

التمرين الأول

نعتبر العبارتين A و B حيث $a \in \mathbb{R}^*$ و $b \in \mathbb{R}^*$

$$A = \frac{(ab^2)^{-4} \times ab^{-3}}{(a^2b^7)^{-2} \times a^{-1}} ; \quad B = a^2b^3 + a^4b^4$$

1- ا- بين ان $A = a^2b^3$

ب- احسب القيمة العددية ل A حيث $ab = \left(\frac{\sqrt{2}}{2}\right)^{-3}$ و $b = \sqrt{2}$ دون حساب قيمة العدد a .

2- ا- بين ان $B = b + 1$ اذا كان a و b مقلوبان.

ب- استنتج قيمة العبارة B اذا كان $b = \sqrt{3} + 1$ و a مقلوب b .

التمرين الثاني

$$a = \frac{5(\sqrt{28+1}) - (\sqrt{343}-1)}{3} \text{ ليكن}$$

1- بين ان $a = \sqrt{7} + 2$

2- ا- بين ان $a(\sqrt{7} - 2) = 3$

ب- بين ان $(a + 1)(3 - \sqrt{7}) = 2$

ج- بين ان $(a - 1)(\sqrt{7} - 1) = 6$

3- استنتج ان $\sqrt{\frac{6}{a-1} + \frac{6}{a} + \frac{6}{a+1}} \in \mathbb{N}$

التمرين الثالث

ليكن $b = 2(1 - 2\sqrt{24}) + 3\sqrt{54}$ و $a = (\sqrt{3} - \sqrt{2})(\sqrt{3} - 1) + |\sqrt{2} - \sqrt{3}|$

1- بين ان $a = 3 - \sqrt{6}$ و $b = \sqrt{6} + 2$

2- احسب $2a - 1$ و $2b + 1$

ب- بين ان $2a - 1$ و $2b + 1$ مقلوبان.

3- بين ان $a^2 = 3(2a - 1)$ و $b^2 = 2(2b + 1)$

ب- استنتج ان $3(\frac{1}{a^2} - 10)$ و $2(\frac{1}{b^2} + 10)$ متقابلان.

التمرين الرابع

1- انشر واختصر العبارتين $(2 + \sqrt{3})^2$ و $(\sqrt{5} - \sqrt{2})^2$

2- احسب $(2 - \sqrt{3})^{2024} \times (7 + 4\sqrt{3})^{1012}$ ثم بين ان $\sqrt{\frac{3}{7-4\sqrt{3}}} - \sqrt{\frac{3}{7+4\sqrt{3}}} = 6$

3- احسب: $A = \frac{10}{\sqrt{6}-1} - \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} + 3(\sqrt{5} - 2)^8 \times (\sqrt{5} + 2)^8$

$$B = \frac{\sqrt{5} - \sqrt{7 - 2\sqrt{10}}}{\sqrt{2}}$$

التمرين الخامس

1- نعتبر العبارة $A = \frac{(a^2b^3c^4)^{-1} \times (\frac{1}{2}a)^{-2}}{(\sqrt{2}a^{-2}c^{-1})^4 \times b^{-5}}$ حيث $a \in \mathbb{R}^*$ و $b \in \mathbb{R}^*$ و $c \in \mathbb{R}^*$

بين ان $A = a^4b^2$

2- نعتبر العبارتين a و b حيث $a = \frac{2\sqrt{6}-\sqrt{32}}{2\sqrt{2}}$ و $b = \frac{\sqrt{3}}{2-\sqrt{3}} - 3\sqrt{3} - 5$

ا- اختصر العبارتين a و b

ب- بين ان a مقلوب b

3- احسب \sqrt{A}

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نعتبر العبارتين A و B حيث $a \in \mathbb{R}^*$ و $b \in \mathbb{R}^*$

$$A = \frac{(ab^2)^{-4} \times ab^{-3}}{(a^2b^7)^{-2} \times a^{-1}}$$

$$B = a^2b^3 + a^4b^4$$

$$A = \frac{(ab^2)^{-4} \times ab^{-3}}{(a^2b^7)^{-2} \times a^{-1}} = \frac{a^{-4} \times (b^2)^{-4} \times a \times b^{-3}}{(a^2)^{-2} \times (b^7)^{-2} \times a^{-1}} \quad \text{1- ا}$$

$$= \frac{a^{-4} \times b^{-8} \times a \times b^{-3}}{a^{-4} \times b^{-14} \times a^{-1}} = \frac{a \times b^{-8} \times b^{-3}}{a^{-1} \times b^{-14}} = \frac{a^1 \times b^{-11}}{a^{-1} \times b^{-14}}$$

$$= \frac{a^1 \times b^{-11}}{a^{-1} \times b^{-14}} = a^{1-(-1)} \times b^{-11-(-14)} = a^2 b^3$$

$$A = a^2 b^3 \quad \text{انن}$$

$$\text{ب- في حالة } ab = \left(\frac{\sqrt{2}}{2}\right)^{-3} \text{ و } b = \sqrt{2}$$

$$A = a^2 b^3 = a^2 \cdot b^2 \cdot b = (ab)^2 \cdot b = \left[\left(\frac{\sqrt{2}}{2}\right)^{-3}\right]^2 \times \sqrt{2}$$

التمرين الثاني

ليكن $a = \frac{5(\sqrt{28+1}) - (\sqrt{343}-1)}{3}$

$$a = \frac{5(\sqrt{28+1}) - (\sqrt{343}-1)}{3} = \frac{5\sqrt{28} + 5 - \sqrt{343} + 1}{3}$$

$$= \frac{5\sqrt{4} \cdot \sqrt{7} - \sqrt{49} \cdot \sqrt{7} + 5 + 1}{3} = \frac{10\sqrt{7} - 7\sqrt{7} + 6}{3} = \frac{3\sqrt{7} + 6}{3}$$

$$= \frac{3(\sqrt{7} + 2)}{3} = \sqrt{7} + 2$$

اذن $a = \sqrt{7} + 2$

$$a(\sqrt{7}-2) = (\sqrt{7}+2)(\sqrt{7}-2)$$

$$= (\sqrt{7} \times \sqrt{7}) - (\sqrt{7} \times 2) + (2 \times \sqrt{7}) - (2 \times 2)$$

$$= 7 - 2\sqrt{7} + 2\sqrt{7} - 4 = 7 - 4 = 3$$

اذن $a(\sqrt{7}-2) = 3$

$$(a+1)(3-\sqrt{7}) = (\sqrt{7}+2+1)(3-\sqrt{7})$$

$$= (\sqrt{7}+3)(3-\sqrt{7})$$

$$= (\sqrt{7} \times 3) - (\sqrt{7} \times \sqrt{7}) + (3 \times 3) - (3 \times \sqrt{7})$$

$$= 3\sqrt{7} - 7 + 9 - 3\sqrt{7}$$

$$= 9 - 7 = 2$$

اذن $(a+1)(3-\sqrt{7}) = 2$

$$(a-1)(\sqrt{7}-1) = (\sqrt{7}+2-1)(\sqrt{7}-1)$$

$$= (\sqrt{7}+1)(\sqrt{7}-1)$$

$$= (\sqrt{7} \times \sqrt{7}) - (\sqrt{7} \times 1) + (1 \times \sqrt{7}) - (1 \times 1)$$

$$= 7 - \sqrt{7} + \sqrt{7} - 1$$

$$= 7 - 1 = 6$$

اذن $(a-1)(\sqrt{7}-1) = 6$

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التمرين الثالث

ليكن $a = (\sqrt{3} - \sqrt{2})(\sqrt{3} - 1) + |\sqrt{2} - \sqrt{3}|$ و $b = 2(1 - 2\sqrt{24}) + 3\sqrt{54}$

$$\textcircled{1} a = (\sqrt{3} - \sqrt{2})(\sqrt{3} - 1) + |\sqrt{2} - \sqrt{3}| \quad \dots \dots \dots 1$$

$$a = (\sqrt{3} \times \sqrt{3}) - (\sqrt{3} \times 1) - (\sqrt{2} \times \sqrt{3}) + (\sqrt{2} \times 1) - (\sqrt{2} - \sqrt{3})$$

$$a = 3 - \sqrt{3} - \sqrt{6} + \sqrt{2} - \sqrt{2} + \sqrt{3}$$

$$a = 3 - \sqrt{6}$$

$$\textcircled{2} b = 2(1 - 2\sqrt{24}) + 3\sqrt{54}$$

$$b = (2 \times 1) - (2 \times 2\sqrt{24}) + 3\sqrt{54}$$

$$b = 2 - 4\sqrt{24} + 3\sqrt{54}$$

$$b = 2 - 4 \cdot \sqrt{4} \times \sqrt{6} + 3 \cdot \sqrt{9} \times \sqrt{6}$$

$$b = 2 - 4 \times 2\sqrt{6} + 3 \times 3\sqrt{6}$$

$$b = 2 - 8\sqrt{6} + 9\sqrt{6}$$

$$b = \sqrt{6} + 2$$



$$2a(\sqrt{7} - 2) = 6 \quad \dots \dots \dots \text{اذن, } a(\sqrt{7} - 2) = 3 \quad \dots \dots \dots 3$$

$$\frac{6}{a} = 2(\sqrt{7} - 2) \quad \dots \dots \dots \text{وبالتالي}$$

$$3(a+1)(3-\sqrt{7}) = 6 \quad \dots \dots \dots \text{اذن, } (a+1)(3-\sqrt{7}) = 2 \quad \dots \dots \dots \text{ولدينا}$$

$$\frac{6}{a+1} = 3(3-\sqrt{7}) \quad \dots \dots \dots \text{وبالتالي}$$

$$\frac{6}{a-1} = \sqrt{7} - 1 \quad \dots \dots \dots \text{اذن: } (a-1)(\sqrt{7}-1) = 6 \quad \dots \dots \dots \text{ولدينا}$$

$$\sqrt{\frac{6}{a-1} + \frac{6}{a} + \frac{6}{a+1}} = \sqrt{\sqrt{7}-1 + 2(\sqrt{7}-2) + 3(3-\sqrt{7})}$$

$$= \sqrt{\sqrt{7}-1 + 2\sqrt{7}-4 + 9-3\sqrt{7}}$$

$$= \sqrt{9-4-1} = \sqrt{4} = 2 \in \mathbb{N}$$



$$a^2 = 9 + 6 - 3\sqrt{6} - 3\sqrt{6} = 15 - 6\sqrt{6} = 3(5 - 2\sqrt{6}) = 3(2a - 1)$$

اذن $a^2 = 3(2a - 1)$

$$\begin{aligned} \textcircled{1} b^2 &= (\sqrt{6} + 2)^2 = (\sqrt{6} + 2)(\sqrt{6} + 2) \\ &= (\sqrt{6} \times \sqrt{6}) + (\sqrt{6} \times 2) + (2 \times \sqrt{6}) + (2 \times 2) \\ &= 6 + 2\sqrt{6} + 2\sqrt{6} + 4 \\ &= 10 + 4\sqrt{6} \\ &= 2(5 + 2\sqrt{6}) = 2(2b + 1) \end{aligned}$$

اذن $b^2 = 2(2b + 1)$

$$\begin{aligned} 3\left(\frac{1}{a^2} - 10\right) + 2\left(\frac{1}{b^2} + 10\right) &= \left(3 \times \frac{1}{a^2}\right) - (3 \times 10) + \left(2 \times \frac{1}{b^2}\right) + (2 \times 10) \\ &= \frac{3}{a^2} - 30 + \frac{2}{b^2} + 20 \\ &= \frac{3}{a^2} + \frac{2}{b^2} - 10 \end{aligned}$$

ولمينا: $a^2 = 3(2a - 1)$ اذن $\frac{a^2}{3} = 2a - 1$ يعني $\frac{3}{a^2} = \frac{1}{2a - 1}$

ولمينا: $b^2 = 2(2b + 1)$ اذن $\frac{b^2}{2} = 2b + 1$ يعني $\frac{2}{b^2} = \frac{1}{2b + 1}$

$$\begin{aligned} \textcircled{1} 2a - 1 &= 2(3 - \sqrt{6}) - 1 = (2 \times 3) - (2 \times \sqrt{6}) - 1 \\ &= 6 - 2\sqrt{6} - 1 = 5 - 2\sqrt{6} \end{aligned}$$

$$\begin{aligned} \textcircled{1} 2b + 1 &= 2(\sqrt{6} + 2) + 1 = (2 \times \sqrt{6}) + (2 \times 2) + 1 \\ &= 2\sqrt{6} + 4 + 1 = 2\sqrt{6} + 5 \end{aligned}$$

$$\begin{aligned} (2a - 1)(2b + 1) &= (5 - 2\sqrt{6})(2\sqrt{6} + 5) \\ &= (5 \times 2\sqrt{6}) + (5 \times 5) - (2\sqrt{6} \times 2\sqrt{6}) - (2\sqrt{6} \times 5) \\ &= 10\sqrt{6} + 25 - 24 - 10\sqrt{6} \\ &= 25 - 24 = 1 \end{aligned}$$

اذن $2a - 1$ و $2b + 1$ متقلوبان

$$\begin{aligned} \textcircled{1} a^2 &= (3 - \sqrt{6})^2 = (3 - \sqrt{6}) \times (3 - \sqrt{6}) \\ &= (3 \times 3) - (3 \times \sqrt{6}) - (\sqrt{6} \times 3) + (\sqrt{6} \times \sqrt{6}) \\ &= 9 - 3\sqrt{6} - 3\sqrt{6} + 6 \end{aligned}$$

التمرين الرابع

$$\begin{aligned} \textcircled{1} (2 + \sqrt{3})^2 &= (2 + \sqrt{3})(2 + \sqrt{3}) \\ &= (2 \times 2) + (2 \times \sqrt{3}) + (\sqrt{3} \times 2) + (\sqrt{3} \times \sqrt{3}) \\ &= 4 + 2\sqrt{3} + 2\sqrt{3} + 3 \\ &= 7 + 4\sqrt{3} \end{aligned}$$

$$\begin{aligned} \textcircled{2} (\sqrt{5} - \sqrt{2})^2 &= (\sqrt{5} - \sqrt{2})(\sqrt{5} - \sqrt{2}) \\ &= (\sqrt{5} \times \sqrt{5}) - (\sqrt{5} \times \sqrt{2}) - (\sqrt{2} \times \sqrt{5}) + (\sqrt{2} \times \sqrt{2}) \\ &= 5 - \sqrt{10} - \sqrt{10} + 2 \\ &= 7 - 2\sqrt{10} \end{aligned}$$

$$\begin{aligned} (7 + 4\sqrt{3})^{1012} \times (2 - \sqrt{3})^{2024} &= [(2 + \sqrt{3})^2]^{1012} \times (2 - \sqrt{3})^{2024} \\ &= (2 + \sqrt{3})^{2024} \times (2 - \sqrt{3})^{2024} \\ &= [(2 + \sqrt{3})(2 - \sqrt{3})]^{2024} \\ &= [(2 \times 2) - (2 \times \sqrt{3}) + (\sqrt{3} \times 2) - (\sqrt{3} \times \sqrt{3})]^{2024} \end{aligned}$$

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وبالتالي :

$$\begin{aligned} 3\left(\frac{1}{a^2} - 10\right) + 2\left(\frac{1}{b^2} + 10\right) &= \frac{3}{a^2} + \frac{2}{b^2} - 10 \\ &= \frac{1}{2a-1} + \frac{1}{2b+1} - 10 \\ &= \frac{1 \times (2b+1)}{(2a-1)(2b+1)} + \frac{1 \times (2a-1)}{(2a-1)(2b+1)} - 10 \\ &= \frac{2b+1 + 2a-1}{(2a-1)(2b+1)} - 10 \\ &= \frac{2a+2b}{1} - 10 \\ &= 2a+2b-10 \\ &= 2(\sqrt{3}-\sqrt{6}) + 2(\sqrt{6}+2) - 10 \\ &= 6 - 2\sqrt{6} + 2\sqrt{6} + 4 - 10 \\ &= 6 + 4 - 10 = 10 - 10 = 0 \end{aligned}$$

أذن $3\left(\frac{1}{a^2} - 10\right)$ و $2\left(\frac{1}{b^2} + 10\right)$ متعاينين

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$$\frac{\sqrt{3}}{\sqrt{7-4\sqrt{3}}} - \frac{\sqrt{3}}{\sqrt{7+4\sqrt{3}}} = \frac{\sqrt{3}(2+\sqrt{3}) - \sqrt{3}(2-\sqrt{3})}{(2-\sqrt{3})(2+\sqrt{3})}$$

$$= \frac{\cancel{2\sqrt{3}} + 3 - \cancel{2\sqrt{3}} + 3}{1}$$

$$= 3 + 3 = 6$$

⊙ $A = \frac{10}{\sqrt{6}-1} \cdot \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}} + 3(\sqrt{5}-2)^8 \times (\sqrt{5}+2)^8$ -3

$$= \frac{10(\sqrt{3}-\sqrt{2}) - (\sqrt{3}+\sqrt{2})(\sqrt{6}-1)}{(\sqrt{6}-1)(\sqrt{3}-\sqrt{2})} + 3[(\sqrt{5}-2)(\sqrt{5}+2)]^8$$

$$= \frac{10\sqrt{3} - 10\sqrt{2} - (\sqrt{18} - \sqrt{3} + \sqrt{12} - \sqrt{2})}{\sqrt{18} - \sqrt{12} - \sqrt{3} + \sqrt{2}} + 3[5 + \cancel{2\sqrt{5}} - \cancel{2\sqrt{5}} - 4]^8$$

$$= \frac{10\sqrt{3} - 10\sqrt{2} - \sqrt{18} + \sqrt{3} - \sqrt{12} + \sqrt{2}}{\sqrt{18} - \sqrt{12} - \sqrt{3} + \sqrt{2}} + 3 \times 1^8$$

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$$(7+4\sqrt{3})^{1012} \times (2-\sqrt{3})^{2024} = (4 - \cancel{2\sqrt{3}} + \cancel{2\sqrt{3}} - 3)^{2024}$$

$$= (4-3)^{2024}$$

$$= 1^{2024}$$

$$= 1$$

⊙ $\frac{\sqrt{3}}{\sqrt{7-4\sqrt{3}}} - \frac{\sqrt{3}}{\sqrt{7+4\sqrt{3}}} = \frac{\sqrt{3}}{\sqrt{7-4\sqrt{3}}} - \frac{\sqrt{3}}{\sqrt{7+4\sqrt{3}}}$

$$= \frac{\sqrt{3}}{\sqrt{(2-\sqrt{3})^2}} - \frac{\sqrt{3}}{\sqrt{(2+\sqrt{3})^2}}$$

$$= \frac{\sqrt{3}}{|2-\sqrt{3}|} - \frac{\sqrt{3}}{|2+\sqrt{3}|}$$

$$\left(\begin{array}{l} 2-\sqrt{3} \in \mathbb{R}^+ \setminus \{0\} \\ 2+\sqrt{3} \in \mathbb{R}^+ \end{array} \right) = \frac{\sqrt{3}}{2-\sqrt{3}} - \frac{\sqrt{3}}{2+\sqrt{3}}$$

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$$\odot B = \frac{\sqrt{5} - \sqrt{7 - 2\sqrt{10}}}{\sqrt{2}}$$

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

$$= \frac{\sqrt{5} - |\sqrt{5} - \sqrt{2}|}{\sqrt{2}}$$

$$= \frac{\sqrt{5} - (\sqrt{5} - \sqrt{2})}{\sqrt{2}} \quad (\sqrt{5} - \sqrt{2} \in \mathbb{R}_+ \text{ ; ?})$$

$$= \frac{\cancel{\sqrt{5}} - \cancel{\sqrt{5}} + \sqrt{2}}{\sqrt{2}}$$

$$= \frac{\sqrt{2}}{\sqrt{2}}$$

$$B = 1$$

$$A = \frac{10\sqrt{3} - 10\sqrt{2} - \sqrt{9} \times \sqrt{2} + \sqrt{3} - \sqrt{4} \times \sqrt{3} + \sqrt{2}}{\sqrt{9} \times \sqrt{2} - \sqrt{4} \times \sqrt{3} - \sqrt{3} + \sqrt{2}} + 3$$

$$= \frac{10\sqrt{3} - 10\sqrt{2} - 3\sqrt{2} + \sqrt{3} - 2\sqrt{3} + \sqrt{2}}{3\sqrt{2} - 2\sqrt{3} - \sqrt{3} + \sqrt{2}} + 3$$

$$= \frac{-10\sqrt{2} - 3\sqrt{2} + \sqrt{2} + 10\sqrt{3} + \sqrt{3} - 2\sqrt{3}}{3\sqrt{2} + \sqrt{2} - 2\sqrt{3} - \sqrt{3}} + 3$$

$$= \frac{-12\sqrt{2} + 9\sqrt{3}}{4\sqrt{2} - 3\sqrt{3}} + 3$$

$$= \frac{-3(4\sqrt{2} - 3\sqrt{3})}{4\sqrt{2} - 3\sqrt{3}} + 3$$

$$= -3 + 3$$

$$A = 0$$

2- نعتبر العبارتين a و b حيث $a = \frac{2\sqrt{6}-\sqrt{32}}{2\sqrt{2}}$ و $b = \frac{\sqrt{3}}{2-\sqrt{3}} - 3\sqrt{3} - 5$

$$\textcircled{a} \quad a = \frac{2\sqrt{6} - \sqrt{32}}{2\sqrt{2}} = \frac{2\sqrt{2} \times \sqrt{3} - \sqrt{16} \times \sqrt{2}}{2\sqrt{2}}$$

$$= \frac{2\sqrt{2} \times \sqrt{3} - 4\sqrt{2}}{2\sqrt{2}} = \frac{2\sqrt{2}(\sqrt{3} - 2)}{2\sqrt{2}} = \sqrt{3} - 2$$

$$\textcircled{b} \quad b = \frac{\sqrt{3}}{2-\sqrt{3}} - 3\sqrt{3} - 5 = \frac{\sqrt{3}}{2-\sqrt{3}} - (3\sqrt{3} + 5)$$

$$= \frac{\sqrt{3}}{2-\sqrt{3}} - \frac{(3\sqrt{3} + 5)(2-\sqrt{3})}{2-\sqrt{3}} = \frac{\sqrt{3} - (3\sqrt{3} + 5)(2-\sqrt{3})}{2-\sqrt{3}}$$

$$= \frac{\sqrt{3} - [(3\sqrt{3} \times 2) - (3\sqrt{3} \times \sqrt{3}) + (5 \times 2) - (5 \times \sqrt{3})]}{2-\sqrt{3}}$$

$$= \frac{\sqrt{3} - (6\sqrt{3} - 9 + 10 - 5\sqrt{3})}{2-\sqrt{3}} = \frac{\sqrt{3} - (\sqrt{3} + 1)}{2-\sqrt{3}} = \frac{\sqrt{3} - \sqrt{3} - 1}{2-\sqrt{3}}$$

1- نعتبر العبارة $A = \frac{(a^2 b^3 c^4)^{-1} \times (\frac{1}{2}a)^{-2}}{(\sqrt{2}a^{-2}c^{-1})^4 \times b^{-5}}$ حيث $a \in \mathbb{R}^*$ و $b \in \mathbb{R}^*$ و $c \in \mathbb{R}^*$

$$A = \frac{(a^2 b^3 c^4)^{-1} \times (\frac{1}{2}a)^{-2}}{(\sqrt{2} a^{-2} c^{-1})^4 \times b^{-5}}$$

$$A = \frac{(a^2)^{-1} \times (b^3)^{-1} \times (c^4)^{-1} \times (\frac{1}{2})^{-2} \times a^{-2}}{(\sqrt{2})^4 \times (a^{-2})^4 \times (c^{-1})^4 \times b^{-5}}$$

$$A = \frac{a^{-2} \times b^{-3} \times c^{-4} \times 2^2 \times a^{-2}}{4 \times a^{-8} \times c^{-4} \times b^{-5}}$$

$$A = \frac{a^{-2} \times a^{-2} \times b^{-3}}{a^{-8} \times b^{-5}} = \frac{a^{-4} \times b^{-3}}{a^{-8} \times b^{-5}} = \frac{a^{-4}}{a^{-8}} \times \frac{b^{-3}}{b^{-5}}$$

$$A = a^4 b^2$$

$$\sqrt{A} = \sqrt{a^4 b^2} = \sqrt{(a^2 b)^2} = |a^2 b| \quad -3$$

نعلم أن $a^2 \in \mathbb{R}_+$ و $b = -2 - \sqrt{3} \in \mathbb{R}_-$ إذن $a^2 b \in \mathbb{R}_-$

$$\sqrt{A} = -a^2 b = -a \cdot \underbrace{a \cdot b}_1 = -a \times 1 = -a$$

$$\sqrt{A} = -(\sqrt{3} - 2) = 2 - \sqrt{3} \quad \text{إذن}$$

$$b = \frac{-1}{2 - \sqrt{3}} = \frac{-1 \times (2 + \sqrt{3})}{(2 - \sqrt{3})(2 + \sqrt{3})}$$

$$b = \frac{-2 - \sqrt{3}}{(2 \times 2) + (2 \times \sqrt{3}) - (\sqrt{3} \times 2) - (\sqrt{3} \times \sqrt{3})}$$

$$b = \frac{-2 - \sqrt{3}}{4 + 2\sqrt{3} - 2\sqrt{3} - 3} = \frac{-2 - \sqrt{3}}{1}$$

$$b = -2 - \sqrt{3}$$

$$a \times b = (\sqrt{3} - 2)(-2 - \sqrt{3}) \quad \text{بـ}$$

$$= -(\sqrt{3} \times 2) - (\sqrt{3} \times \sqrt{3}) + (2 \times 2) + (2 \times \sqrt{3})$$

$$= -2\sqrt{3} - 3 + 4 + 2\sqrt{3}$$

$$= -3 + 4 = 1$$

إذن a مقلوب b .