

Fiche d'entraînement : calculs avec des racines carrées

Simplifier au maximum les calculs suivants :

1) $\sqrt{80}$

2) $\sqrt{98}$

3) $\frac{\sqrt{32}}{\sqrt{50}}$

4) $\frac{\sqrt{48}}{\sqrt{75}}$

5) $\frac{\sqrt{45}}{\sqrt{20}}$

6) $\sqrt{63} + \sqrt{28}$

7) $4\sqrt{18} - 3\sqrt{72}$

8) $7\sqrt{125} + 3\sqrt{20}$

9) $\frac{\sqrt{8} + 3\sqrt{18}}{4\sqrt{98} - \sqrt{50}}$

10) $\frac{\sqrt{20} + 2\sqrt{80}}{3\sqrt{45} - \sqrt{180}}$

Solutions

1) $\sqrt{80} = \sqrt{16 \times 5} = \sqrt{16} \times \sqrt{5} = \boxed{4\sqrt{5}}$

2) $\sqrt{98} = \sqrt{49 \times 2} = \sqrt{49} \times \sqrt{2} = \boxed{7\sqrt{2}}$

3) $\frac{\sqrt{32}}{\sqrt{50}} = \frac{\sqrt{16 \times 2}}{\sqrt{25 \times 2}} = \frac{\sqrt{16} \times \cancel{\sqrt{2}}}{\sqrt{25} \times \cancel{\sqrt{2}}} = \boxed{\frac{4}{5}}$

4) $\frac{\sqrt{48}}{\sqrt{75}} = \frac{\sqrt{16 \times 3}}{\sqrt{25 \times 3}} = \frac{\sqrt{16} \times \cancel{\sqrt{3}}}{\sqrt{25} \times \cancel{\sqrt{3}}} = \boxed{\frac{4}{5}}$

5) $\frac{\sqrt{45}}{\sqrt{20}} = \frac{\sqrt{9 \times 5}}{\sqrt{4 \times 5}} = \frac{\sqrt{9} \times \cancel{\sqrt{5}}}{\sqrt{4} \times \cancel{\sqrt{5}}} = \boxed{\frac{3}{2}}$

6) $\sqrt{63} + \sqrt{28} = \sqrt{9 \times 7} + \sqrt{4 \times 7} = \sqrt{9} \times \sqrt{7} + \sqrt{4} \times \sqrt{7} = 3\sqrt{7} + 2\sqrt{7} = \boxed{5\sqrt{7}}$

7) $4\sqrt{18} - 3\sqrt{72} = 4\sqrt{9 \times 2} - 3\sqrt{36 \times 2} = 4 \times \sqrt{9} \times \sqrt{2} - 3 \times \sqrt{36} \times \sqrt{2}$
 $= 4 \times 3 \times \sqrt{2} - 3 \times 6 \times \sqrt{2} = 12\sqrt{2} - 18\sqrt{2} = \boxed{-6\sqrt{2}}$

8) $7\sqrt{125} + 3\sqrt{20} = 7\sqrt{25 \times 5} + 3\sqrt{4 \times 5} = 7 \times \sqrt{25} \times \sqrt{5} + 3 \times \sqrt{4} \times \sqrt{5}$
 $= 7 \times 5 \times \sqrt{5} + 3 \times 2 \times \sqrt{5} = 35\sqrt{5} + 6\sqrt{5} = \boxed{41\sqrt{5}}$

9) $\frac{\sqrt{8} + 3\sqrt{18}}{4\sqrt{98} - \sqrt{50}} = \frac{\sqrt{4 \times 2} + 3\sqrt{9 \times 2}}{4\sqrt{49 \times 2} - \sqrt{25 \times 2}} = \frac{\sqrt{4} \times \sqrt{2} + 3 \times \sqrt{9} \times \sqrt{2}}{4 \times \sqrt{49} \times \sqrt{2} - \sqrt{25} \times \sqrt{2}}$
 $= \frac{2\sqrt{2} + 3 \times 3 \times \sqrt{2}}{4 \times 7 \times \sqrt{2} - 5\sqrt{2}} = \frac{2\sqrt{2} + 9\sqrt{2}}{28\sqrt{2} - 5\sqrt{2}} = \frac{11\cancel{\sqrt{2}}}{23\cancel{\sqrt{2}}} = \boxed{\frac{11}{23}}$

10) $\frac{\sqrt{20} + 2\sqrt{80}}{3\sqrt{45} - \sqrt{180}} = \frac{\sqrt{4 \times 5} + 2\sqrt{16 \times 5}}{3\sqrt{9 \times 5} - \sqrt{36 \times 5}} = \frac{\sqrt{4} \times \sqrt{5} + 2 \times \sqrt{16} \times \sqrt{5}}{3 \times \sqrt{9} \times \sqrt{5} - \sqrt{36} \times \sqrt{5}}$
 $= \frac{2\sqrt{5} + 2 \times 4 \times \sqrt{5}}{3 \times 3 \times \sqrt{5} - 6 \times \sqrt{5}} = \frac{2\sqrt{5} + 8\sqrt{5}}{9\sqrt{5} - 6\sqrt{5}} = \frac{10\cancel{\sqrt{5}}}{3\cancel{\sqrt{5}}} = \boxed{\frac{10}{3}}$