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20 Algebra Formulas

With Examples

$$(a+b)^2 = \ ?$$

ALG_1	ALG_6	ALG_11	ALG_16
$(a+b)^2$	$(a+b)(a-b)$	$|a \cdot b|$	a^{b-c}
ALG_2	ALG_7	ALG_12	ALG_17
$a^2 + 2ab + b^2$	$(a+b)^3$	$\left|\dfrac{a}{b}\right|$	$\left(a^b\right)^c$
ALG_3	ALG_8	ALG_13	ALG_18
$(a-b)^2$	$(a-b)^3$	$a^2 + b^2 = 0$	$(a \cdot b)^c$
ALG_4	ALG_9	ALG_14	ALG_19
$a^2 - 2ab + b^2$	$a^3 + b^3$	a^{-1}	$\left(\dfrac{a}{b}\right)^c$
ALG_5	ALG_10	ALG_15	ALG_20
$a^2 - b^2$	$a^3 - b^3$	a^{b+c}	$(a + b \cdot i)$ $+$ $(c + d \cdot i)$

Formula 1:

$$(a + b)^2 = a^2 + 2 \cdot a \cdot b + b^2$$

Example:

$$(1 + \sqrt{5})^2 = ?$$

Solution:

$$(1 + \sqrt{5})^2 = 1^2 + 2 \cdot 1 \cdot \sqrt{5} + (\sqrt{5})^2 =$$

$$= 1 + 2\sqrt{5} + 5 = 1 + 5 + 2\sqrt{5} = 6 + 2\sqrt{5}$$

Formula 2:

$$a^2 + 2 \cdot a \cdot b + b^2 = (a + b)^2$$

Example:

Factor $x^2 + 6x + 9$

Solution:

$$x^2 + 6x + 9 = x^2 + 2 \cdot x \cdot 3 + 3^2 =$$

$$= (x + 3)^2$$

Formula 3:

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

Example:

$$(1 - \sqrt{5})^2 = \ ?$$

Solution:

$$(1 - \sqrt{5})^2 = 1^2 - 2 \cdot 1 \cdot (\sqrt{5}) + (\sqrt{5})^2 =$$

$$= 1 - 2\sqrt{5} + 5 = 1 + 5 - 2\sqrt{5} = 6 - 2\sqrt{5}$$

Formula 4 :

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

Example :

Factor : $x^2 - 6x + 9$

Solution :

$$x^2 - 6x + 9 = x^2 - 2 \cdot x \cdot 3 + 3^2 =$$

$$= (x-3)^2$$

Formula 5:

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

Example:

Factor $9x^2 - 16$

Solution:

$$9x^2 - 16 = 3^2 \cdot x^2 - 4^2 = (3x)^2 - (4)^2 =$$

$$= (3x + 4) \cdot (3x - 4)$$

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