EXERCISE 19(D)

Question 1.

Divide :

(*i*) $3a$ by a

(*ii*) $15x$ by $3x$

(*iii*) $16m$ by 4

(*iv*) $20x^2$ by $5x$

(*v*) $30p^2$ by $10p^2$

(*vi*) $14a^3b^3$ by $2a^2$

(*vii*) $18pqr^2$ by $3pq$

(*viii*) 100 by $50b$

Solution:

(*i*) $3a \div a = \dfrac{3 \times a}{a} = 3$

(*ii*) $15x \div 3x = \dfrac{3 \times 5 \times x}{3 \times x} = 5$

(*iii*) $16m \div 4 = \dfrac{4 \times 4 \times m}{4} = 4m$

(*iv*) $20x^2 \div 5x = \dfrac{4 \times 5 \times x^{2-1}}{5} = 4x$

(*v*) $30p^2 \div 10p^2 = \dfrac{3 \times 10p^2}{10p^2} = 3$

(*vi*) $14a^3b^3 \div 2a^2 = \dfrac{2 \times 7a^{3-2}b^3}{2} = 7ab^3$

(*vii*) $18pqr^2 \div 3pq = \dfrac{3 \times 6.p \times q \times r^2}{3 \times p \times q} = 6r^2$

(*viii*) $100 \div 50b = \dfrac{2 \times 50}{50 \times b} = \dfrac{2}{b}$

Question 2.

Simplify :

(*i*) $2x^5 \div x^2$

(*ii*) $6a^8 \div 3a^3$

(*iii*) $20xy \div -5xy$

(*iv*) $-24a^2b^2c^2 \div 6ab$

(*v*) $-5x^2y \div xy^2$

(*vi*) $40p^3q^4r^5 \div 10p^3q$

(*vii*) $-64x^4y^3z \div 4x^3y^2z$

(*viii*) $35xy^5 \div 7x^2y^4$

Solution:

(*i*) $2x^5 \div x^2 = \dfrac{2x^5}{x^2}$

$= 2x^{5-2} = \mathbf{2x^3}$

(*ii*) $6a^8 \div 3a^3 = \dfrac{2 \times 3 \times a^{8-3}}{3} = \mathbf{2a^5}$

(*iii*) $20xy \div -5xy = \dfrac{4 \times 5 \times x \times y}{-5 \times x \times y} = \mathbf{-4}$

(*iv*) $-24a^2b^2c^2 \div 6ab$

$= \dfrac{-4 \times 6 \times a^{2-1}b^{2-1}c^2}{6} = \mathbf{-4abc^2}$

(*v*) $-5x^2y \div xy^2 = \dfrac{-5x^{2-1}}{y^{2-1}} = -\dfrac{\mathbf{5x}}{\mathbf{y}}$

(*vi*) $40p^3q^4r^5 \div 10p^3q$

$= \dfrac{4 \times 10 \times p^{3-3} \cdot q^{4-1} \cdot r^5}{10}$

$= 4 \times q^{4-1} \times r^5 = \mathbf{4q^3 r^5}$

(*vii*) $-64x^4y^3z \div 4x^3y^2z$

$= \dfrac{4 \times 4 \times 4 \times x^4 \times y^3 \times z}{4 \times x^3 \times y^2 \times z}$

$= -16x^{4-3}\, y^{3-2} = \mathbf{-16xy}$

(*viii*) $35xy^5 \div 7x^2y^4$

$= \dfrac{5 \times 7 \times y^{5-4}}{7 \times x^{2-1}} = \dfrac{\mathbf{5y}}{\mathbf{x}}$

Question 3.

Divide :

(*i*) $-\dfrac{3m}{4}$ by $2m$

(*ii*) $-15p^6q^8$ by $-5p^6q^7$

(iii) $-21m^5n^7$ by $14m^2n^2$

(iv) $36a^4x^5y^6$ by $4x^2a^3y^2$

(v) $20x^3a^6$ by $5xy$

(vi) $\frac{28a^2b^3}{c^2}$ by $4abc$

(vii) $\frac{2a^2}{9b^2}$ by $\frac{3b}{2a}$

(viii) $\frac{-5{\cdot}5x^2}{y}$ by $\frac{11x}{y}$

(ix) $\frac{64x^2y^2}{z^2}$ by $\frac{8xy}{z}$

Solution:

(i) $-\frac{3m}{4} \div 2m = \frac{-3 \times m}{4 \times 2 \times m} = -\frac{\mathbf{3}}{\mathbf{8}}$

(ii) $-15p^6q^8 \div -5p^6q^7 = \frac{-5 \times 3 \times p^6 \times q^8}{-5 \times p^6 \times q^7}$

$= 3q^{8-7} = \mathbf{3q}$

(iii) $-21m^5n^7 \div 14m^2n^2$

$= \frac{-3 \times 7 \times m^{5-2}n^{7-2}}{14} = -\frac{\mathbf{3}}{\mathbf{2}}\mathbf{m^3n^5}$

(iv) $36a^4x^5y^6 \div 4x^2a^3y^2$

$= \frac{4 \times 9a^{4-3} \times x^{5-2} \times y^{6-2}}{4} = \mathbf{9ax^3y^4}$

(v) $20x^3a^6 \div 5xy = \frac{4 \times 5x^3a^6}{5xy}$

$= \frac{4 \times 5 \times x^{3-1} \times a^6}{5xy} = \frac{\mathbf{4x^2a^6}}{\mathbf{y}}$

(vi) $\frac{28a^2b^3}{c^2} \div 4abc$

$= \frac{4 \times 7 \times a^{2-1} \times b^{3-1}}{4 \times c^{2+1}} = \frac{\mathbf{7ab^2}}{\mathbf{c^3}}$

(vii) $\frac{2a^2}{9b^2} \div \frac{3b}{2a} = \frac{2a^2}{9b^2} \times \frac{2a}{3b}$

$= \frac{2 \times 2 \times a^{2+1}}{9 \times 3b^{2+1}} = \frac{\mathbf{4a^3}}{\mathbf{27b^3}}$

(viii) $\frac{-5{\cdot}5x^2}{y} \div \frac{11x}{y} = \frac{-55x^2}{10y} \times \frac{y}{11x}$

$= -\frac{5x}{10} = -\mathbf{0{\cdot}5x}$

(ix) $\frac{64x^2y^2}{z^2} \div \frac{8xy}{z}$

$= \frac{8 \times 8 \times x^2 \times y^2}{z^2} \times \frac{z}{8 \times x \times y}$

$= \frac{8x^{2-1}y^{2-1}}{z^{2-1}} = \frac{\mathbf{8xy}}{z}$

Question 4.

Simplify :

(i) $\frac{-15m^5n^2}{-3m^5}$ (ii) $\frac{35x^4y^2}{-15x^2y^2}$

(iii) $\frac{-24x^6y^2}{6x^6y}$

Solution:

(i) $\frac{-15m^5n^2}{-3m^5} = \frac{-3 \times 5 \times m^5 \times n^2}{-3 \times m^5} = \mathbf{5n^2}$

(ii) $\frac{35x^4y^2}{-15x^2y^2} = \frac{-5 \times -7 \times x^4 \times y^2}{3 \times -5 \times x^2 \times y^2}$

$= \frac{-7x^{4-2}}{3} = -\frac{7x^2}{3}$

(iii) $\frac{-24x^6y^2}{6x^6y} = \frac{-4 \times 6 \times x^6 \times y^2}{6 \times x^6 \times y}$

$= -4y^{2-1} = -4y$

Question 5.

Divide :

(*i*) $9x^3 - 6x^2$ by $3x$

(*ii*) $6m^2 - 16m^3 + 10m^4$ by $-2m$

(*iii*) $15x^3y^2 + 25x^2y^3 - 36x^4y^4$ by $5x^2y^2$

(*iv*) $36a^3x^5 - 24a^4x^4 + 18a^5x^3$ by $-6a^3x^3$.

Solution:

(*i*) $9x^3 - 6x^2$ by $3x$

$$= \frac{9x^3 - 6x^2}{3x} = \frac{9x^3}{3x} - \frac{6x^2}{3x}$$

$$= 3x^{3-1} - 2x^{2-1}$$

$$= 3x^2 - 2x$$

(*ii*) $6m^2 - 16m^3 + 10m^4$ by $-2m$

$$= \frac{6m^2 - 16m^3 + 10m^4}{-2m}$$

$$= \frac{6m^2}{-2m} - \frac{6m^3}{-2m} + \frac{10m^4}{-2m}$$

$$= -3m^{2-1} + 8m^{3-1} - 5m^{4-1}$$

$$= -3m + 8m^2 - 5m^3$$

(*iii*) $15x^3y^2 + 25x^2y^3 - 36x^4y^4$ by $5x^2y^2$

$$= \frac{15x^3y^2 + 25x^2y^3 - 36x^4y^4}{5x^2y^2}$$

$$= \frac{15x^3y^2}{5x^2y^2} + \frac{25x^2y^3}{5x^2y^2} - \frac{36x^4y^4}{5x^2y^2}$$

$$= 3x^{3-2}.y^{2-2} + 5x^{2-2}.y^{3-2} - \frac{36}{5}x^{4-2}.y^{4-2}$$

$$= 3x^1y^0 + 5x^0y^1 - \frac{36}{5}x^2y^2$$

$$= 3x + 5y - \frac{36}{5}x^2y^2 \qquad (\because x^0 \text{ or } y^0 = 1)$$

(*iv*) $36a^3x^5 - 24a^4x^4 + 18a^5x^3$ by $-6a^3x^3$

$$= \frac{36a^3x^5 - 24a^4x^4 + 18a^5x^3}{-6a^3x^3}$$

$$= \frac{36a^3x^5}{-6a^3x^3} - \frac{24a^4x^4}{-6a^3x^3} + \frac{18a^5x^3}{-6a^3x^3}$$

$$= -6a^{3-3}x^{5-3} + 4a^{4-3}x^{4-3} - 3a^{5-3}x^{3-3}$$

$$= -6a^0x^2 + 4a^1x^2 - 3a^2x^0$$

$$= -6x^2 + 4ax - 3a^2 \qquad (\because x^0 \text{ or } y^0 = 1)$$