SOUTIEN – RACINES CARREES

EXERCICE 1 :

Calculer les produits et les quotients suivants :

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

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

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

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.

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

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

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

EXERCICE 3 :

Réduire chaque expression:

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

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

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.

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

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

EXERCICE 5 :

Développer et réduire chaque produit :

$A = \sqrt{3}(\sqrt{3} - 2)$ $B = \sqrt{15}(5 - 3\sqrt{15})$ $C = (\sqrt{5} - 3)(4 + \sqrt{5})$

$D = (2\sqrt{6} + 1)(8 - 5\sqrt{6})$ $E = (\sqrt{7} - \sqrt{3})(\sqrt{7} + \sqrt{3})$ $F = (\sqrt{3} - \sqrt{5})^2$

$G = (2\sqrt{3} + 5)^2$ $H = (3\sqrt{5} - 2\sqrt{7})^2$ $I = 8\sqrt{3}(12 - 10\sqrt{7})$

CORRECTION DU SOUTIEN – RACINES CARREES

EXERCICE 1 :

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

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

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

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

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

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

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

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

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

EXERCICE 2 :

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

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

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

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

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

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

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

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

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

EXERCICE 3 :

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

$B = \sqrt{2} + 6\sqrt{2} - 7\sqrt{2} = \mathbf{0}$

$C = 8\sqrt{2} - 3 + 7 - 15\sqrt{2} = \mathbf{23\sqrt{2} + 4}$

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

EXERCICE 4 :

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

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

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

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

EXERCICE 5 :

$A = \sqrt{3}(\sqrt{3} - 2) = \sqrt{9} - 2\sqrt{3} = \mathbf{3 - 2\sqrt{3}}$

$B = \sqrt{15}(5 - 3\sqrt{15}) = 5\sqrt{15} - 3 \times (\sqrt{15})^2 = 5\sqrt{15} - 3 \times 15 = \mathbf{5\sqrt{15} - 45}$

$C = (\sqrt{5} - 3)(4 + \sqrt{5}) = 4\sqrt{5} + (\sqrt{5})^2 - 12 - 3\sqrt{5} = 4\sqrt{5} + 5 - 12 - 3\sqrt{5} = \mathbf{\sqrt{5} - 7}$

$D = (2\sqrt{6} + 1)(8 - 5\sqrt{6}) = 16\sqrt{6} - 10 \times (\sqrt{6})^2 + 8 - 5\sqrt{6} = 16\sqrt{6} - 10 \times 6 + 8 - 5\sqrt{6}$
$= 16\sqrt{6} - 60 + 8 - 5\sqrt{6} = \mathbf{11\sqrt{6} - 52}$

$E = (\sqrt{7} - \sqrt{3})(\sqrt{7} + \sqrt{3}) = (\sqrt{7})^2 - (\sqrt{3})^2 = 7 - 3 = \mathbf{4}$

$F = (\sqrt{3} - \sqrt{5})^2 = (\sqrt{3})^2 - 2 \times \sqrt{3} \times \sqrt{5} + (\sqrt{5})^2 = 3 - 2\sqrt{15} + 5 = \mathbf{8 - 2\sqrt{15}}$

$G = (2\sqrt{3} + 5)^2 = (2\sqrt{3})^2 + 2 \times 2\sqrt{3} \times 5 + 5^2 = 12 + 20\sqrt{3} + 25 = \mathbf{37 + 20\sqrt{3}}$

$H = (3\sqrt{5} - 2\sqrt{7})^2 = (3\sqrt{5})^2 - 2 \times 3\sqrt{5} \times 2\sqrt{7} + (2\sqrt{7})^2 = 45 - 12\sqrt{35} + 28$
$= \mathbf{73 - 12\sqrt{35}}$

$I = 8\sqrt{3}(12 - 10\sqrt{7}) = \mathbf{96\sqrt{3} - 80\sqrt{21}}$