

Notre Dame de la merci - Montpellier

Bilan sur les racines carrées

Exercice 1F.1

Simplifier les écritures suivantes

$$A = \sqrt{28} \times \sqrt{20} \times \sqrt{35}$$

$$C = \frac{\sqrt{56}}{\sqrt{21}}$$

$$E = \sqrt{\frac{42}{25}} \times \sqrt{\frac{40}{28}}$$

$$B = \sqrt{15} \times \sqrt{35} \times \sqrt{33}$$

$$D = \frac{\sqrt{24}}{\sqrt{54}}$$

$$F = \sqrt{\frac{14}{15}} \times \sqrt{\frac{45}{24}} \times \sqrt{\frac{20}{9}}$$

Exercice 1F.2

Simplifier les écritures suivantes

$$A = \sqrt{28} + \sqrt{63}$$

$$C = \sqrt{6} + \sqrt{24} + \sqrt{54}$$

$$E = 3\sqrt{8} + 5\sqrt{72} - 4\sqrt{128}$$

$$B = \sqrt{20} - \sqrt{45}$$

$$D = 4\sqrt{6} + 3\sqrt{24} - 5\sqrt{54}$$

$$F = 9\sqrt{20} - 5\sqrt{45} - 2\sqrt{180}$$

Exercice 1F.3

Simplifier les écritures suivantes

$$A = (3\sqrt{7} - 5)(2 - 4\sqrt{7})$$

$$B = \sqrt{180} + 3\sqrt{80} - 2\sqrt{125}$$

Exercice 1F.4

Simplifier les écritures suivantes

$$A = \frac{5}{3 + \sqrt{2}}$$

$$C = \frac{3 + \sqrt{2}}{4 + \sqrt{8}}$$

$$B = \frac{5}{\sqrt{7} - 4}$$

$$D = \frac{8 + \sqrt{8}}{8}$$

$$\begin{aligned} A &= (3\sqrt{7} - 5)(2 - 4\sqrt{7}) \\ &= 3\sqrt{7} \times 2 - 3\sqrt{7} \times 4\sqrt{7} - 5 \times 2 + 5 \times 4\sqrt{7} \\ &= 6\sqrt{7} - 12 \times 7 - 10 + 20\sqrt{7} \\ &= 26\sqrt{7} - 94 \end{aligned}$$

CORRIGE - Notre Dame de La Merci - Montpellier

Exercice 1F.1

$$A = \sqrt{28} \times \sqrt{20} \times \sqrt{35} = \sqrt{7} \times \sqrt{4} \times \sqrt{4} \times \sqrt{5} \times \sqrt{5} \times \sqrt{7} = (\sqrt{4} \times \sqrt{4}) \times (\sqrt{5} \times \sqrt{5}) \times (\sqrt{7} \times \sqrt{7}) = 4 \times 5 \times 7 = 140$$

$$B = \sqrt{15} \times \sqrt{35} \times \sqrt{33} = \sqrt{5} \times \sqrt{3} \times \sqrt{7} \times \sqrt{5} \times \sqrt{3} \times \sqrt{11} = (\sqrt{3} \times \sqrt{3}) \times (\sqrt{5} \times \sqrt{5}) \times \sqrt{7} \times \sqrt{11} = 3 \times 5 \times \sqrt{77} = 15\sqrt{77}$$

$$C = \frac{\sqrt{56}}{\sqrt{21}} = \sqrt{\frac{56}{21}} = \sqrt{\frac{8 \times 7}{3 \times 7}} = \sqrt{\frac{8}{3}} = \sqrt{\frac{4 \times 2}{3}} = \sqrt{4} \times \sqrt{\frac{2}{3}} = 2\sqrt{\frac{2}{3}} = 2 \frac{\sqrt{2}}{\sqrt{3}} = 2 \frac{\sqrt{2}}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} = 2 \frac{\sqrt{2 \times 3}}{3} = \frac{2}{3} \sqrt{6}$$

$$D = \frac{\sqrt{24}}{\sqrt{54}} = \sqrt{\frac{24}{54}} = \sqrt{\frac{3 \times 8}{9 \times 6}} = \sqrt{\frac{3 \times 2 \times 4}{3 \times 3 \times 2 \times 3}} = \sqrt{\frac{4}{9}} = \frac{2}{3}$$

$$E = \sqrt{\frac{42}{25}} \times \sqrt{\frac{40}{28}} = \sqrt{\frac{42}{25} \times \frac{40}{28}} = \sqrt{\frac{42 \times 40}{25 \times 28}} = \sqrt{\frac{7 \times 6 \times 8 \times 5}{5 \times 5 \times 7 \times 4}} = \sqrt{\frac{2 \times 3 \times 2 \times 4}{5 \times 4}} = \sqrt{\frac{4 \times 3}{5}} = \sqrt{4} \times \sqrt{\frac{3}{5}} = 2\sqrt{\frac{3}{5}}$$

$$F = \sqrt{\frac{14}{15}} \times \sqrt{\frac{45}{24}} \times \sqrt{\frac{20}{9}} = \sqrt{\frac{14 \times 45 \times 20}{15 \times 24 \times 9}} = \sqrt{\frac{2 \times 7 \times 9 \times 5 \times 5 \times 4}{3 \times 5 \times 8 \times 3 \times 9}} = \sqrt{\frac{8 \times 7 \times 5}{3 \times 8 \times 3}} = \sqrt{\frac{35}{9}} = \frac{\sqrt{35}}{\sqrt{9}} = \frac{\sqrt{35}}{3}$$

Exercice 1F.2

$$\begin{aligned} A &= \sqrt{28} + \sqrt{63} \\ &= \sqrt{4 \times 7} + \sqrt{9 \times 7} \\ &= \sqrt{4} \times \sqrt{7} + \sqrt{9} \times \sqrt{7} \\ &= 2\sqrt{7} + 3\sqrt{7} \\ &= (2+3)\sqrt{7} \\ &= 5\sqrt{7} \end{aligned}$$

$$\begin{aligned} B &= \sqrt{20} - \sqrt{45} \\ &= \sqrt{4 \times 5} - \sqrt{9 \times 5} \\ &= \sqrt{4} \times \sqrt{5} - \sqrt{9} \times \sqrt{5} \\ &= 2\sqrt{5} - 3\sqrt{5} \\ &= (2-3)\sqrt{5} \\ &= -\sqrt{5} \end{aligned}$$

$$\begin{aligned} C &= \sqrt{6} + \sqrt{24} + \sqrt{54} \\ &= \sqrt{6} + \sqrt{4 \times 6} + \sqrt{9 \times 6} \\ &= \sqrt{6} + \sqrt{4} \times \sqrt{6} + \sqrt{9} \times \sqrt{6} \\ &= 1 \times \sqrt{6} + 2 \times \sqrt{6} + 3 \times \sqrt{6} \\ &= (1+2+3) \times \sqrt{6} \\ &= 6\sqrt{6} \end{aligned}$$

$$\begin{aligned} D &= 4\sqrt{6} + 3\sqrt{24} - 5\sqrt{54} \\ &= 4\sqrt{6} + 3 \times \sqrt{4 \times 6} - 5 \times \sqrt{9 \times 6} \\ &= 4\sqrt{6} + 3 \times \sqrt{4} \times \sqrt{6} - 5 \times \sqrt{9} \times \sqrt{6} \\ &= 4\sqrt{6} + 3 \times 2 \times \sqrt{6} - 5 \times 3 \times \sqrt{6} \\ &= 4 \times \sqrt{6} + 6 \times \sqrt{6} - 15 \times \sqrt{6} \\ &= (4+6-15) \times \sqrt{6} \\ &= -5\sqrt{6} \end{aligned}$$

$$\begin{aligned} E &= 3\sqrt{8} + 5\sqrt{72} - 4\sqrt{128} = 3 \times \sqrt{4} \times \sqrt{2} + 5 \times \sqrt{9} \times \sqrt{8} - 4 \times \sqrt{64} \times \sqrt{2} \\ &= 3 \times 2 \times \sqrt{2} + 5 \times 3 \times \sqrt{4} \times \sqrt{2} - 4 \times 8 \times \sqrt{2} \\ &= 6 \times \sqrt{2} + 15 \times 2 \times \sqrt{2} - 32 \times \sqrt{2} \\ &= 6 \times \sqrt{2} + 30 \times \sqrt{2} - 32 \times \sqrt{2} \\ &= (6+30-32) \times \sqrt{2} \\ &= 4\sqrt{2} \end{aligned}$$

$$\begin{aligned} F &= 9\sqrt{20} - 5\sqrt{45} - 2\sqrt{180} = 9 \times \sqrt{4} \times \sqrt{5} - 5 \times \sqrt{9} \times \sqrt{5} - 2 \times \sqrt{36} \times \sqrt{5} \\ &= 9 \times 2 \times \sqrt{5} - 5 \times 3 \times \sqrt{5} - 2 \times 6 \times \sqrt{5} \\ &= 18 \times \sqrt{5} - 15 \times \sqrt{5} - 12 \times \sqrt{5} \\ &= (18-15-12) \times \sqrt{5} \\ &= -9\sqrt{5} \end{aligned}$$

Exercice 1F.3

$$\begin{aligned}
 A &= (3\sqrt{7} - 5)(2 - 4\sqrt{7}) \\
 &= 3\sqrt{7} \times 2 - 3\sqrt{7} \times 4\sqrt{7} - 5 \times 2 + 5 \times 4\sqrt{7} \\
 &= 6\sqrt{7} - 12 \times 7 - 10 + 20\sqrt{7} \\
 &= 26\sqrt{7} - 94 \\
 B &= \sqrt{180} + 3\sqrt{80} - 2\sqrt{125} \\
 &= \sqrt{36} \times \sqrt{5} + 3 \times \sqrt{16} \times \sqrt{5} - 2 \times \sqrt{25} \times \sqrt{5} \\
 &= 6\sqrt{5} + 3 \times 4\sqrt{5} - 2 \times 5\sqrt{5} \\
 &= 6\sqrt{5} + 12\sqrt{5} - 10\sqrt{5} \\
 &= 8\sqrt{5}
 \end{aligned}$$

Exercice 1F.4

$$\begin{aligned}
 A &= \frac{5}{3 + \sqrt{2}} \\
 &= \frac{5}{3 + \sqrt{2}} \times \frac{3 - \sqrt{2}}{3 - \sqrt{2}} \\
 &= \frac{5(3 - \sqrt{2})}{3^2 - (\sqrt{2})^2} \\
 &= \frac{5(3 - \sqrt{2})}{9 - 2} \\
 &= \frac{5(3 - \sqrt{2})}{7}
 \end{aligned}$$

$$\begin{aligned}
 B &= \frac{5}{\sqrt{7} - 4} \\
 &= \frac{5}{\sqrt{7} - 4} \times \frac{\sqrt{7} + 4}{\sqrt{7} + 4} \\
 &= \frac{5(\sqrt{7} + 4)}{(\sqrt{7})^2 - 4^2} \\
 &= \frac{5(\sqrt{7} + 4)}{7 - 16} \\
 &= \frac{5(\sqrt{7} + 4)}{-9} \\
 &= -\frac{5(\sqrt{7} + 4)}{9}
 \end{aligned}$$

$$\begin{aligned}
 C &= \frac{3 + \sqrt{2}}{4 + \sqrt{8}} \\
 &= \frac{3 + \sqrt{2}}{4 + \sqrt{8}} \times \frac{4 - \sqrt{8}}{4 - \sqrt{8}} \\
 &= \frac{(3 + \sqrt{2})(4 - \sqrt{8})}{4^2 - (\sqrt{8})^2} \\
 &= \frac{12 - 3\sqrt{8} + 4\sqrt{2} - \sqrt{16}}{16 - 8} \\
 &= \frac{8 - 3\sqrt{8} + 4\sqrt{2}}{8} \\
 &= \frac{8 - 3 \times 2\sqrt{2} + 4\sqrt{2}}{8} \\
 &= \frac{8 - 2\sqrt{2}}{8} = \frac{4 - \sqrt{2}}{4}
 \end{aligned}$$

$$\begin{aligned}
 D &= \frac{8 + \sqrt{8}}{8} \\
 &= \frac{2 \times 4 + \sqrt{4} \times \sqrt{2}}{2 \times 4} \\
 &= \frac{2 \times 4 + 2 \times \sqrt{2}}{2 \times 4} \\
 &= \frac{\boxed{2}(4 + \sqrt{2})}{\boxed{2} \times 4} \\
 &= \frac{4 + \sqrt{2}}{4}
 \end{aligned}$$