Pakistan School
Kingdom of Bahrain

Welcome Class 10th (arts)

Algebraic Formulas and Applications

Objectives

Students will be able to:

Simplify the given algebraic expression using formula

Formulas

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

Formulas

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

Proof:

$$\begin{aligned} L.H.S &= (a+b)^2+(a-b)^2 \\ &= a^2+2ab+b^2+a^2-2ab+b^2 \\ &= 2a^2+2b^2 \\ &= 2(a^2+b^2) \\ &= R.H.S \end{aligned}$$

Formulas

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

Proof:

$$\begin{aligned} L.H.S &= (a+b)^2-(a-b)^2 \\ &= (a^2+2ab+b^2)-(a^2-2ab+b^2) \\ &= a^2+2ab+b^2-a^2+2ab-b^2 \\ &= 4ab \\ &= R.H.S \end{aligned}$$

Ex. 1.2.

Solve the following question Using formulas.

Q1. $(x+2y)^2 + (x-2y)^2$

$(x+2y)^2 + (x-2y)^2$

$= x^2 + 2(x)(2y) + (2y)^2 + (x)^2 - 2(x)(2y) + (2y)^2$

$= x^2 + 4xy + 4y^2 + x^2 - 4xy + 4y^2$

$= 2x^2 + 8y^2$

Q4. $(l+m)(l-m)(l^2+m^2)(l^4+m^4)$

$(l+m)(l-m)(l^2+m^2)(l^4+m^4)$

$= (l^2-m^2)(l^2+m^2)(l^4+m^4)$

$= [(l^2)^2-(m^2)^2](l^4+m^4)$

$= (l^4-m^4)(l^4+m^4)$

$= (l^4)^2-(m^4)^2$

$= l^8-m^8$

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

Plenary

Simplify using formula

$$(5x + 3y)^2 + (5x - 3y)^2$$

Solution

2 $(5x + 3y)^2 + (5x - 3y)^2$

Solution: $(5x + 3y)^2 + (5x - 3y)^2$

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

$$= 25x^2 + 9y^2 + 30xy + 25x^2 - 30xy + 9y^2$$

$$= 50x^2 + 18y^2$$

Homework

Ex 1.2 remaining parts