Integrated Math 9 Quiz – Exponents & Radicals Name: _____.

Part A – The Basics

1. Simplify the following expressions using the appropriate rules of exponents. All final answers should be expressed with positive exponents. **(11 marks)**

   a. $x^4 \times x^6 =$ _____.

   b. $\frac{y^8}{y^2} =$ _____.

   c. $\left(b^5\right)^4 =$ _____.

   d. $\left(a^4 b^6\right)^2 =$ _____.

   e. $\left(\frac{m^3}{n^2}\right)^3 =$ _____.

   f. $\left(k^{-4}\right) \times \left(k^{-3}\right) =$ _____.

   g. $d^5 \times d^{-3} =$ _____.

   h. $\frac{y^6}{y^{-3}} =$ _____.

   i. $\left(ab^3\right)^0 =$ _____.

   j. $\left(\frac{m^0}{n^{-3}}\right)^{-1} =$ _____.

2. Convert the following numbers into scientific notation. **(4 marks)**

   a. 789,000,000 = _____.

   b. 0.0000000275 = _____.

   c. 308 = _____.

   d. 0.0054 = _____.

3. Convert the following numbers from scientific notation. **(2 marks)**

   a. $2.3 \times 10^{-2} =$ _____.

   b. $1.286 \times 10^6 =$ _____.

4. Simplify the following radical expressions: **(4 marks)**

   a. $\sqrt{45}$ = _____.

   b. $\sqrt{8x}$ = _____.

5. Perform the required operations for the following radical expressions and simplify your final answer: **(4 marks)**

   a. $\sqrt{5} \times \sqrt{15}$

   b. $\sqrt{200} \div \sqrt{10}$

Part B – Applying the Basics

1. Simplify the following expressions using the appropriate rules of exponents. All final answers should be expressed with positive exponents. **(11 marks)**

(a) $\dfrac{6a^3b^{-2}\times 3ab^{-3}}{2a^{-1}b^{-4}}$	(b) $\left(-4m^2n^4\right)^3\left(-6m^2n^3\right)^{-2}$	(c) $\dfrac{\left(6x^2y^4\right)^2\left(2x^{-4}z^{-1}\right)}{\left(3xyz^{-2}\right)}$

2. Perform the required operations with the numbers given. All final answers must be written in scientific notation and rounded to the correct number of significant digits. **(9 marks)**

(a) $\left(9.45\times10^4\right)\times\left(3.861\times10^6\right)$	(b) $\dfrac{\left(6.927\times10^3\right)}{\left(9.74\times10^{-2}\right)}$	(c) $\left(1.204\times10^2\right)+\left(7.05\times10^3\right)$

3. Evaluate the following expressions, showing the key steps of your solution. **(9 marks)**

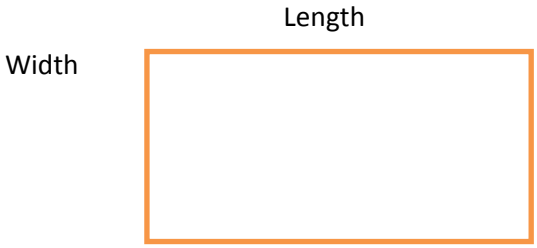
   a. $-2^3+(-3)^2+2^{-1}$

   b. $\sqrt{72}+\dfrac{\sqrt{32}}{2}-\sqrt{18}$

   c. $2x^{-4}y^{-1}$ given that $x=2$ and $y=\dfrac{1}{3}$

Part C – Applying and Problem Solving with Exponents and Radicals.

1. You are given a diagram of a rectangular field:



   a. Use the formula $A = l \times w$ to determine the area of the field. The length is 3.25×10^2 cm and the width is 8.3×10^1 cm. Express your final answer in scientific notation and include proper units. **(2 marks)**

   b. Use the formula $p = 2(l + w)$ to determine the perimeter of the field. Express your final answer in scientific notation and include proper units. **(2 marks)**

2. You are given a diagram of a triangle below.

   a. Determine the perimeter of the triangle, by adding the three sides. Express you final answer using properly simplified radicals. **(2 marks)**

   b. Prove that the triangle is a right triangle. **(2 marks)**

   c. The formula for the area of a triangle is $A = \frac{1}{2}bh$. What is the area of this right triangle? Give answer using correct units. **(2 marks)**