



$$\begin{aligned} \text{a)} \quad & 56x + (424y - 305) - (356y - 42x - 220) + 100 \\ & = 56x + 424y - 305 - 356y + 42x + 220 + 100 = \mathbf{98x + 68y + 15} \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & 86a - \{10a + 13b - [(5a - 3b) - (3a + 2b)]\} \\ & = 86a - \{10a + 13b - [5a - 3b - 3a - 2b]\} = 86a - \{10a + 13b - [2a - 5b]\} \\ & = 86a - \{10a + 13b - 2a + 5b\} = 86a - \{8a + 18b\} = 86a - 8a - 18b = \mathbf{78a - 18b} \end{aligned}$$

$$\text{c)} \quad \frac{3a}{x} + \frac{10a}{6x} + \frac{a}{3x} = \frac{18a}{6x} + \frac{10a}{6x} + \frac{2a}{6x} = \frac{30a}{6x} = \frac{\mathbf{5a}}{x}$$

$$\text{d)} \quad \frac{36mn^2}{5x} \div \frac{9m^2n}{10x} = \frac{36mn^2}{5x} \cdot \frac{10x}{9m^2n} = \frac{4n}{1} \cdot \frac{2}{m} = \frac{\mathbf{8n}}{m}$$

$$\text{e)} \quad 32z^2 \div \frac{8z}{9x} = 32z^2 \cdot \frac{9x}{8z} = 4z \cdot \frac{9x}{1} = \mathbf{36xz}$$

$$\text{f)} \quad \left(\frac{a}{4b} - \frac{4b}{a}\right) \cdot 4ab = \frac{4a^2b}{4b} - \frac{16ab^2}{a} = \mathbf{a^2 - 16b^2}$$

$$\text{g)} \quad (x^2 - y^2) \left(\frac{x}{y} + \frac{y}{x}\right) = \frac{x^3}{y} + \frac{x^2y}{x} - \frac{y^2x}{y} - \frac{y^3}{x} = \frac{x^4}{xy} + \frac{x^2y^2}{xy} - \frac{y^2x^2}{xy} - \frac{y^4}{xy} = \frac{x^4 - y^4}{xy} = \frac{\mathbf{x^3}}{y} - \frac{\mathbf{y^3}}{x}$$

$$\text{h)} \quad \frac{6ax - 4bx}{4ax + 2bx} = \frac{2x(3a - 2b)}{2x(2a + b)} = \frac{\mathbf{3a - 2b}}{\mathbf{2a + b}}$$

$$\text{i)} \quad \frac{u + v}{7p} \div \frac{6u + 6v}{14p^2q} = \frac{u + v}{7p} \cdot \frac{14p^2q}{6(u + v)} = \frac{2pq}{6} = \frac{\mathbf{pq}}{\mathbf{3}}$$

$$\text{j)} \quad \frac{u^2 - 2u + 1}{u^2 - 1} = \frac{(u - 1)^2}{(u + 1)(u - 1)} = \frac{\mathbf{u - 1}}{\mathbf{u + 1}}$$

$$\text{k)} \quad (16a^4 - 81b^4) \div (4a^2 + 9b^2) = \frac{16a^4 - 81b^4}{4a^2 + 9b^2} = \frac{(4a^2 + 9b^2)(4a^2 - 9b^2)}{4a^2 + 9b^2} = \mathbf{4a^2 - 9b^2}$$

$$\begin{aligned} \text{l)} \quad & \frac{3u - 5v}{15uv} - \frac{u - 7w}{12uw} - \frac{5v - 4w}{20vw} + \frac{3}{4u} + \frac{3}{5v} + \frac{4}{3w} \\ & = \frac{4w(3u - 5v) - 5v(u - 7w) - 3u(5v - 4w) + 15vw \cdot 3 + 12uw \cdot 3 + 20uv \cdot 4}{60uvw} \\ & = \frac{60uw + 60vw + 60uv}{60uvw} = \frac{60(uw + vw + uv)}{60(uvw)} = \frac{uw}{uvw} + \frac{vw}{uvw} + \frac{uv}{uvw} = \frac{\mathbf{1}}{\mathbf{v}} + \frac{\mathbf{1}}{\mathbf{u}} + \frac{\mathbf{1}}{\mathbf{w}} \end{aligned}$$

$$\begin{aligned} \text{m)} \quad & \frac{a}{2} \cdot 4a + \frac{1}{8} \left\{ \left[-\left(\frac{1}{4}a - \frac{1}{4}b\right) \right] \cdot [32a + 32b] \right\} = 2a^2 + \frac{1}{8} \left\{ \left[-\frac{1}{4}a + \frac{1}{4}b \right] \cdot [32a + 32b] \right\} \\ & = 2a^2 + \frac{1}{8} \{-8a^2 - 8ab + 8ab + 8b^2\} = 2a^2 - a^2 + b^2 = \mathbf{a^2 + b^2} \end{aligned}$$

$$\begin{aligned} \text{n)} \quad & \frac{\{-2 \cdot (3x - y)^2 - [3(4xy - 6x^2 - \frac{2}{3}y^2)]\} + 199}{-199} = \frac{\{-2 \cdot (9x^2 - 6xy + y^2) - [12xy - 18x^2 - 2y^2]\} + 199}{-199} \\ & = \frac{-18x^2 + 12xy - 2y^2 - 12xy + 18x^2 + 2y^2 + 199}{-199} = \frac{199}{-199} = \mathbf{-1} \end{aligned}$$