Pakistan School
Kingdom of Bahrain

Welcome Class 10th (arts)

Algebraic Formulas and Applications

Formulas

$$(a+b)^2 = a^2 + 2ab + b^2$$
$$(a-b)^2 = a^2 - 2ab + b^2$$
$$(a+b)(a-b) = a^2 - b^2$$
$$(a+b+c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ca$$
$$(a+b)^3 = a^2 + 3ab(a+b) + b^2$$
$$(a-b)^3 = a^2 - 3ab(a-b) - b^2$$
$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$
$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

Objectives

Students will be able to:

Simplify and find the unknown value in algebraic expression using formula

13 $x^6 - 729y^6$

Solution: $x^6 - 729y^6$

$$= \left(x^3\right)^2 - \left(27y^3\right)^2$$

$$= \left(x^3 + 27y^3\right)\left(x^3 - 27y^3\right)$$

$$= \left[(x)^3 + (3y)^3\right]\left[x^3 - (3y)^3\right]$$

$$= (x + 3y)\left(x^2 + 9y^2 - 3xy\right)(x - 3y)\left(x^2 + 9y^2 + 3xy\right)$$

17. Find the value of $a^2 + b^2$ and ab when $a + b = 5$ and $a - b = 3$.

Solution: We know that

$$2\left(a^2+b^2\right)=(a+b)^2+(a-b)^2$$

$$2\left(a^2+b^2\right)=(5)^2+(3)^2$$

$$2\left(a^2+b^2\right)=25+9=34$$

$$a^2+b^2=\frac{34}{2}$$

$$a^2+b^2=17$$

19. Find the value of $x^3 + y^3$ if $xy = 10$ and $x + y = 7$.

Solution:

$$x + y = 7$$

$$(x + y)^3 = (7)^3$$

$$x^3 + y^3 + 3xy(x + y) = 343$$

$$x^3 + y^3 + 3(10)(7) = 343$$

$$x^3 + y^3 + 210 = 343$$

$$x^3 + y^3 = 343 - 210 = 133$$

21. **Find the value of ab + bc + ca when the values of $a^2 + b^3 + c^2 = 81$, $a + b + c = 11$.**

Solution:

$$a+b+c=11$$

$$(a+b+c)^2 = (11)^2$$

$$a^2+b^2+c^2+2ab+2bc+2ca=121$$

$$a^2+b^2+c^2+2(ab+bc+ca)=121$$

$$81+2(ab+bc+ca) = 21$$

$$2(ab+bc+ca) = 81$$

$$ab+bc+ca+ca = -\frac{60}{2}$$

$$ab+bc+ca = -30$$

Activity

Simplify using formula

$64a^6 - b^6$

Solution

14 $64a^6 - b^6$

Solution: $64a^6 - b^6$

$$= \left(8a^3\right)^2 - \left(b^3\right)^2$$

$$= \left(8a^3 - b^3\right)\left(8a^3 + b^3\right)$$

$$= \left[(2a)^3 - (b)^3\right]\left[(2a)^3 + (b)^3\right]$$

$$= (2a - b)\left[(2a)^2 + (2a)(b) + (b)^2\right](2a + b)\left[(2a)^2 - (2a)(b) + (b)^2\right]$$

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

Homework

Ex 1.2 remaining parts