



SHIKSHA CLASSES

Sub. : Maths

Answer Paper

Marks : 20

Std. : VIIIth - S.B.

5. Expansion formulae

Q.1A) Select the most appropriate Alternative.

02

1) The expansion of $(x - 10)(x + 12)$ is _____.

Ans : a) $x^2 + 2x - 120$

2) The expansion of $\left(x + \frac{1}{3}\right)\left(x - \frac{7}{3}\right)$ is _____.

Ans : d) $x^2 - 2x - \frac{7}{9}$

: B) Solve the following.

01

1) Expand : $(a + 2)(a - 1)$.

Ans : $(a + 2)(a - 1)$

$$= a^2 + (2 - 1)a \times (2) - 1$$

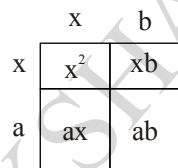
$$= a^2 + a - 2$$

Q.2 : A) Solve any one of the following.

(Activity)

02

1) Activity : Expand $(x + a)(x + b)$ using formulae for areas of a square and a rectangle.



$$= x \left[\frac{x}{x} \cdot x^2 \right] + x + a \left[\frac{ax}{x} \right] + \left[\frac{xb}{b} \right] x + a \left[\frac{ab}{b} \right]$$

$$(x + a)(x + b) = x^2 + ax + bx + ab$$

$$= x^2 + (a + b)x + ab.$$

Ans : $(x + a)$ and $(x + b)$ are binomials with one term x in common. a and b are unequal terms.

$$(x + a)(x + b) = x(x + b) + a(x + b)$$

$$= x^2 + bx + ax + ab$$

$$= x^2 + (b + a)x + ab$$

$$\text{i.e. } x^2 + (a + b)x + ab$$

$$(x + a)(x + b) = x^2 + (a + b)x + ab$$

2) $(101)^2 = (100 + 1)^2$

Ans : $= (100)^2 + 2 \times 100 \times 1 + 1^2$

$$= 10000 + 200 + 1 = 10201.$$

: B) Solve any one of the following. 02

1) Expand : $\left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right)$.

Ans : $\left(x + \frac{1}{x}\right)\left(x - \frac{1}{x}\right)$

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

$$= x^2 + 0 \times x - \frac{1}{x^2}$$

$$= x^2 - \frac{1}{x^2}$$

2) Expand : $(101)^3$ [using suitable identity]

Ans : $(101)^3 = (100 + 1)^3$

$$\begin{aligned}
 &= (100)^3 + 3(100)^2(1) + 3(100)(1)^2 + (1)^3 \\
 &= 1000000 + 3(10000) + 300 + 1 \\
 &= 1000000 + 30000 + 300 + 1 \\
 &= 1030301
 \end{aligned}$$

Q.3 : A) Solve any one of the following. (Activity) 03

1) Fill in the boxes with appropriate terms in the steps of expansion.

$$\begin{aligned}
 &(2p + 3m + 4n)^2 \\
 &= (2p)^2 + (3m)^2 + \boxed{(4n)^2} + 2 \times 2p \times 3m \\
 &\quad + 2 \times \boxed{3m} \times 4n + 2 \times 2p \times \boxed{4n} \\
 &= \boxed{4p^2} + 9m^2 + \boxed{16n^2} + 12pm + \boxed{24mn} + \boxed{16pn}
 \end{aligned}$$

2) Expand : i) $(98)^2 = (100 - 2)^2$

$$\begin{aligned}
 &= 10000 - \boxed{400} + \boxed{4} \\
 &= 9604.
 \end{aligned}$$

ii) $(5m + 3n)(5m - 3n)$

$$\begin{aligned}
 &= \boxed{(5m)^2} - \boxed{(3n)^2} \\
 &= \boxed{25m^2} - \boxed{9n^2}
 \end{aligned}$$

: B) Solve any one of the following. 03

1) Expand : $\left(2p - \frac{1}{2p}\right)^3$.

$$\begin{aligned}
 \text{Ans : } \left(2p - \frac{1}{2p}\right)^3 &= (2p)^3 - 3 \times (2p)^2 \times \left(\frac{1}{2p}\right) \\
 &\quad + 3 \times (2p) \times \left(\frac{1}{2p}\right)^2 - \left(\frac{1}{2p}\right)^3 \\
 &= 8p^3 - 3 \times (4p^2) \times \left(\frac{1}{2p}\right) + 3 \times (2p) \times
 \end{aligned}$$

$$\left(\frac{1}{4p^2}\right) - \frac{1}{8p^3}$$

$$= 8p^3 - 6p + \frac{3}{2p} - \frac{1}{8p^3}$$

2) Expand : $(3x + 4y - 5p)^2$.

$$\begin{aligned}
 \text{Ans : } (3x + 4y - 5p)^2 &= (3x)^2 + (4y)^2 + (-5p)^2 + 2 \times 3x \times \\
 &\quad 4y + 2 \times 4y \times (-5p) + 2 \times (-5p) \times 3x \\
 &= 9x^2 + 16y^2 + 25p^2 + 24xy - 40yp - 30px
 \end{aligned}$$

Q.4 : Solve any one of the following. 04

1) Simplify : $(2x + 3y)^3 - (2x - 3y)^3$.

$$\begin{aligned}
 \text{Ans : } (2x + 3y)^3 - (2x - 3y)^3 &= \left[(2x)^3 + 3(2x)^2(3y) + 3(2x)(3y)^2 + (3y)^3 \right] \\
 &\quad - \left[(2x)^3 - 3(2x)^2(3y) + 3(2x)(3y)^2 - (3y)^3 \right] \\
 &= (8x^3 + 36x^2y + 54xy^2 + 27y^3) - \\
 &\quad (8x^3 - 36x^2y + 54xy^2 - 27y^3) \\
 &= 8x^3 + 36x^2y + 54xy^2 + 27y^3 - \\
 &\quad 8x^3 + 36x^2y - 54xy^2 + 27y^3 \\
 &= 72x^2y + 54y^3
 \end{aligned}$$

2) Simplify :

$$(3k - 4r - 2m)^2 - (3k + 4r - 2m)^2.$$

$$\begin{aligned}
 \text{Ans : } (3k - 4r - 2m)^2 - (3k + 4r - 2m)^2 &= 9k^2 + 16r^2 + 4m^2 + 2 \times 3k \times (-4r) + \\
 &\quad 2 \times (-4r) \times (-2m) + 2 \times (-2m) \times 3k \\
 &\quad - [9k^2 + 16r^2 + 4m^2 + 2 \times 3k \times 4r + \\
 &\quad 2 \times 4r \times (-2m) + 2 \times (-2m) \times 3k]
 \end{aligned}$$

$$= 9k^2 + 16r^2 + 4m^2 - 24kr + 16rm - 12mk -$$

$$9k^2 - 16r^2 - 4m^2 - 24kr + 16rm + 12mk$$

$$= -48kr + 32rm$$

Q.5 : Solve any one of the following. 03

1) Simplify : $\left(x + \frac{1}{x}\right)^3 - \left(x - \frac{1}{x}\right)^3$.

Ans : $\left(x + \frac{1}{x}\right)^3 - \left(x - \frac{1}{x}\right)^3$.

$$= \left(x^3 + 3 \times x^2 \times \frac{1}{x} + 3 \times x \times \frac{1}{x^2} + \frac{1}{x^3}\right) -$$

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

$$\left[\begin{array}{l} \because (a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3 \\ (a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3 \end{array} \right]$$

$$= x^3 + 3x + \frac{3}{x} + \frac{1}{x^3} - x^3 + 3x - \frac{3}{x} + \frac{1}{x^3}$$

$$= 3x + \frac{1}{x^3} + 3x + \frac{1}{x^3}$$

$$= 6x + \frac{2}{x^3}$$

2) Expand : $(x^2 + x + 1)^2$.

Ans : $(x^2 + x + 1)^2$.

$$= (x^2)^2 + (x)^2 + (1)^2 + 2 \times x^2 \times x +$$

$$2 \times x \times 1 + 2 \times 1 \times x^2$$

$$= x^4 + x^2 + 1 + 2x^3 + 2x + 2x^2$$

$$= x^4 + 2x^3 + 3x^2 + 2x + 1$$

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