Board – CBSE	Class – 7th	Topic – Algebraic Expression

Q.1 Find the products: $3a^2 \times 8a^4$

Ans. $3a^2 \times 8a^4$

$= (3 \times 8) \times \left(a^2 \times a^4\right)$

$= 24 \times a^{(2+4)}$

$= 24\, a^6$

Q.2 Simplify :$(3x + 4)\,(2x - 3) + (5x - 4)(x + 2)$

Ans. $= (3x + 4)\,(2x - 3)$

$= 3x \times (2x - 3) + 4 \times (2x - 3)$

$= 6x^{(1+1)} - 9x + 8x - 12$

$= 6x^2 - x - 12$

$= (5x - 4)(x + 2)$

$= 5x(x + 2) - 4(x + 2)$

$= 5x^{(1+1)} + 10x - 4x - 8$

$= 5x^2 + 6x - 8$

$\therefore (3x + 4)(2x - 3) + (5x - 4)(x + 2)$

$= 6x^2 - x - 12 + 5x^2 + 6x - 8$

$= 11x^2 + 5x - 20$

Q.3 *Add the following expressions*: $\frac{3}{5}x, \frac{2}{3}x, \frac{-4}{5}x$

Ans. $\frac{3}{5}x + \frac{2}{3}x + \frac{-4}{5}x$

$= \frac{9x+10x-12x}{15}$

$= \frac{7x}{15}$

Q.4 Subtract $(2a - 3b + 4c)$ from the sum of $(a + 3b - 4c)$, $(4a - b + 9c)$ and $(-2b + 3c - a)$.

Ans. $(a + 3b - 4c) + (4a - b + 9c) + (-2b + 3c - a)$

$= a + 4a - a + 3b - b - 2b - 4c + 9c + 3c$

$= 4a + 8c$

Now, $(4a + 8c) - (2a - 3b + 4c)$

$= 4a - 2a + 3b + 8c - 4c$

$= 2a + 3b + 4c$

Q.5 Subtract the sum of $(8m - 7n + 6p^2)$ and $(-3m - 4n - p^2)$ from the sum of $(2m + 4n - 3p^2)$ and $(- m - n - p^2)$.

Ans. $(8m - 7n + 6p^2) + (-3m - 4n - p^2)$

$8m - 3m - 7n - 4n + 6p^2 - p^2$

$= 5m - 11n + 5p^2$

$(2m + 4n - 3p^2) + (- m - n - p^2)$.

$= 2m - m + 4n - n - 3p^2 - p^2$

$= m + 3n - 4p^2$

Now, $(m + 3n - 4p^2) - (5m - 11n + 5p^2)$

$= -4m + 14n - 9p^2$

Q.6 Subtract the sum of $(8a - 6a^2 + 9)$ and $(-10a - 8 + 8a^2)$ from -3.

Ans. $(8a - 6a^2 + 9) + (-10a - 8 + 8a^2)$

Collecting like terms and adding them:

$8a - 10a - 6a^2 + 8a^2 + 9 - 8$

$= -2a + 2a^2 + 1$

Now, $-3 - (-2a + 2a^2 + 1)$

$= 2a - 2a^2 - 4$

Q.7 $\frac{2}{3}a - \frac{4}{5}b + \frac{3}{5}c, -\frac{3}{4}a - \frac{5}{2}b + \frac{2}{3}c, \frac{5}{2}a + \frac{7}{4}b - \frac{5}{6}c$

Ans. Collecting like terms and adding them:

$\frac{2}{3}a - \frac{4}{5}b + \frac{3}{5}c + \left(-\frac{3}{4}a - \frac{5}{2}b + \frac{2}{3}c\right) + \frac{5}{2}a + \frac{7}{4}b - \frac{5}{6}c$

$b - \frac{5}{2}b + \frac{7}{4}b + \frac{3}{5}c + \frac{2}{3}c - \frac{5}{6}c$

$= \frac{(8-9+30)a}{12} + \frac{(-16-50+35)b}{20} + \frac{(18+20-25)c}{30}$

$= \frac{29}{12}a - \frac{31}{20}b + \frac{13}{30}c$

Q.7 *Simplify*: $\left(\frac{1}{3}y^2 - \frac{4}{7}y + 5\right) - \left(\frac{2}{7}y - \frac{2}{3}y^2 + 2\right) - \left(\frac{1}{7}y - 3 + 2y^2\right)$

Ans. $\frac{1}{3}y^2 + \frac{2}{3}y^2 - 2y^2 - \frac{4}{7}y - \frac{2}{7}y - \frac{1}{7}y + 5 - 2 + 3$

$= -y^2 - y + 6$

Q.8 *Find the product*: $\left(x^3 - y^3\right)\left(x^2 + y^2\right)$

Ans. $\left(x^3 - y^3\right)\left(x^2 + y^2\right)$

$x^3 \times \left(x^2 + y^2\right) - y^3 \times \left(x^2 + y^2\right)$

$= \left(x^3 \times x^2 + x^3 \times y^2\right) - \left(y^3 \times x^2 + y^3 \times y^2\right)$

$= x^5 + x^3y^2 - x^2y^3 - y^5$

Q.9 *Find the product*: $\left(\frac{2}{5}x - \frac{1}{2}y\right)(10x - 8y)$

Ans. $\left(\frac{2}{5}x - \frac{1}{2}y\right)(10x - 8y)$

$= \frac{2}{5}x \times (10x - 8y) - \frac{1}{2}y \times (10x - 8y)$

$= \left(\frac{2}{5}x \times 10x - \frac{2}{5}x \times 8y\right) - \left(\frac{1}{2}y \times 10x - \frac{1}{2}y \times 8y\right)$

$= 4x^2 - \frac{16}{5}xy - 5yx + 4y^2$

$= 4x^2 - \frac{41}{5}xy + 4y^2$

Q.10 *Simplify*: $a^2b\left(a - b^2\right) + ab^2\left(4ab - 2a^2\right) - a^3b(1 - 2b)$

Ans. $a^2b(a - b^2) + ab^2(4ab - 2a^2) - a^3b(1 - 2b)$

$a^2b \times a - a^2b \times b^2 + ab^2 \times 4ab - ab^2 \times 2a^2 - a^3b + a^3b \times 2b$

$= a^{(2+1)} \times b - a^2 \times b^{(1+2)} + 4 \times a^{(1+1)} \times b^{(2+1)} - 2 \times a^{(1+2)} \times b^2 - a^3b + 2 \times a^3 \times b^{(1+1)}$

$= a^3b - a^2b^3 + 4a^2b^3 - 2a^3b^2 - a^3b + 2a^3b^2 /$

$= 3a^2b^3$

Q.11 Simplify: a(b − c) + b(c − a) + c(a − b)

Ans. a(b − c) + b(c − a) + c(a − b)

$= a \times b - a \times c + b \times c - b \times a + c \times a - c \times b$

= ab −ac +bc −ab +ac −bc

= 0

Q.12 $\frac{2}{3}abc(a^2 + b^2 - 3c^2)$

Ans. $= \frac{2}{3}abc \times a^2 + \frac{2}{3}abc \times b^2 - \frac{2}{3}abc \times 3c^2$

$= \frac{2}{3}a \times a^2 \times b \times c + \frac{2}{3}a \times b \times b^2 \times c - \frac{2}{3} \times 3 \times a \times b \times c \times c^2$

$= \frac{2}{3} \times a^{(1+2)} \times b \times c + \frac{2}{3} \times a \times b^{(1+2)} \times c - 2 \times a \times b \times c^{(1+2)}$

$= \frac{2}{3}a^3bc + \frac{2}{3}ab^3c - 2\,abc^3$

Q.13 *Find the product*: $10a^2(0.1a - 0.5b)$

Ans. $= 10a^2 \times 0.1a - 10a^2 \times 0.5b$

$= 10 \times 0.1 \times a^2 \times a - 10 \times 0.5 \times a^2 \times b$

$= 1 \times a^{(2+1)} - 5a^2b$

$= a^3 - 5a^2b$

Q.14 *Find the product*: $\frac{3}{5}m^2n(m + 5n)$

Ans. $\frac{3}{5}m^2n \times m + \frac{3}{5}m^2n \times 5n$

$= \frac{3}{5} \times m^2 \times m \times n + \frac{3}{5} \times 5 \times m^2 \times n \times n$

$= \frac{3}{5} m^{(2+1)} \times n + 3 \times m^2 \times n^{(1+1)}$

$= \frac{3}{5} m^3 n + 3 m^2 n^2$

Q.15 *Find the product:* $ab(a2 - b2)$

Ans. $= ab \times a^2 - ab \times b^2$

$= a^{(1+2)} b - ab^{(1+2)}$

$= a^3 b - ab^3$