SOUTIEN – RACINES CARREES

EXERCICE 1 :

Calculer les produits et les quotients suivants :

$A = \sqrt{4,9} \times \sqrt{10}$ $\qquad$ $B = \sqrt{250} \times \sqrt{10^3}$ $\qquad$ $C = \sqrt{3,6} \times \sqrt{10^{-1}}$

$D = \dfrac{\sqrt{54}}{\sqrt{6}}$ $\qquad$ $E = \dfrac{\sqrt{48}}{\sqrt{3}}$ $\qquad$ $F = \sqrt{\dfrac{1}{3}} \times \sqrt{12}$

$G = \sqrt{\dfrac{4}{3}} \times \sqrt{\dfrac{3}{4}}$ $\qquad$ $H = \dfrac{\sqrt{63}}{\sqrt{8}} \times \sqrt{\dfrac{2}{7}}$ $\qquad$ $I = \dfrac{\sqrt{7}}{\sqrt{63}}$

$J = 5\sqrt{6} \times \sqrt{54}$ $\qquad$ $K = \sqrt{12} \times 3\sqrt{27}$ $\qquad$ $L = \sqrt{175} \times \sqrt{\dfrac{1}{63}}$

EXERCICE 2 :

Ecrire les nombres suivants sous la forme $a\sqrt{b}$ où a et b sont deux nombres entiers avec b le plus petit possible.

$A = \sqrt{50}$ $\qquad$ $B = \sqrt{300}$ $\qquad$ $C = \sqrt{80}$

$D = \sqrt{72}$ $\qquad$ $E = \sqrt{147}$ $\qquad$ $F = 3\sqrt{32}$

$G = 6\sqrt{45}$ $\qquad$ $H = \sqrt{6} \times \sqrt{21}$ $\qquad$ $I = \sqrt{\dfrac{80}{13}} \times \sqrt{\dfrac{39}{4}}$

$J = \sqrt{16 \times 10^5}$ $\qquad$ $K = \sqrt{5^3 \times 2^2}$ $\qquad$ $L = \sqrt{6} \times 2\sqrt{3}$

EXERCICE 3 :

Réduire chaque expression:

$A = -5\sqrt{3} + 2\sqrt{3}$ $\qquad$ $B = \sqrt{2} + 6\sqrt{2} - 7\sqrt{2}$

$C = 8\sqrt{2} - 3 + 7 - 15\sqrt{2}$ $\qquad$ $D = 5 - 4\sqrt{3} + 2\sqrt{3} - 8$

EXERCICE 4 :

Ecrire chaque expression sous la forme $a\sqrt{b}$ où a et b sont deux nombres entiers avec b le plus petit possible.

$A = \sqrt{2} + \sqrt{8} + \sqrt{18}$ $\qquad$ $B = \sqrt{3} - \sqrt{12} + \sqrt{27}$

$C = 13\sqrt{2} + 4\sqrt{50} - \sqrt{162}$ $\qquad$ $D = 3\sqrt{45} + 2\sqrt{20} - 4\sqrt{80}$

$E = -3\sqrt{76} + 2\sqrt{19}$ $\qquad$ $F = \sqrt{363} + 5\sqrt{3} + \sqrt{2} \times \sqrt{54} - 3\sqrt{12}$

CORRECTION DU SOUTIEN – RACINES CARREES

EXERCICE 1 :

$A = \sqrt{4,9} \times \sqrt{10} = \sqrt{4,9 \times 10} = \sqrt{49} =$ **7**

$B = \sqrt{250} \times \sqrt{10^3} = \sqrt{250 \times 10^3} = \sqrt{250\ 000} =$ **500**

$C = \sqrt{3,6} \times \sqrt{10^{-1}} = \sqrt{3,6 \times 10^{-1}} = \sqrt{0,36} =$ **0,6**

$D = \dfrac{\sqrt{54}}{\sqrt{6}} = \sqrt{\dfrac{54}{6}} = \sqrt{9} =$ **3**

$E = \dfrac{\sqrt{48}}{\sqrt{3}} = \sqrt{\dfrac{48}{3}} = \sqrt{16} =$ **4**

$F = \sqrt{\dfrac{1}{3}} \times \sqrt{12} = \sqrt{\dfrac{1}{3} \times 12} = \sqrt{\dfrac{12}{3}} = \sqrt{4} =$ **2**

$G = \sqrt{\dfrac{4}{3}} \times \sqrt{\dfrac{3}{4}} = \sqrt{\dfrac{4}{3} \times \dfrac{3}{4}} = \sqrt{\dfrac{12}{12}} = \sqrt{1} =$ **1**

$H = \dfrac{\sqrt{63}}{\sqrt{8}} \times \sqrt{\dfrac{2}{7}} = \sqrt{\dfrac{63}{8}} \times \sqrt{\dfrac{2}{7}} = \sqrt{\dfrac{63}{8} \times \dfrac{2}{7}} = \sqrt{\dfrac{9 \times 7 \times 2}{2 \times 4 \times 7}} = \sqrt{\dfrac{9}{4}} = \dfrac{\sqrt{9}}{\sqrt{4}} = \dfrac{\mathbf{3}}{\mathbf{2}}$

$I = \dfrac{\sqrt{7}}{\sqrt{63}} = \sqrt{\dfrac{7}{63}} = \sqrt{\dfrac{1}{9}} = \dfrac{\sqrt{1}}{\sqrt{9}} = \dfrac{\mathbf{1}}{\mathbf{3}}$

$J = 5\sqrt{6} \times \sqrt{54} = 5 \times \sqrt{6 \times 54} = 5 \times \sqrt{6 \times 6 \times 9} = 5 \times \sqrt{6^2 \times 9}$
$ = 5 \times \sqrt{6^2} \times \sqrt{9} = 5 \times 6 \times 3 =$ **90**

$K = \sqrt{12} \times 3\sqrt{27} = \sqrt{12 \times 27} \times 3 = \sqrt{4 \times 3 \times 3 \times 9} \times 3 = \sqrt{4 \times 9 \times 9} \times 3$
$ = \sqrt{4} \times \sqrt{9} \times \sqrt{9} \times 3 = 2 \times 3 \times 3 \times 3 =$ **72**

$L = \sqrt{175} \times \sqrt{\dfrac{1}{63}} = \sqrt{175 \times \dfrac{1}{63}} = \sqrt{\dfrac{175}{63}} = \sqrt{\dfrac{7 \times 25}{7 \times 9}} = \sqrt{\dfrac{25}{9}} = \dfrac{\sqrt{25}}{\sqrt{9}} = \dfrac{\mathbf{5}}{\mathbf{3}}$

EXERCICE 2 :

$A = \sqrt{50} = \sqrt{25 \times 2} = \sqrt{25} \times \sqrt{2} =$ **$5\sqrt{2}$**

$B = \sqrt{300} = \sqrt{100 \times 3} = \sqrt{100} \times \sqrt{3} =$ **$10\sqrt{3}$**

$C = \sqrt{80} = \sqrt{16 \times 5} = \sqrt{16} \times \sqrt{5} =$ **$4\sqrt{5}$**

$D = \sqrt{72} = \sqrt{36 \times 2} = \sqrt{36} \times \sqrt{2} =$ **$6\sqrt{2}$**

$E = \sqrt{147} = \sqrt{49 \times 3} = \sqrt{49} \times \sqrt{3} =$ **$7\sqrt{3}$**

$F = 3\sqrt{32} = 3 \times \sqrt{16 \times 2} = 3 \times \sqrt{16} \times \sqrt{2} = 3 \times 4 \times \sqrt{2} =$ **$12\sqrt{2}$**

$G = 6\sqrt{45} = 6 \times \sqrt{9 \times 5} = 6 \times \sqrt{9} \times \sqrt{5} = 6 \times 3 \times \sqrt{5} = \mathbf{18\sqrt{5}}$

$H = \sqrt{6} \times \sqrt{21} = \sqrt{6 \times 21} = \sqrt{126} = \sqrt{9 \times 14} = \sqrt{9} \times \sqrt{14} = \mathbf{3\sqrt{14}}$

$I = \sqrt{\dfrac{80}{13}} \times \sqrt{\dfrac{39}{4}} = \sqrt{\dfrac{80}{13} \times \dfrac{39}{4}} = \sqrt{\dfrac{4 \times 20 \times 13 \times 3}{13 \times 4}} = \sqrt{60} = \sqrt{4 \times 15}$
$\quad = \sqrt{4} \times \sqrt{15} = \mathbf{2\sqrt{15}}$

$J = \sqrt{16 \times 10^5} = \sqrt{16 \times 10 \times 10^4} = \sqrt{16} \times \sqrt{10} \times \sqrt{10^4} = 4 \times \sqrt{10} \times \sqrt{10000}$
$\quad = 4 \times \sqrt{10} \times 100 = \mathbf{400\sqrt{10}}$

$K = \sqrt{5^3 \times 2^2} = \sqrt{5^2 \times 5 \times 2^2} = \sqrt{5^2} \times \sqrt{5} \times \sqrt{2^2} = 5 \times \sqrt{5} \times 2 = \mathbf{10\sqrt{5}}$

$L = \sqrt{6} \times 2\sqrt{3} = 2 \times \sqrt{6 \times 3} = 2 \times \sqrt{2 \times 3 \times 3} = 2 \times \sqrt{2 \times 3^2} = 2 \times \sqrt{2} \times \sqrt{3^2}$
$\quad = 2 \times \sqrt{2} \times 3 = \mathbf{6 \times \sqrt{2}}$

EXERCICE 3 :

$A = -5\sqrt{3} + 2\sqrt{3} = \sqrt{3} \times (-5 + 2) = \mathbf{-3\sqrt{3}}$

$B = \sqrt{2} + 6\sqrt{2} - 7\sqrt{2} = \sqrt{2} \times (1 + 6 - 7) = \mathbf{0}$

$C = 8\sqrt{2} - 3 + 7 - 15\sqrt{2} = (8\sqrt{2} - 15\sqrt{2}) + (-3 + 7) = \sqrt{2} \times (8 - 15) + 4 = \mathbf{-7\sqrt{2} + 4}$

$D = 5 - 4\sqrt{3} + 2\sqrt{3} - 8 = (5 - 8) + (-4\sqrt{3} + 2\sqrt{3}) = -3 + \sqrt{3} \times (-4 + 2) = \mathbf{-3 - 2\sqrt{3}}$

EXERCICE 4 :

$A = \sqrt{2} + \sqrt{8} + \sqrt{18} = \sqrt{2} + \sqrt{4 \times 2} + \sqrt{9 \times 2} = \sqrt{2} + \sqrt{4} \times \sqrt{2} + \sqrt{9} \times \sqrt{2}$
$\quad = \sqrt{2} + 2\sqrt{2} + 3\sqrt{2} = \sqrt{2} \times (1 + 2 + 3) = \mathbf{6\sqrt{2}}$

$B = \sqrt{3} - \sqrt{12} + \sqrt{27} = \sqrt{3} - \sqrt{4 \times 3} + \sqrt{9 \times 3} = \sqrt{3} - \sqrt{4} \times \sqrt{3} + \sqrt{9} \times \sqrt{3}$
$\quad = \sqrt{3} - 2\sqrt{3} + 3\sqrt{3} = \sqrt{3} \times (1 - 2 + 3) = \mathbf{2\sqrt{3}}$

$C = 13\sqrt{2} + 4\sqrt{50} - \sqrt{162} = 13\sqrt{2} + 4 \times \sqrt{25 \times 2} - \sqrt{81 \times 2}$
$\quad = 13\sqrt{2} + 4 \times \sqrt{25} \times \sqrt{2} - \sqrt{81} \times \sqrt{2} = 13\sqrt{2} + 4 \times 5 \times \sqrt{2} - 9\sqrt{2}$
$\quad = 13\sqrt{2} + 20\sqrt{2} - 9\sqrt{2} = \sqrt{2} \times (13 + 20 - 9) = \mathbf{24\sqrt{2}}$

$D = 3\sqrt{45} + 2\sqrt{20} - 4\sqrt{80} = 3 \times \sqrt{9 \times 5} + 2 \times \sqrt{4 \times 5} - 4 \times \sqrt{16 \times 5}$
$\quad = 3 \times \sqrt{9} \times \sqrt{5} + 2 \times \sqrt{4} \times \sqrt{5} - 4 \times \sqrt{16} \times \sqrt{5}$
$\quad = 3 \times 3 \times \sqrt{5} + 2 \times 2 \times \sqrt{5} - 4 \times 4 \times \sqrt{5} = 9\sqrt{5} + 4\sqrt{5} - 16\sqrt{5}$
$\quad = \sqrt{5} \times (9 + 4 - 16) = \mathbf{-3\sqrt{5}}$

$E = -3\sqrt{76} + 2\sqrt{19} = -3 \times \sqrt{4 \times 19} + 2\sqrt{19} = -3 \times \sqrt{4} \times \sqrt{19} + 2\sqrt{19}$
$\quad = -3 \times 2 \times \sqrt{19} + 2\sqrt{19} = -6\sqrt{19} + 2\sqrt{19} = \sqrt{19} \times (-6 + 2) = \mathbf{-4\sqrt{19}}$

$F = \sqrt{363} + 5\sqrt{3} + \sqrt{2} \times \sqrt{54} - 3\sqrt{12} = \sqrt{121 \times 3} + 5\sqrt{3} + \sqrt{2 \times 54} - 3 \times \sqrt{4 \times 3}$
$\quad = \sqrt{121} \times \sqrt{3} + 5\sqrt{3} + \sqrt{108} - 3 \times \sqrt{4} \times \sqrt{3} = 11\sqrt{3} + 5\sqrt{3} + \sqrt{36 \times 3} - 3 \times 2 \times \sqrt{3}$
$\quad = 11\sqrt{3} + 5\sqrt{3} + \sqrt{36} \times \sqrt{3} - 6\sqrt{3} = 11\sqrt{3} + 5\sqrt{3} + 6\sqrt{3} - 6\sqrt{3} = 11\sqrt{3} + 5\sqrt{3}$
$\quad = \sqrt{3} \times (11 + 5) = \mathbf{16\sqrt{3}}$