

Tender Heart High School, Sector-33 B chd.

Class: VIII

Teacher: Deepa

Subject: Mathematics

Topic: Algebraic Identities (Chapter - 13)

The following formulas will be done in the given chapter - 13

Formulas:

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

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

$$a^2 - b^2 = (a+b)(a-b)$$

$$(a+b)^2 + (a-b)^2 = 2(a^2 + b^2)$$

$$(a+b)^2 - (a-b)^2 = 4ab$$

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

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

Exercise - 13B

Find the following products:

$$\begin{aligned} \text{Soln 1 (iii)} \quad \left(z + \frac{1}{2}\right) \left(z - \frac{1}{2}\right) &= (z)^2 - \left(\frac{1}{2}\right)^2 \\ &= z^2 - \frac{1}{4} \end{aligned}$$

$$\begin{aligned} \text{Soln 2 (iv)} \quad (4x + 3y)(4x - 3y) &= (4x)^2 - (3y)^2 \\ &= 16x^2 - 9y^2 \end{aligned}$$

$$\begin{aligned} \text{Soln 5} \quad \left(ab - \frac{3cd}{2}\right) (2ab + 3cd) &= \left(\frac{2ab - 3cd}{2}\right) (2ab + 3cd) \\ &= \frac{(2ab)^2 - (3cd)^2}{2} = \frac{4a^2b^2 - 9c^2d^2}{2} \end{aligned}$$

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$$\begin{aligned}\text{Sol'n-6 (iv)} & \left(\frac{2}{5} + x \right) \left(\frac{2}{5} - x \right) \left(\frac{4}{25} + x^2 \right) \\ &= \left[\left(\frac{2}{5} \right)^2 - (x)^2 \right] \left(\frac{4}{25} + x^2 \right) \\ &= \left(\frac{4}{25} - x^2 \right) \left(\frac{4}{25} + x^2 \right) \\ &= \left(\frac{4}{25} \right)^2 - (x^2)^2 = \frac{16}{625} - x^4\end{aligned}$$

Exercise - 13C

$$\begin{aligned}\text{Sol'n-2: (vi)} \quad \left(2a - \frac{5}{2} \right)^2 &= (2a)^2 + \left(\frac{5}{2} \right)^2 - 2 \times 2a \times \frac{5}{2} \\ &= 4a^2 + \frac{25}{4} - 10a\end{aligned}$$

$$\begin{aligned}\text{Sol'n-3: (iii)} \quad (1011)^2 &= (1000 + 11)^2 \\ &= (1000)^2 + (11)^2 + 2 \times 1000 \times 11 \\ &= 1000000 + 121 + 22000 \\ &= 1022121\end{aligned}$$

$$\text{Sol'n-9: } \left(2p + \frac{1}{2p} \right) = 5, \quad 4p^2 + \frac{1}{4p^2} = ?$$

$$\begin{aligned}\left(2p + \frac{1}{2p} \right)^2 &= (2p)^2 + \left(\frac{1}{2p} \right)^2 + 2 \times 2p \times \frac{1}{2p} \\ (5)^2 &= 4p^2 + \frac{1}{4p^2} + 2\end{aligned}$$

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$$25 - 2 = 4p^2 + \frac{1}{4p^2}$$

$$\boxed{4p^2 + \frac{1}{4p^2} = 23}$$

Soln: $a^2 + b^2 = 52$, $ab = 24$, $(a-b) = ?$

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

$$(a-b)^2 = 52 - 2 \times 24$$

$$= 52 - 48$$

$$= 4$$

$$a-b = \pm \sqrt{4}$$

$$a-b = \pm 2$$

Soln: $36x^2 + 49y^2 + 84xy$, when $x = 3$, $y = 6$

$$= (6x)^2 + (7y)^2 + 2 \times 6x \times 7y$$
$$= (6x + 7y)^2$$
$$= (6 \times 3 + 7 \times 6)^2$$
$$= (18 + 42)^2 = (60)^2 = 3600$$

————— x ————— x —————