AChor/MPM1D **Name: _____**
Date: _____

Extra Practice Test 2: Powers and Roots

PART A: Multiple Choice Questions

Circle the English letter of the best answer. Circle ONLY one answer for each question.

Knowledge:

1. Which of these relations is exponential?

(a) $y = 0.5x$ (b) $y = 3x^2$ (c) $y = 2(x)^3$ (d) $y = 3^x$

2. 2^{-4} is:

(a) $-\frac{1}{8}$ (b) -2^4 (c) $\frac{1}{16}$ (d) -16

3. -3.5^0 is:

(a) -3.5 (b) 0 (c) 1 (d) -1

4. Evaluate $2.58^{-1.4}$ to 2 decimal places, the answer is:

(a) -3.61 (b) 0.27 (c) -0.27 (d) 3.61

5. A certain type of bacteria doubles every hour. A culture begins with 30 000 bacteria, and have been undergone the doubling process for 8 hours. Which of the following formula best models the growth of the bacteria in the culture?

(a) $P = 30000(2)^x$ (b) $P = 30000(2)^{8x}$ (c) $P = 30000(8)^x$ (d) $P = 30000(8)^2$

6. The population of fish in a lake grows according to the expression $50(1.05)^t$, where t is the number of years. Find the number of fish after 8 years. Round to the nearest fish.

(a) 420 (b) 80 (c) 74 (d) 53

7. Write $x^4 \times x^3$ as a single power. Then, evaluate for $x = -2$.

(a) 128 (b) –128 (c) 16 (d) –16

8. The screen of a new graphing calculator has a resolution of 512 by 512 pixels. The number of pixels on the screen can be written as:

(a) $(4^2)^5$ (b) $(4^3)^4$ (c) $(2^3)^6$ (d) $(2^4)^4$

9. The deer population in a national park is declining every year. The population can be modelled using the formula $P = 380(0.975)^n$, where P is the population after n years. What is the declining rate of the deer population as a percent?

(a) 97.5% (b) 38% (c) 10% (d) 2.5%

Answers: 1. d**; 2.** c**; 3.** d**; 4.** b**; 5.** a**; 6.** c**; 7.** b**; 8.** c**; 9.** d

Part B: Full Solution Questions
Show steps in proper form and provide answer statements get full mark.

Application:

1. A special type of light filter reduces the intensity of the light passing through it by 10%. Light intensity is further reduced as more light filters are placed together. Let I represent the light intensity and t represent the number of light filters. Write an equation that best models the situation. [A: 3]

2. A town's racoon population is growing exponentially. The expected population can be estimated using the relation $P = 1250(1.013)^n$, where P is the population and n is the number of years.

(a) What is the current racoon population? [A: 1]

(b) What is the growth factor for the relation? [A: 1]

(c) What is the yearly growth rate of the racoon population? Write as a percent. [A: 1]

(d) What is the expected population in 5 years? [A: 2]

(e) How long does it take the racoon population to be doubled? [A: 3]

Answers: 1. $I = (0.9)^t$ **; 2. (a)** 1250, **(b)** 1.013, **(c)** 1.3%, **(d)** 1333, **(e)** 54 years**;**