

Complete the following problems.

1.) Multiply $\sqrt[3]{6x^2} \cdot \sqrt[4]{4x^5}$ exponents add when multiplied

$$\sqrt[3]{24x^7} = \sqrt[3]{2 \cdot 2 \cdot 2 \cdot 3 \cdot x^6 \cdot x} = 2x^2 \sqrt[3]{3x}$$

means 2

$$\sqrt[2]{64x^5y^8} = 8x^2 \sqrt[2]{4xy}$$

3.) Simplify $\sqrt{80} + \sqrt{45} - \sqrt{72}$

$$2 \cdot 2\sqrt{5} + 3\sqrt{5} - 3 \cdot 2\sqrt{2} = 4\sqrt{5} + 3\sqrt{5} - 6\sqrt{2} = 7\sqrt{5} - 6\sqrt{2}$$

4.) What is the extraneous solution to the equation $5 + \sqrt{x+7} = x$?

$$\sqrt{x+7} = x-5 \Rightarrow x+7 = (x-5)^2 \Rightarrow x+7 = x^2 - 10x + 25 \Rightarrow 0 = x^2 - 11x + 18 \Rightarrow (x-9)(x-2) = 0 \Rightarrow x=9, 2$$

make sure the power of y doesn't look like a root

5.) Simplify: $(3 + \sqrt{6})^2$

$$(3 + \sqrt{6})(3 + \sqrt{6}) = 9 + 3\sqrt{6} + 3\sqrt{6} + 6 = 15 + 6\sqrt{6}$$

Challenge (*) Solve: $(4x - 2)^{\frac{2}{3}} - 2 = 6$

$$(4x - 2)^{\frac{2}{3}} = 8 \Rightarrow 4x - 2 = (\sqrt[3]{8})^3 = 8 \Rightarrow 4x = 10 \Rightarrow x = \frac{5}{2}$$

* you could do $\sqrt[3]{(8)^3}$ if you prefer

7.) Solve for x: $3 + (4-x)^{\frac{3}{2}} = 11$

$$(4-x)^{\frac{3}{2}} = 8 \Rightarrow 4-x = (\sqrt[2]{8})^2 = 8 \Rightarrow 4-x = 8 \Rightarrow -x = 4 \Rightarrow x = -4$$

8.) Solve for x: $\sqrt{5x+14} = x-2$

$$\sqrt{5x+14} = x-2 \Rightarrow 5x+14 = (x-2)^2 = x^2 - 4x + 4 \Rightarrow 0 = x^2 - 9x - 10 = (x-10)(x+1) \Rightarrow x=10, -1$$

9.) Simplify: $\sqrt{\frac{7}{8x}}$

$$\frac{\sqrt{7}}{\sqrt{8x}} = \frac{\sqrt{7}}{\sqrt{2 \cdot 2 \cdot 2x}} = \frac{\sqrt{7}}{2\sqrt{2x}} = \frac{\sqrt{7} \cdot \sqrt{2x}}{2 \cdot \sqrt{2x} \cdot \sqrt{2x}} = \frac{\sqrt{14x}}{4x}$$

