Name: Solutions   Date:

Take Home Quiz # 1

- Justify and show the means by which you arrive at your answers using equations, pictures, calculations, geometry, algebra steps, and/or technology. *You will not receive full credit if your answer is not supported by work that is legible and organized.*
- Place a box around your final answer. *It won't be graded if you do not do this!*
- Make your answers and their presentation in a professional and easily understandable format … make this your clearest and best work! *Points will be deducted for disorganized , sloppy work.*

8.1

1. Simplify these radicals (1pt each)

a. $\sqrt{121} = \sqrt{11^2} = \boxed{11}$

b. $\sqrt{a^{10}} = \sqrt{(a^5)^2} = \boxed{|a^5|}$

c. $\sqrt[3]{-125} = \sqrt[3]{(-5)^3} = \boxed{-5}$

d. $\sqrt{49x^4y^6} = \sqrt{(7x^2y^3)^2} = \boxed{7x^2|y^3|}$

e. $\sqrt[3]{-27m^6} = \sqrt[3]{(-3m^2)^3} = \boxed{-3m^2}$

f. $\sqrt[4]{81b^{12}} = \sqrt[4]{3^4 b^{12}} = \sqrt[4]{(3b^3)^4}$

$= \boxed{3|b^3|}$

8.2

Use the radical product property to simplify the radical expressions. (2pt each)

2. $\sqrt{80x^3y^8} = \sqrt{16x^2y^8} \cdot \sqrt{5x} = \boxed{4|x|y^4\sqrt{5x}}$

3. $\sqrt[3]{54a^6b^8} = \sqrt[3]{27a^6b^6}\sqrt[3]{2b^2} = \boxed{3a^2b^2\sqrt[3]{2b^2}}$

4. $\sqrt[4]{\dfrac{p^9q^8}{16p^3}} = \sqrt[4]{\dfrac{p^6q^8}{16}} = \dfrac{\sqrt[4]{p^4q^8}\sqrt[4]{p^2}}{\sqrt[4]{16}} = \boxed{\dfrac{|p|q^2\sqrt[4]{p^2}}{2}}$

8.3

Use rational exponents to simplify the expressions. Assume that all variables are positive. (2pt. each)

5. $(125x^9y^6)^{\frac{1}{3}}$ $= \left(5^3 x^9 y^6\right)^{\frac{1}{3}} = 5^{\frac{3}{3}} x^{\frac{9}{3}} y^{\frac{6}{3}} = \boxed{5x^3y^2}$

6. $\left(\sqrt[8]{16x^4y^{10}}\right)^2$ $= \left(\left(16x^4y^{10}\right)^{\frac{1}{8}}\right)^2 = \left(16x^4y^{10}\right)^{\frac{2}{8}} = \left(16x^4y^{10}\right)^{\frac{1}{4}}$

$= 2^{\frac{4}{4}} x^{\frac{4}{4}} y^{\frac{10}{4}} = 2 \times y^{\frac{8}{4}} y^{\frac{2}{4}} = \boxed{2xy^2\sqrt{y}}$

7. The function $C(w) = 70w^{\frac{3}{4}}$ models the number of calories (C) per day a person needs as a function of their weight (w) in kilograms. Find the number of calories necessary for a person who weighs 82 kilograms.

$C(82) = 70(82)^{\frac{3}{4}} = \boxed{1907.5C}$

8.4

Simplify the expressions

8. $\sqrt{12d^2} + \sqrt{75d^2} - \sqrt{27d^2}$

9. $\sqrt[3]{6x^7y} \cdot \sqrt[3]{9x^4y^{12}}$

10. $(\sqrt{3} + 3\sqrt{5})(\sqrt{3} - 2\sqrt{5})$