

SOLUTIONS

Math 51B Summer 2006

Name: _____

QUIZ #7 @ 20 points Sections 8.2, 8.3 & 8.4

Write neatly. Use a pencil. Show work in order to get credit. No proof, no credit given.

1. Simplify each radical. Assume that all variables represent nonnegative real numbers.

$$\begin{aligned} \text{a) } \sqrt{90} &= \sqrt{9 \cdot 10} \\ &= \sqrt{9} \cdot \sqrt{10} \\ &= \boxed{3\sqrt{10}} \end{aligned}$$

$$\begin{aligned} \text{b) } -\sqrt{700} &= -\sqrt{7 \cdot 100} \\ &= -\sqrt{7} \cdot \sqrt{100} \\ &= \boxed{-10\sqrt{7}} \end{aligned}$$

$$\begin{aligned} \text{c) } \frac{\sqrt{75}}{\sqrt{3}} &= \sqrt{\frac{75}{3}} \\ &= \sqrt{25} \\ &= \boxed{5} \end{aligned}$$

$$\begin{aligned} \text{d) } \sqrt{25x^{11}} &= \sqrt{25x^9 x^2} \\ &= \sqrt{25} \sqrt{x^9} \sqrt{x^2} \\ &= \boxed{5x^5 \sqrt{x}} \end{aligned}$$

$$\begin{aligned} \text{e) } \sqrt[3]{40} &= \sqrt[3]{8 \cdot 5} \\ &= \sqrt[3]{8} \cdot \sqrt[3]{5} \\ &= \boxed{2\sqrt[3]{5}} \end{aligned}$$

$$\begin{aligned} \text{f) } \sqrt[3]{\frac{216}{125}} &= \sqrt[3]{-\frac{2^3 \cdot 3^3}{5^3}} \\ &= -\frac{2 \cdot 3}{5} = \boxed{-\frac{6}{5}} \end{aligned}$$

2. Simplify the following expressions. Assume that all variables represent nonnegative real numbers.

$$\begin{aligned} \text{a) } 2\sqrt{3} - 5\sqrt{7} + \sqrt{3} - \sqrt{7} &= \\ &= \boxed{3\sqrt{3} - 6\sqrt{7}} \end{aligned}$$

$$\begin{aligned} \text{b) } 5\sqrt{72} - 3\sqrt{48} - 4\sqrt{128} &= \\ &= 5\sqrt{2 \cdot 36} - 3\sqrt{16 \cdot 3} - 4\sqrt{2 \cdot 64} \\ &= 5 \cdot 6\sqrt{2} - 3 \cdot 4\sqrt{3} - 4 \cdot 8\sqrt{2} \\ &= 30\sqrt{2} - 12\sqrt{3} - 32\sqrt{2} \\ &= \boxed{-2\sqrt{2} - 12\sqrt{3}} \end{aligned}$$

$$\begin{aligned} \text{c) } 3\sqrt{8x^2} - 4x\sqrt{2} &= \\ &= 3\sqrt{4 \cdot 2x^2} - 4x\sqrt{2} \\ &= 3 \cdot 2x\sqrt{2} - 4x\sqrt{2} \\ &= \boxed{2x\sqrt{2}} \end{aligned}$$

$$\begin{aligned} \text{d) } 5^4 \sqrt{m^3} + 8^4 \sqrt{16m^3} &= \\ &= 5^4 \sqrt{m^3} + 8 \cdot 2^4 \sqrt{m^3} \\ &= 5^4 \sqrt{m^3} + 16 \sqrt{m^3} \\ &= \boxed{21\sqrt{m^3}} \end{aligned}$$

3. Simplify and rationalize each denominator.

$$\begin{aligned} \text{a) } \sqrt{\frac{1}{8}} &= \frac{\sqrt{1}}{\sqrt{8}} = \frac{\sqrt{1}}{2\sqrt{2}} \\ &= \frac{\sqrt{2}}{2\sqrt{2} \cdot \sqrt{2}} \\ &= \frac{\sqrt{2}}{2 \cdot 2} = \boxed{\frac{\sqrt{2}}{4}} \end{aligned}$$

$$\begin{aligned} \text{b) } \sqrt{\frac{x^2}{4y}} &= \frac{\sqrt{x^2}}{\sqrt{4y}} = \frac{x}{2\sqrt{y}} \\ &= \frac{x\sqrt{y}}{2\sqrt{y}\sqrt{y}} = \boxed{\frac{x\sqrt{y}}{2y}} \end{aligned}$$

$$\begin{aligned} \text{c) } \sqrt[3]{\frac{1}{4}} &= \frac{\sqrt[3]{1}}{\sqrt[3]{4}} \\ &= \frac{\sqrt[3]{2}}{\sqrt[3]{2^2}} \\ &= \frac{\sqrt[3]{2}}{\sqrt[3]{2^2} \cdot \sqrt[3]{2}} \\ &= \frac{\sqrt[3]{2}}{\sqrt[3]{2^3}} \\ &= \boxed{\frac{\sqrt[3]{2}}{2}} \end{aligned}$$

$$\begin{aligned} \text{d) } \frac{\sqrt[3]{5^2}}{\sqrt[3]{5}} &= \frac{\sqrt[3]{5^2}}{\sqrt[3]{5} \cdot \sqrt[3]{5^2}} \\ &= \frac{\sqrt[3]{25}}{\sqrt[3]{5^3}} \\ &= \boxed{\frac{\sqrt[3]{25}}{5}} \end{aligned}$$