Math 1010 – Intermediate Algebra

Summary Exercises on Operations with Radicals and Rational Exponents

Name _____ Score _____

Conditions for a Simplified Radical
1. The radicand has no factor raised to a power greater than or equal to the index. 2. The radicand has no fractions. 3. No denominator contains a radical. 4. Exponents in the radicand and the index of the radical have greatest common factor 1.

Perform all indicated operations, and express each answer in simplest form with positive exponents. Assume that all variables represent positive real numbers.

1) $6\sqrt{10} - 12\sqrt{10}$

2) $\sqrt{7}(\sqrt{7} - \sqrt{2})$

3) $(1 - \sqrt{3})(2 + \sqrt{6})$

4) $\sqrt{50} - \sqrt{98} + \sqrt{72}$

5) $(3\sqrt{5} + 2\sqrt{7})^2$

6) $\dfrac{-3}{\sqrt{6}}$

7) $\dfrac{8}{\sqrt{7} + \sqrt{5}}$

8) $\dfrac{1 - \sqrt{2}}{1 + \sqrt{2}}$

9) $(\sqrt{5} + 7)(\sqrt{5} - 7)$

10) $\dfrac{1}{\sqrt{x} - \sqrt{5}}, \quad x \neq 5$

11) $\sqrt[3]{8a^3b^5c^9}$

12) $\dfrac{15}{\sqrt[3]{9}}$

13) $\dfrac{3}{\sqrt{5}+2}$

14) $\sqrt{\dfrac{3}{5x}}$

15) $\dfrac{16\sqrt{3}}{5\sqrt{12}}$

16) $\dfrac{2\sqrt{25}}{8\sqrt{50}}$

17) $\dfrac{-10}{\sqrt[3]{10}}$

18) $\dfrac{\sqrt{6}+\sqrt{5}}{\sqrt{6}-\sqrt{5}}$

19) $\sqrt{12x}-\sqrt{75x}$

20) $\left(5-3\sqrt{3}\right)^2$

21) $\sqrt[3]{\dfrac{13}{81}}$

22) $\dfrac{\sqrt{3}+\sqrt{7}}{\sqrt{6}-\sqrt{5}}$

23) $\dfrac{6}{\sqrt[4]{3}}$

24) $\sqrt[3]{\dfrac{x^2y}{x^{-3}y^4}}$

25) $\sqrt{12}-\sqrt{108}-\sqrt[3]{27}$

26) $\dfrac{x^{-2/3}y^{4/5}}{x^{-5/3}y^{-2/5}}$

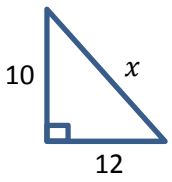
27) $\left(\dfrac{x^{3/4}y^{2/3}}{x^{1/3}y^{5/8}}\right)^{24}$

28) $(125x^3)^{\frac{-2}{3}}$

29) $\dfrac{4^{1/2}+3^{1/2}}{4^{1/2}-3^{1/2}}$

30) $\sqrt[3]{16x^2}-\sqrt[3]{54x^2}+\sqrt[3]{128x^2}$

31) Find the missing length in the right triangle. Simplify the answer if applicable.



32) Find the distance between the points $(-1,-2)$ and $(1,-6)$. Simplify the answer if applicable.