

## Math 98 Worksheet #2 Solutions

1. Simplify the following.

$$(a) \sqrt{75} = \sqrt{25 \cdot 3} = \sqrt{25} \cdot \sqrt{3} = 5\sqrt{3}$$

$$(b) \sqrt[3]{24} = \sqrt[3]{8 \cdot 3} = \sqrt[3]{8} \cdot \sqrt[3]{3} = 2 \cdot \sqrt[3]{3}$$

$$(c) \sqrt[4]{r^8} = (r^8)^{1/4} = r^{8/4} = r^2$$

$$\begin{aligned}(d) \sqrt{98x^3} &= \sqrt{49 \cdot 2x^3} = \sqrt{49} \cdot \sqrt{2x^3} = 7 \cdot \sqrt{2x^3} \\ &= 7 \cdot \sqrt{2x^2 \cdot x^1} \\ &= 7 \cdot \sqrt{x^2} \cdot \sqrt{2x^1} \\ &= 7x \cdot \sqrt{2x}\end{aligned}$$

$$\begin{aligned}(e) \sqrt[3]{250a^2b^7} &= \sqrt[3]{125 \cdot 2a^2b^7} = \sqrt[3]{125} \cdot \sqrt[3]{2a^2b^7} = 5 \cdot \sqrt[3]{2a^2b^7} \\ &= 5 \cdot \sqrt[3]{2a^2b^6 \cdot b^1} \\ &= 5 \cdot \sqrt[3]{b^6} \cdot \sqrt[3]{2a^2b^1} \\ &= 5b^2 \cdot \sqrt[3]{2a^2b}\end{aligned}$$

$$(f) \sqrt{\frac{x^{23}}{32}} = \frac{\sqrt{x^{23}}}{\sqrt{32}} = \frac{\sqrt{x^{22} \cdot x^1}}{\sqrt{16 \cdot 2}} = \frac{\sqrt{x^{22}} \cdot \sqrt{x^1}}{\sqrt{16} \cdot \sqrt{2}} = \frac{x^{11} \cdot \sqrt{x}}{4 \cdot \sqrt{2}}$$

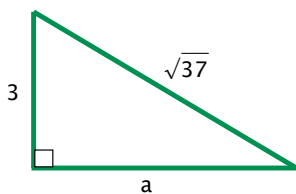
$$(g) -\sqrt[3]{-125x^6y^9z^{14}} = -\sqrt[3]{-125} \cdot \sqrt[3]{x^6y^9z^{14}} = -(-5) \cdot \sqrt[3]{x^6y^9z^{12} \cdot z^2} = 5x^2y^3z^4 \cdot \sqrt[3]{z^2}$$

2. Simplify the following by reducing the index of the root. (Consider the rational exponent form.)

$$(a) \sqrt[12]{5^3} = (5^3)^{1/12} = 5^{3/12} = 5^{1/4} = \sqrt[4]{5}$$

$$(b) \sqrt[10]{y^5} = (y^5)^{1/10} = y^{5/10} = y^{1/2} = \sqrt{y}$$

3. Find the value of  $a$  given the figure below.



$$\begin{aligned}\text{Pythagorean Formula} &\Rightarrow a^2 + 3^2 = (\sqrt{37})^2 \\ &\Rightarrow a^2 + 9 = 37 \\ &\Rightarrow a^2 = 28 \quad \Rightarrow a = \sqrt{28} = \sqrt{4 \cdot 7} = 2\sqrt{7}\end{aligned}$$