



تمرين 6:

نعتبر $a \in \mathbb{R}^*$ و $b \in \mathbb{R}^*$

1. اختصر العبارتين $J = a^{-3}b^{-8}a^7b^5$ و $I = a^{-3}b^2(a^{-2}b)^{-3}$

2. لتكن العبارة: $E = \frac{I}{J}$

أ. بَيِّنْ أَنَّ: $E = a^{-1}b^2$

ب. احسب E في حالة: $a = \frac{3}{2}$ و $b = \sqrt{2}$

ridha Maths

$$\begin{aligned} I &= a^{-3} \times b^2 \times (a^{-2}b)^{-3} \\ &= a^{-3} \times b^2 \times (a^{-2})^{-3} \times b^{-3} = a^{-3} \times b^2 \times a^6 \times b^{-3} \\ &= a^{-3} \times a^6 \times b^2 \times b^{-3} \end{aligned}$$

$$I = a^3 \times b^{-1}$$

ridha Maths

$$J = a^{-3}b^{-8}a^7b^5 = a^4 \times b^{-3}$$

$$E = \frac{I}{J} = \frac{a^3 \times b^{-1}}{a^4 \times b^{-3}} = a^{3-4} \times b^{-1+3} = a^{-1} \times b^2$$

$$E = a^{-1}b^2 = \left(\frac{3}{2}\right)^{-1} \times (\sqrt{2})^2$$

$$= \left(\frac{2}{3}\right)^1 \times 2 = \frac{4}{3}$$





تمرين 7: أحسب:

$$c = \left(\frac{3}{\sqrt{5}}\right)^{-2} \times \frac{3}{5} \quad ; \quad b = \left(\frac{\sqrt{3}}{2}\right)^{-2} \quad ; \quad a = 3^{-3} \times \sqrt{2}^2$$

$$e = \sqrt{3}^{-1} \times \sqrt{21} - \frac{\sqrt{7}^{-2}}{\sqrt{7}^{-5}} \quad ; \quad d = \left(\frac{\sqrt{5}}{2}\right)^{-2} + \left(-\frac{5}{3}\right)^{-1} + (-\sqrt{5})^{-4}$$

ridha Maths

$$e = \sqrt{3}^{-1} \times \sqrt{21} - \frac{\sqrt{7}^{-2}}{\sqrt{7}^{-5}}$$

$$= \frac{1}{\sqrt{3}} \times \sqrt{3} \times \sqrt{7} - \sqrt{7}^{-2+5}$$

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

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

$$(\sqrt{a})^3 = \sqrt{a} \times \sqrt{a} \times \sqrt{a} = a\sqrt{a}$$

$$e = -6\sqrt{7}$$

ridha Maths

$$d = \left(\frac{\sqrt{5}}{2}\right)^{-2} + \left(-\frac{5}{3}\right)^{-1} + (-\sqrt{5})^{-4}$$

$$= \left(\frac{2}{\sqrt{5}}\right)^2 + \left(-\frac{3}{5}\right) + \frac{1}{(-\sqrt{5})^4}$$

$$= \frac{4}{5} - \frac{3}{5} + \frac{1}{25} = \frac{1}{5} + \frac{1}{25}$$





تمرين 8:

اكتب في صورة قوة لعدد حقيقي:

$$c = \left(-\frac{\sqrt{3}}{2}\right)^{51} \times \left(\frac{9}{16}\right)^{-71} \quad b = \left(\frac{3}{5}\right)^{-111} \times \left[\left(-\frac{3}{5}\right)^7\right]^4 \quad a = \left(\frac{2}{\sqrt{3}}\right)^4 \times \left(-\frac{2}{\sqrt{3}}\right)^{77}$$

$$d = \left(-\frac{7}{\sqrt{11}}\right)^{101} \times \sqrt{\frac{11}{7}}^{101}$$

ridha Maths

$$a = \left(\frac{2}{\sqrt{3}}\right)^4 \times \left(-\frac{2}{\sqrt{3}}\right)^{77}$$

$$= \left(-\frac{2}{\sqrt{3}}\right)^4 \times \left(-\frac{2}{\sqrt{3}}\right)^{77}$$

$$= \left(-\frac{2}{\sqrt{3}}\right)^{81}$$

$$b = \left(\frac{3}{5}\right)^{-111} \times \left[\left(-\frac{3}{5}\right)^7\right]^4$$

$$= \left(\frac{3}{5}\right)^{-111} \times \left(-\frac{3}{5}\right)^{28}$$

$$= \left(\frac{3}{5}\right)^{-111} \times \left(\frac{3}{5}\right)^{28} = \left(\frac{3}{5}\right)^{-83}$$

ridha Maths





$$\begin{aligned}
 c &= \left(-\frac{\sqrt{3}}{2}\right)^{51} \times \left(\frac{9}{16}\right)^{-71} \\
 &= \left(-\frac{\sqrt{3}}{2}\right)^{51} \times \left(\left(\frac{3}{4}\right)^2\right)^{-71} \\
 &= \left(-\frac{\sqrt{3}}{2}\right)^{51} \times \left(\frac{3}{4}\right)^{-142} \\
 &= \left(-\frac{\sqrt{3}}{2}\right)^{51} \times \left[\left(\frac{\sqrt{3}}{2}\right)^2\right]^{-142} \\
 &= \left(-\frac{\sqrt{3}}{2}\right)^{51} \times \left(\frac{\sqrt{3}}{2}\right)^{-284} \\
 &= \left(-\frac{\sqrt{3}}{2}\right)^{51} \times \left(-\frac{\sqrt{3}}{2}\right)^{-284}
 \end{aligned}$$

$$c = \left(-\frac{\sqrt{3}}{2}\right)^{-233}$$

$$\begin{aligned}
 d &= \left(-\frac{7}{\sqrt{11}}\right)^{101} \times \sqrt{\frac{11}{7}}^{101} \\
 &= \left(-\frac{7}{\sqrt{11}}\right)^{101} \times \left(\frac{\sqrt{11}}{\sqrt{7}}\right)^{101} \\
 &= \left(-\frac{7}{\sqrt{11}} \times \frac{\sqrt{11}}{\sqrt{7}}\right)^{101} = \left(-\frac{7}{\sqrt{7}}\right)^{101} = \left(-\sqrt{7}\right)^{101}
 \end{aligned}$$

$$\left(-\sqrt{7}\right)^{101}$$



I- لتكن العبارة E حيث $a \in \mathbb{R}^*$ و $b \in \mathbb{R}^*$

$$E = \frac{(a^{-1}b^{-3})^2 a^{-6}b^8}{(a^{-3}b^2)^2}$$

(1) بين أن $E = a^{-2}b^{-2}$

(2) احسب E إذا علمت أن $a = 1 + \sqrt{3}$ و $b = 1 - \sqrt{3}$

II- (1) احسب العبارات التالية

$$K = 3 \times \left(-\frac{3}{2}\right)^{-1} + 9 \times \left(-\frac{2}{3}\right)^2 - \frac{1}{2} \times (-3)^{-1} \quad J = \frac{10^{-4} \times (0,01)^2}{\frac{1}{100} \times (0,001)^2} \quad I = \left[\frac{5}{\sqrt{2}^2} - \left(\frac{3}{2}\right)^2 \right]^{-1}$$

(2) اكتب في صيغة قوة لعدد حقيقي

$$N = \frac{0,5^{-3} \times 2^{-9}}{\left(\frac{1}{2}\right)^{-4}} \quad M = \left(\frac{2}{\sqrt{5}}\right)^{-7} \times \left(\frac{5}{4}\right) \quad L = 25^{-3} \times \left(\frac{1}{5}\right)^{-4}$$

$$E = \frac{(a^{-1}b^{-3})^2 a^{-6}b^8}{(a^{-3}b^2)^2}$$

$$= \frac{a^{-2} \times b^{-6} \times a^{-6} b^8}{a^{-6} b^4}$$

$$= \frac{a^{-2} \cancel{a^{-6}} \times b^{-6} \times b^8}{\cancel{a^{-6}} b^4}$$

$$= a^{-2} \times \frac{b^2}{b^4} = a^{-2} \times b^{2-4}$$

$$E = a^{-2} \times b^{-2}$$

ridha Maths





$$b = 1 - \sqrt{3} \quad \text{و} \quad a = 1 + \sqrt{3}$$

$$E = a^{-2} \times b^{-2}$$

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

$$= \left[(1 + \sqrt{3})(1 - \sqrt{3}) \right]^{-2}$$

$$= [1 - \sqrt{3} + \sqrt{3} - 3]^{-2}$$

$$= (-2)^{-2}$$

$$= \frac{1}{(-2)^2} = \frac{1}{4}$$

$$(a \times b)^{-1} = a^{-1} \times b^{-1}$$

$$I = \left[\frac{5}{\sqrt{2}^2} - \left(\frac{3}{2} \right)^2 \right]^{-1}$$

$$= \left[\frac{5}{2} - \frac{9}{4} \right]^{-1} = \left[\frac{10}{4} - \frac{9}{4} \right]^{-1} = \left(\frac{1}{4} \right)^{-1}$$

$$= \left(\frac{4}{1} \right)^1 = 4$$

ridha Maths

II





$$\begin{aligned} J &= \frac{10^{-4} \times (0,01)^2}{\frac{1}{100} \times (0,001)^2} = \frac{10^{-4} \times (10^{-2})^2}{10^{-2} \times (10^{-3})^2} \\ &= \frac{10^{-4} \times 10^{-4}}{10^{-2} \times 10^{-6}} \\ &= \frac{10^{-8}}{10^{-8}} \\ &= 1 \end{aligned}$$

ridha Maths

$$\begin{aligned} K &= 3 \times \left(-\frac{3}{2}\right)^{-1} + 9 \times \left(-\frac{2}{3}\right)^2 - \frac{1}{2} \times (-3)^{-1} \\ &= 3 \times \left(-\frac{2}{3}\right) + 9 \times \left(\frac{2}{3}\right)^2 - \frac{1}{2} \times \left(-\frac{1}{3}\right) \\ &= -\frac{6}{3} + \cancel{9} \times \frac{4}{\cancel{9}} + \frac{1}{6} \\ &= \underbrace{-2 + 4} + \frac{1}{6} \\ &= 2 + \frac{1}{6} = \frac{12}{6} + \frac{1}{6} = \frac{13}{6} \end{aligned}$$





$$\begin{aligned} L &= 25^{-3} \times \left(\frac{1}{5}\right)^{-4} \\ &= (5^2)^{-3} \times 5^4 \\ &= 5^{-6} \times 5^4 \\ &= 5^{-2} \end{aligned}$$

(2)

$$\begin{aligned} M &= \left(\frac{2}{\sqrt{5}}\right)^{-2} \times \left(\frac{5}{4}\right)^2 \\ &= \left(\frac{2}{\sqrt{5}}\right)^{-2} \times \left(\frac{\sqrt{5}}{2}\right)^2 \\ &= \left(\frac{\sqrt{5}}{2}\right)^2 \times \left(\frac{\sqrt{5}}{2}\right)^2 \\ &= \left(\frac{\sqrt{5}}{2}\right)^4 \end{aligned}$$

$$0,5 = \frac{1}{2}$$

$$\begin{aligned} N &= \frac{0,5^{-3} \times 2^{-9}}{\left(\frac{1}{2}\right)^{-4}} = \frac{\left(\frac{1}{2}\right)^{-3} \times 2^{-9}}{2^4} \\ &= \frac{2^3 \times 2^{-9}}{2^4} \\ &= \frac{2^{-6}}{2^4} = 2^{-6-4} = 2^{-10} \end{aligned}$$





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اكتب في صورة قوة لعدد حقيقي:

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$$E = \frac{(a^{-1}b^{-3})^2 a^{-6}b^8}{(a^{-3}b^2)^2}$$

(1) بين ان $E = a^{-2}b^{-2}$

(2) احسب E اذا علمت ان $a = 1 + \sqrt{3}$ و $b = 1 - \sqrt{3}$

II- (1) احسب العبارات التالية

$$K = 3 \times \left(-\frac{3}{2}\right)^{-1} + 9 \times \left(-\frac{2}{3}\right)^2 - \frac{1}{2} \times (-3)^{-1} \quad J = \frac{10^{-4} \times (0,01)^2}{\frac{1}{100} \times (0,001)^2} \quad I = \left[\frac{5}{\sqrt{2}^2} - \left(\frac{3}{2}\right)^2 \right]^{-1}$$

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$$N = \frac{0,5^{-3} \times 2^{-9}}{\left(\frac{1}{2}\right)^{-4}} \quad M = \left(\frac{2}{\sqrt{5}}\right)^{-7} \times \left(\frac{5}{4}\right) \quad L = 25^{-3} \times \left(\frac{1}{5}\right)^{-4}$$

$$E = \frac{(a^{-1}b^{-3})^2 a^{-6}b^8}{(a^{-3}b^2)^2}$$

$$= \frac{a^{-2} \times b^{-6} \times a^{-6} b^8}{a^{-6} b^4}$$

$$= \frac{a^{-2} \cancel{a^{-6}} \times b^{-6} \times b^8}{\cancel{a^{-6}} b^4}$$

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ridha Maths





$$b = 1 - \sqrt{3} \quad \text{و} \quad a = 1 + \sqrt{3}$$

$$E = a^{-2} \times b^{-2}$$

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

$$= \left[(1 + \sqrt{3})(1 - \sqrt{3}) \right]^{-2}$$

$$= [1 - \sqrt{3} + \sqrt{3} - 3]^{-2}$$

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$$(a \times b)^{-1} = a^{-1} \times b^{-1}$$

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$$= \left(\frac{4}{1} \right)^1 = 4$$

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II





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ridha Maths

$$\begin{aligned} K &= 3 \times \left(-\frac{3}{2}\right)^{-1} + 9 \times \left(-\frac{2}{3}\right)^2 - \frac{1}{2} \times (-3)^{-1} \\ &= 3 \times \left(-\frac{2}{3}\right) + 9 \times \left(\frac{2}{3}\right)^2 - \frac{1}{2} \times \left(-\frac{1}{3}\right) \\ &= -\frac{6}{3} + \cancel{9} \times \frac{4}{\cancel{9}} + \frac{1}{6} \\ &= \underbrace{-2 + 4} + \frac{1}{6} \\ &= 2 + \frac{1}{6} = \frac{12}{6} + \frac{1}{6} = \frac{13}{6} \end{aligned}$$





$$\begin{aligned} L &= 25^{-3} \times \left(\frac{1}{5}\right)^{-4} \\ &= (5^2)^{-3} \times 5^4 \\ &= 5^{-6} \times 5^4 \\ &= 5^{-2} \end{aligned}$$

(2)

$$\begin{aligned} M &= \left(\frac{2}{\sqrt{5}}\right)^{-2} \times \left(\frac{5}{4}\right)^2 \\ &= \left(\frac{2}{\sqrt{5}}\right)^{-2} \times \left(\frac{\sqrt{5}}{2}\right)^2 \\ &= \left(\frac{\sqrt{5}}{2}\right)^2 \times \left(\frac{\sqrt{5}}{2}\right)^2 \\ &= \left(\frac{\sqrt{5}}{2}\right)^4 \end{aligned}$$

$$0,5 = \frac{1}{2}$$

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$$c = \left(-\frac{\sqrt{3}}{2}\right)^{51} \times \left(\frac{9}{16}\right)^{-71} \quad b = \left(\frac{3}{5}\right)^{-111} \times \left[\left(-\frac{3}{5}\right)^7\right]^4 \quad a = \left(\frac{2}{\sqrt{3}}\right)^4 \times \left(-\frac{2}{\sqrt{3}}\right)^{77}$$

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$$a = \left(\frac{2}{\sqrt{3}}\right)^4 \times \left(-\frac{2}{\sqrt{3}}\right)^{77}$$

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 \end{aligned}$$

$$\left(-\sqrt{7}\right)^{101}$$



I- لتكن العبارة E حيث $a \in \mathbb{R}^*$ و $b \in \mathbb{R}^*$

$$E = \frac{(a^{-1}b^{-3})^2 a^{-6}b^8}{(a^{-3}b^2)^2}$$

(1) بين ان $E = a^{-2}b^{-2}$

(2) احسب E إذا علمت ان $a = 1 + \sqrt{3}$ و $b = 1 - \sqrt{3}$

II- (1) احسب العبارات التالية

$$K = 3 \times \left(-\frac{3}{2}\right)^{-1} + 9 \times \left(-\frac{2}{3}\right)^2 - \frac{1}{2} \times (-3)^{-1} \quad J = \frac{10^{-4} \times (0,01)^2}{\frac{1}{100} \times (0,001)^2} \quad I = \left[\frac{5}{\sqrt{2}^2} - \left(\frac{3}{2}\right)^2 \right]^{-1}$$

(2) اكتب في صيغة قوة لعدد حقيقي

$$N = \frac{0,5^{-3} \times 2^{-9}}{\left(\frac{1}{2}\right)^{-4}} \quad M = \left(\frac{2}{\sqrt{5}}\right)^{-7} \times \left(\frac{5}{4}\right) \quad L = 25^{-3} \times \left(\frac{1}{5}\right)^{-4}$$

$$E = \frac{(a^{-1}b^{-3})^2 a^{-6}b^8}{(a^{-3}b^2)^2}$$

$$= \frac{a^{-2} \times b^{-6} \times a^{-6} b^8}{a^{-6} b^4}$$

$$= \frac{a^{-2} \cancel{a^{-6}} \times b^{-6} \times b^8}{\cancel{a^{-6}} b^4}$$

$$= a^{-2} \times \frac{b^2}{b^4} = a^{-2} \times b^{2-4}$$

$$E = a^{-2} \times b^{-2}$$

ridha Maths





$$b = 1 - \sqrt{3} \quad \text{و} \quad a = 1 + \sqrt{3}$$

$$E = a^{-2} \times b^{-2}$$

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

$$= \left[(1 + \sqrt{3})(1 - \sqrt{3}) \right]^{-2}$$

$$= [1 - \sqrt{3} + \sqrt{3} - 3]^{-2}$$

$$= (-2)^{-2}$$

$$= \frac{1}{(-2)^2} = \frac{1}{4}$$

$$(a \times b)^{-1} = a^{-1} \times b^{-1}$$

$$I = \left[\frac{5}{\sqrt{2}^2} - \left(\frac{3}{2} \right)^2 \right]^{-1}$$

$$= \left[\frac{5}{2} - \frac{9}{4} \right]^{-1} = \left[\frac{10}{4} - \frac{9}{4} \right]^{-1} = \left(\frac{1}{4} \right)^{-1}$$

$$= \left(\frac{4}{1} \right)^1 = 4$$

ridha Maths

II





$$\begin{aligned} J &= \frac{10^{-4} \times (0,01)^2}{\frac{1}{100} \times (0,001)^2} = \frac{10^{-4} \times (10^{-2})^2}{10^{-2} \times (10^{-3})^2} \\ &= \frac{10^{-4} \times 10^{-4}}{10^{-2} \times 10^{-6}} \\ &= \frac{10^{-8}}{10^{-8}} \\ &= 1 \end{aligned}$$

ridha Maths

$$\begin{aligned} K &= 3 \times \left(-\frac{3}{2}\right)^{-1} + 9 \times \left(-\frac{2}{3}\right)^2 - \frac{1}{2} \times (-3)^{-1} \\ &= 3 \times \left(-\frac{2}{3}\right) + 9 \times \left(\frac{2}{3}\right)^2 - \frac{1}{2} \times \left(-\frac{1}{3}\right) \\ &= -\frac{6}{3} + \cancel{9} \times \frac{4}{\cancel{9}} + \frac{1}{6} \\ &= \underbrace{-2 + 4} + \frac{1}{6} \\ &= 2 + \frac{1}{6} = \frac{12}{6} + \frac{1}{6} = \frac{13}{6} \end{aligned}$$





$$\begin{aligned} L &= 25^{-3} \times \left(\frac{1}{5}\right)^{-4} \\ &= (5^2)^{-3} \times 5^4 \\ &= 5^{-6} \times 5^4 \\ &= 5^{-2} \end{aligned}$$

(2)

$$\begin{aligned} M &= \left(\frac{2}{\sqrt{5}}\right)^{-2} \times \left(\frac{5}{4}\right) \\ &= \left(\frac{2}{\sqrt{5}}\right)^{-2} \times \left(\frac{\sqrt{5}}{2}\right)^2 \\ &= \left(\frac{\sqrt{5}}{2}\right)^2 \times \left(\frac{\sqrt{5}}{2}\right)^2 \\ &= \left(\frac{\sqrt{5}}{2}\right)^4 \end{aligned}$$

$$0,5 = \frac{1}{2}$$

$$\begin{aligned} N &= \frac{0,5^{-3} \times 2^{-9}}{\left(\frac{1}{2}\right)^{-4}} = \frac{\left(\frac{1}{2}\right)^{-3} \times 2^{-9}}{2^4} \\ &= \frac{2^3 \times 2^{-9}}{2^4} \\ &= \frac{2^{-6}}{2^4} = 2^{-6-4} = 2^{-10} \end{aligned}$$



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