



الجزءات المعبرة

ليكن a و b عددين حقيقيين فان:

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

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

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

امثلة:

- $(\sqrt{3} + 2)^2 = (\sqrt{3})^2 + 2 \times \sqrt{3} \times 2 + 2^2 = 3 + 4\sqrt{3} + 4 = 7 + 4\sqrt{3}$
- $(1 - \sqrt{5})^2 = 1^2 - 2 \times 1 \times \sqrt{5} + (\sqrt{5})^2 = 1 - 2\sqrt{5} + 5 = 6 - 2\sqrt{5}$
- $(\sqrt{2} + 7)(\sqrt{2} - 7) = (\sqrt{2})^2 - 7^2 = 2 - 49 = -47$





تطبيق 1:

احسب ما يلي:

$$c = (5\sqrt{2} + \pi)(5\sqrt{2} + \pi) \quad ; \quad b = (3\sqrt{2} - 2\sqrt{3})^2 \quad ; \quad a = (2\sqrt{3} + 5)^2$$

الاصلاح:

▪ $a = (2\sqrt{3} + 5)^2 = (2\sqrt{3})^2 + 2 \times 2\sqrt{3} \times 5 + 5^2 = 12 + 20\sqrt{3} + 25$

$$a = 37 + 20\sqrt{3}$$

اذن:

▪ $(3\sqrt{2} - 2\sqrt{3})^2 = (3\sqrt{2})^2 - 2 \times 3\sqrt{2} \times 2\sqrt{3} + (2\sqrt{3})^2 = 18 - 12\sqrt{6} + 12$

$$b = 30 - 12\sqrt{6}$$

اذن:

▪ $c = (5\sqrt{2} + \pi)(5\sqrt{2} + \pi) = (5\sqrt{2})^2 - \pi^2$

$$c = 50 - \pi^2$$

اذن:





انشر واختصر العبارات التالية حيث x و y عدنان حقيقيان:

$$C = (2\sqrt{7}x - y)(2\sqrt{7}x + y) \quad ; \quad B = (2x - 5\sqrt{2})^2 \quad ; \quad A = (\sqrt{2}x + 3\sqrt{3})^2$$

الاصلاح:

▪ $A = (\sqrt{2}x + 3\sqrt{3})^2 = (\sqrt{2}x)^2 + 2 \times \sqrt{2}x \times 3\sqrt{3} + (3\sqrt{3})^2 = 2x^2 + 6\sqrt{6}x + 27$

$$A = 2x^2 + 6\sqrt{6}x + 27$$

اذن:

▪ $B = (2x - 5\sqrt{2})^2 = (2x)^2 - 2 \times 2x \times 5\sqrt{2} + (5\sqrt{2})^2 = 4x^2 - 20\sqrt{2}x + 50$

$$B = 4x^2 - 20\sqrt{2}x + 50$$

اذن:

▪ $C = (2\sqrt{7}x - y)(2\sqrt{7}x + y) = (2\sqrt{7}x)^2 - y^2 = 28x^2 - y^2$

$$C = 28x^2 - y^2$$

اذن:





فكك العبارات التالية الى جذاء عوامل حيث x و y عدنان حقيقيان:

$$D = (x - 1)^2 - 4 ; C = 5x^2 - 1 ; B = 81x^2 - 18\sqrt{3}x + 3 ; A = x^2 + 8x + 16$$

الاصلاح:

- $A = x^2 + 8x + 16 = x^2 + 2 \times x \times 4 + 4^2 = (x + 4)^2$
- $B = 81x^2 - 18\sqrt{3}x + 3 = (9x)^2 - 2 \times 9x \times \sqrt{3} + \sqrt{3}^2 = (9x - \sqrt{3})^2$
- $C = 5x^2 - 1 = (\sqrt{5}x)^2 - 1^2 = (\sqrt{5}x - 1)(\sqrt{5}x + 1)$
- $D = (x - 1)^2 - 4 = (x - 1)^2 - 2^2 = (x - 1 - 2)(x - 1 + 2) = (x - 3)(x + 1)$



تطبيق:5:

1- اكتب العددين التاليين في شكل جذاءات معتبرة: $14 - 6\sqrt{5}$ و $22 + 4\sqrt{10}$

2- احسب العبارة التالية: $G = \sqrt{14 - 6\sqrt{5}} - \sqrt{22 + 4\sqrt{10}}$

الاصلاح:

1- $14 - 6\sqrt{5} = 9 + 5 - 6\sqrt{5} = 9 - 6\sqrt{5} + 5 = 3^2 - 2 \times 3 \times \sqrt{5} + \sqrt{5}^2$

$$14 - 6\sqrt{5} = (3 - \sqrt{5})^2 \quad \text{اذن:}$$

2- $22 + 4\sqrt{10} = 2 + 20 + 4\sqrt{10} = 2 + 4\sqrt{10} + 20 = \sqrt{2}^2 + 2 \times \sqrt{2} \times 2\sqrt{5} + (2\sqrt{5})^2$

$$22 + 4\sqrt{10} = (\sqrt{2} + 2\sqrt{5})^2 \quad \text{اذن:}$$

$$G = \sqrt{14 - 6\sqrt{5}} - \sqrt{22 + 4\sqrt{10}} = \sqrt{(3 - \sqrt{5})^2} - \sqrt{(\sqrt{2} + 2\sqrt{5})^2} \quad -2$$

$$\begin{aligned} &= |3 - \sqrt{5}| - |\sqrt{2} + 2\sqrt{5}| = (3 - \sqrt{5}) - (\sqrt{2} + 2\sqrt{5}) = 3 - \sqrt{5} - \sqrt{2} - 2\sqrt{5} \\ &= 3 - \sqrt{2} - 3\sqrt{5} \end{aligned}$$





تطبيق 3: احسب العبارتين التاليتين :

$$F = (2\sqrt{3} + \sqrt{11})^{1017} \times (2\sqrt{3} - \sqrt{11})^{1019} \quad \text{و} \quad E = (\sqrt{5} - 2)^{101} \times (\sqrt{5} + 2)^{100}$$

الإصلاح:

$$\begin{aligned} \blacksquare E &= (\sqrt{5} - 2)^{101} \times (\sqrt{5} + 2)^{100} = (\sqrt{5} - 2) \times (\sqrt{5} - 2)^{100} \times (\sqrt{5} + 2)^{100} \\ &= (\sqrt{5} - 2) \times [(\sqrt{5} - 2)(\sqrt{5} + 2)]^{100} = (\sqrt{5} - 2) \times (\sqrt{5}^2 - 2^2)^{100} \\ &= (\sqrt{5} - 2) \times (5 - 4)^{100} = (\sqrt{5} - 2) \times 1^{100} = (\sqrt{5} - 2) \times 1 = \sqrt{5} - 2 \end{aligned}$$

$$\begin{aligned} \blacksquare F &= (2\sqrt{3} + \sqrt{11})^{1017} \times (2\sqrt{3} - \sqrt{11})^{1019} \\ &= (2\sqrt{3} + \sqrt{11})^{1017} \times (2\sqrt{3} - \sqrt{11})^{1017} \times (2\sqrt{3} - \sqrt{11})^2 \\ &= [(2\sqrt{3} + \sqrt{11})(2\sqrt{3} - \sqrt{11})]^{1017} \times (2\sqrt{3} - \sqrt{11})^2 \\ &= [(2\sqrt{3})^2 - (\sqrt{11})^2]^{1017} \times [(2\sqrt{3})^2 - 2 \times 2\sqrt{3} \times \sqrt{11} + (\sqrt{11})^2] \\ &= (12 - 11)^{1017} \times (12 - 4\sqrt{33} + 11) \\ &= 1^{1017} \times (23 - 4\sqrt{33}) = 1 \times (23 - 4\sqrt{33}) = 23 - 4\sqrt{33} \end{aligned}$$



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