{2}\right)$$

$$l) -8(4x+3)^{-2} + 10(5x+1)(4x+3)^{-1} \quad -1 - (-2)$$

$$= -2(4x+3)^{-2} [4 - 5(5x+1)(4x+3)]$$

$$= -2(4x+3)^{-2} [4 - 5(20x^2 + 15x + 4x + 3)]$$

$$= -2(4x+3)^{-2} [4 - 100x^2 - 75x - 20x - 15]$$

$$= -2(4x+3)^{-2} (-100x^2 - 95x - 11)$$

$$= 2(4x+3)^{-2} (100x^2 + 95x + 11)$$

$$b^2 - 4ac$$

$$(95)^2 - 4(100)(11)$$

$$9025 - 4400$$

$$= 4625$$

$$m) -x^{3/2} (x^2+3)^{-3/2} + \frac{1}{3} x^{-1/2} (x^2+3)^{-1/2}$$

$$= -\frac{1}{3} x^{-1/2} (x^2+3)^{-3/2} [3x^2 - (x^2+3)]$$

$$\frac{3}{2} - (-\frac{1}{2}) \quad -\frac{1}{2} - (-\frac{3}{2})$$

$$= -\frac{1}{3} x^{-1/2} (x^2+3)^{-3/2} (2x^2-3)$$

$$n) -\frac{5}{2} (1-2x)^{-1/2} (x-3)^{1/2} + \frac{1}{2} (x-3)^{-1/2} (1-2x)^{1/2}$$

$$\frac{1}{2} - (-\frac{1}{2})$$

$$\frac{1}{2}$$

$$= -\frac{1}{2} (1-2x)^{-1/2} (x-3)^{-1/2} [5(x-3) - (1-2x)]$$

$$= -\frac{1}{2} (1-2x)^{-1/2} (x-3)^{-1/2} (5x-15-1+2x)$$

$$= -\frac{1}{2} (1-2x)^{-1/2} (x-3)^{-1/2} (7x-16)$$