

SOLUTIONS

Math 71B Summer 2006

Name: _____

QUIZ #2 @ 20 points Sections 7.3, 7.4 & 7.5

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

1. Simplify:

$$\begin{aligned} \text{a) } \sqrt{50} &= \sqrt{5^2 \cdot 2} \\ &= \sqrt{5^2} \cdot \sqrt{2} \\ &= 5\sqrt{2} \end{aligned}$$

$$\begin{aligned} \text{b) } \sqrt[5]{x^{17}} &= \sqrt[5]{x^{15} \cdot x^2} \\ &= \sqrt[5]{x^{15}} \cdot \sqrt[5]{x^2} \\ &= x^3 \sqrt[5]{x^2} \end{aligned}$$

$$\begin{aligned} \text{c) } \sqrt{12x} \cdot \sqrt{3x} &= \\ &= \sqrt{36x^2} \\ &= \sqrt{36} \cdot \sqrt{x^2} \\ &= 6|x| \end{aligned}$$

$$\begin{aligned} \text{d) } 3\sqrt{13} - 2\sqrt{5} - 2\sqrt{13} + 4\sqrt{5} &= \\ &= \sqrt{13} + 2\sqrt{5} \end{aligned}$$

$$\begin{aligned} \text{e) } 5\sqrt[3]{16} + \sqrt[3]{54} &= \\ &= 5\sqrt[3]{2^4} + \sqrt[3]{3^3 \cdot 2} \\ &= 5\sqrt[3]{2^3 \cdot 2} + \sqrt[3]{3^3 \cdot 2} \\ &= 5\sqrt[3]{2^3} \cdot \sqrt[3]{2} + 3\sqrt[3]{2} \\ &= 5 \cdot 2 \sqrt[3]{2} + 3\sqrt[3]{2} \\ &= 10\sqrt[3]{2} + 3\sqrt[3]{2} = 13\sqrt[3]{2} \end{aligned}$$

$$\begin{aligned} \text{f) } \frac{\sqrt{32}}{5} + \frac{\sqrt{18}}{7} &= \\ &= \frac{7\sqrt{32} + 5\sqrt{18}}{35} \\ &= \frac{7\sqrt{16 \cdot 2} + 5\sqrt{9 \cdot 2}}{35} \\ &= \frac{7 \cdot 4\sqrt{2} + 5 \cdot 3\sqrt{2}}{35} \\ &= \frac{28\sqrt{2} + 15\sqrt{2}}{35} = \frac{43\sqrt{2}}{35} \end{aligned}$$

$$\begin{aligned} \text{g) } \sqrt{3}(4\sqrt{6} - 2\sqrt{3}) &= \\ &= 4\sqrt{3} \cdot \sqrt{6} - 2\sqrt{3} \cdot \sqrt{3} \\ &= 4\sqrt{18} - 2 \cdot 3 \\ &= 4\sqrt{9 \cdot 2} - 6 \\ &= 4 \cdot 3\sqrt{2} - 6 \\ &= 12\sqrt{2} - 6 \end{aligned}$$

$$\begin{aligned} \text{h) } (\sqrt{6} + 2)(\sqrt{6} - 2) &= \\ &= (\sqrt{6})^2 - 2^2 \\ &= 6 - 4 \\ &= 2 \end{aligned}$$

2) Rationalize each denominator:

$$\begin{aligned} \text{a) } \frac{13}{\sqrt{11}} &= \frac{13\sqrt{11}}{(\sqrt{11})^2} \\ &= \frac{13\sqrt{11}}{11} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}} &= \frac{(\sqrt{5}+\sqrt{3})(\sqrt{5}+\sqrt{3})}{(\sqrt{5}-\sqrt{3})(\sqrt{5}+\sqrt{3})} \\ &= \frac{(\sqrt{5})^2 + 2\sqrt{5}\cdot\sqrt{3} + (\sqrt{3})^2}{(\sqrt{5})^2 - (\sqrt{3})^2} \\ &= \frac{5 + 2\sqrt{15} + 3}{5 - 3} = \frac{8 + 2\sqrt{15}}{2} \\ &= 4 + \sqrt{15} \end{aligned}$$

3. Let $f(x) = x^2 - 6x - 4$. Find $f(3 - \sqrt{13})$.

$$\begin{aligned} f(3 - \sqrt{13}) &= (3 - \sqrt{13})^2 - 6(3 - \sqrt{13}) - 4 \\ &= 3^2 - 2 \cdot 3\sqrt{13} + (\sqrt{13})^2 - 18 + 6\sqrt{13} - 4 \\ &= 9 - 6\sqrt{13} + 13 - 18 + 6\sqrt{13} - 4 \\ &= 0 \end{aligned}$$