Algebra II
Section 8-2 & 8-3 (part I)
Review Sheet E15

Name KEY

1) It would pay to know several square roots that come out even, and more importantly, the four cubed roots that come out even. List the cubed roots (not including $\sqrt[3]{1}$) that come out even.

$\sqrt[3]{8} = 2$ $\sqrt[3]{27} = 3$ $\sqrt[3]{64} = 4$ $\sqrt[3]{125} = 5$

Simplify the following. See if you can find the "easy" way to do all the division problems.

2) $\pm\sqrt{400}$

$= \pm 20$

3) $\sqrt{49b^{10}}$

$= 7b^5$

4) $-\sqrt[3]{-64p^9q^3}$

$= -(-4p^3q)$

$= 4p^3q$

5) $\sqrt{52}$

$= \sqrt{4}\sqrt{13}$

$= 2\sqrt{13}$

6) $\sqrt[3]{54x^5}$

$= \sqrt[3]{27x^3}\sqrt[3]{2x^2}$

$= 3x\sqrt[3]{2x^2}$

7) $\sqrt[5]{j^6w^{11}}$

$= \sqrt[5]{j^5w^{10}}\sqrt[5]{jw}$

$= jw^2\sqrt[5]{jw}$

8) $\sqrt{\frac{2}{81}} = \frac{\sqrt{2}}{\sqrt{81}}$

$= \frac{\sqrt{2}}{9}$

9) $\frac{\sqrt[3]{250}}{\sqrt[3]{2}}$

$= \sqrt[3]{125} = 5$

10) $\sqrt[4]{\frac{1}{y^4}} = \frac{\sqrt[4]{1}}{\sqrt[4]{y^4}}$

$= \frac{1}{y}$

Multiply (and simplify) the following.

11) $10\sqrt{99}$

$= 10\sqrt{9}\sqrt{11}$

$= 10(3)\sqrt{11}$

$= 30\sqrt{11}$

12) $(2\sqrt{28})(-3\sqrt{77})$

$= 2(-3)\sqrt{4}\sqrt{7}\sqrt{7}\sqrt{11}$

$= 2(-3)(2)(7)\sqrt{11}$

$= -84\sqrt{11}$

13) $-9\sqrt[3]{80}$

$= -9\sqrt[3]{8}\sqrt[3]{10}$

$= -9(2)\sqrt[3]{10}$

$= -18\sqrt[3]{10}$

14) $\sqrt[3]{4mn^5} \cdot \sqrt[3]{2m^2n}$

$= \sqrt[3]{8m^3n^6}$

$= 2mn^2$

15) $\sqrt{\frac{a^3}{3}} \cdot \sqrt{\frac{a^2}{12}} = \frac{\sqrt{a^5}}{\sqrt{36}}$

$= \frac{\sqrt{a^4}\sqrt{a}}{6} = \frac{a^2\sqrt{a}}{6}$

Rationalize the denominator for each of the following. Remember, "rationalize" just means get rid of the "root" from the bottom of the problem.

16) $\frac{2}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}}$

$= \frac{2\sqrt{3}}{3}$

17) $\sqrt{\frac{16}{5}} = \frac{4}{\sqrt{5}} \cdot \frac{\sqrt{5}}{\sqrt{5}}$

$= \frac{4\sqrt{5}}{5}$

18) $\sqrt[3]{\frac{2}{7}} \cdot \frac{\sqrt[3]{7}}{\sqrt[3]{7}} \cdot \frac{\sqrt[3]{7}}{\sqrt[3]{7}}$

$= \frac{\sqrt[3]{98}}{7}$

19) $\frac{1}{\sqrt{x}} \cdot \frac{\sqrt{x}}{\sqrt{x}}$

$= \frac{\sqrt{x}}{\sqrt{x^2}} = \frac{\sqrt{x}}{x}$

20) $\sqrt[4]{\frac{4}{n^2}}$

$= \frac{\sqrt[4]{4}}{\sqrt[4]{n^2}} \cdot \frac{\sqrt[4]{n^2}}{\sqrt[4]{n^2}}$

$= \frac{\sqrt[4]{4n^2}}{\sqrt[4]{n^4}} = \frac{\sqrt[4]{4n^2}}{n}$

21) $\frac{6}{\sqrt[3]{32b^5}} \cdot \frac{\sqrt[3]{2b}}{\sqrt[3]{2b}}$

$= \frac{6\sqrt[3]{2b}}{\sqrt[3]{64b^6}}$

$= \frac{6\sqrt[3]{2b}}{4b^2} = \frac{3\sqrt[3]{2b}}{2b^2}$

Use a calculator to approximate each value to ***three decimal places*** (round to the nearest thousandths).

22) $\sqrt{31{,}902} \approx$ 178.611

23) $\sqrt[3]{126} \approx$ 5.013

24) $\sqrt[5]{999} \approx$ 3.980

24) $\sqrt[11]{1{,}000{,}131} \approx$ 3.511

Things to concentrate on:

1) See if the root actually comes out even to begin with! Remember, unless the directions specifically tells you, ***decimals*** that don't come out even ***are not allowed***.
2) If it doesn't come out even, then ***factor trees*** are automatic!
3) Variables are the easy part. Just ***divide the exponent by the root number***! If there is a remainder, then leave it inside the root symbol.
4) For division or rationalize the denominator problems, the key is to get something on the bottom that comes out even! Think for a moment to find the smallest number or amount that will do it.