Radical Operations

AAT

reducing

* always look for perfect squares & cubes

1. $\sqrt{81} = 9$

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

3. $\sqrt[3]{27} = -3$

4. $\sqrt{\frac{4}{9}} = \frac{2}{3}$

5. $\sqrt[3]{\frac{125}{8}} = \frac{5}{3}$

6. $\sqrt[3]{y^3} = y^{3/3} = y^1 = y$

7. $\sqrt{40} \cdot 2\sqrt{7} = 2\sqrt{10} \cdot 2\sqrt{7} = 4\sqrt{70}$

simplifying

* look for perfect squares/cubes or use factor trees

3 in a group to escape → $\sqrt[3]{54x^4y^7} = \sqrt[3]{3^3 \cdot 2x^4y^7} = 3xy^2\sqrt[3]{2xy}$

9 6
3 3 3 2

1. $\sqrt[2]{64x^5} = 8x^2\sqrt{x}$

2. $-\sqrt[3]{40x^6} = -2x^2 \cdot \sqrt[3]{5}$

4 10
2 2 5 2

combining

* to add & subtract the $\sqrt{\ }$ must have the same # inside

1. $2\sqrt{48} - 3\sqrt{27}$ ($\sqrt{16}\sqrt{3}$, $\sqrt{9}\sqrt{3}$)
$8\sqrt{3} - 9\sqrt{3} = -\sqrt{3}$

2. $\sqrt[3]{16x} - \sqrt[3]{54x^4}$ ($\sqrt[3]{8}\sqrt[3]{2}$, $\sqrt[3]{27}\sqrt[3]{2}$)
$2\sqrt[3]{2x} - 3x\sqrt[3]{2x} = (2-3x)\sqrt[3]{2x}$

* multiply you just multiply #s inside & out

3. $\sqrt{7} \cdot \sqrt{10} = \sqrt{70}$

4. $2\sqrt{5} \cdot \sqrt{12} = 2\sqrt{60} = 4\sqrt{15}$