WORK SHEET: SIMPLIFING RADICALS

Assume all variables represent non-negative real numbers.

Examples:

$\sqrt{4} + \sqrt{9} - \sqrt{36} = 2 + 3 - 6 = -1$

$\sqrt{4 + 9} = \sqrt{13}$

$\sqrt{50} = \sqrt{25 \cdot 2} = \sqrt{25} \cdot \sqrt{2} = 5\sqrt{2}$

$\sqrt{x^2y^3} = \sqrt{x^2}\sqrt{y^3} = \sqrt{x^2}\sqrt{y^2}\sqrt{y} = xy\sqrt{y}$

$\sqrt{4x} + \sqrt{x} = \sqrt{4}\sqrt{x} + \sqrt{x} = 2\sqrt{x} + 1\sqrt{x} = 3\sqrt{x}$

$(3\sqrt{2})(4\sqrt{6}) = 12\sqrt{6 \cdot 2} = 12\sqrt{12} = 12\sqrt{4}\sqrt{3} = 12 \cdot 2\sqrt{3} = 24\sqrt{3}$

Practice:

1. $\sqrt{81} - \sqrt{25} + \sqrt{100}$
2. $\sqrt{60} - \sqrt{30}$
3. $\dfrac{\sqrt{64}}{\sqrt{4}}$
4. $\sqrt{8x} - \sqrt{18x}$
5. $15\sqrt{xy^2} - 3y\sqrt{49x}$
6. $(2\sqrt{6})(3\sqrt{15})$
7. $(2 + \sqrt{6})(3 - \sqrt{15})$
8. $\sqrt{36 + 64}$
9. $\sqrt{36 + 9}$
10. $(\sqrt{9} + \sqrt{25})^2$
11. $(\sqrt{x^3} - \sqrt{y^3})^2$

Answers: **1.** 14 **2.** $2\sqrt{15} - \sqrt{30}$ **3.** 4 **4.** $-\sqrt{2x}$ **5.** $-6y\sqrt{x}$ **6.** $18\sqrt{10}$
7. $6 - 2\sqrt{15} + 3\sqrt{6} - 3\sqrt{10}$ **8.** 10 **9.** $\sqrt{45} = 3\sqrt{5}$ **10.** 64 **11.** $x^3 - 2xy\sqrt{xy} + y^3$