Indices and scientific notation - practice test 3

Name: _____ Date: _____

16 questions | 46 marks | 60 minutes

Apply powers and scientific notation to models, measurements and multi-step situations.

A scientific calculator may be used.

1. A rectangular array has 10^3 rows, each containing 10^2 cells. How many cells are there? [2 marks]

2. A machine doubles a quantity six times and then halves it four times. Write the net multiplier as a power of 2. [2 marks]

3. Write the reciprocal of 7^3 using a negative exponent. [1 mark]

4. A rule gives $R = 4t^{-2}$ for $t \neq 0$. Find R when $t = 2$. [2 marks]

5. A cube has side length $2x^2$ cm, where $x \neq 0$. Express its volume in simplest index form. [3 marks]

6. An electronic component has mass 0.000038 kg. Write this in scientific notation. [2 marks]

7. A distance is recorded as 12.5×10^6 m. Rewrite it in standard scientific notation. [2 marks]

8. Sensor A detects 8.6×10^{-5} m. Sensor B detects 1.2×10^{-4} m. Which detects the smaller length? [3 marks]

9. A sheet has area 4×10^{-2} m^2. How much area do 300 sheets cover without overlap? [3 marks]

10. A tank contains 7.2×10^5 mL. Each bottle holds 6×10^2 mL. How many full bottles can be filled? [3 marks]

11. Two measured distances are 3.6×10^7 m and 8×10^6 m. Find their sum in scientific notation. [3 marks]

12. A model planet is 9 cm wide. The planet diameter is 1.8×10^7 m. Find the real-to-model diameter ratio. [4 marks]

13. A craft covers 4.5×10^8 m at 1.5×10^5 m/s. Find its travel time in minutes at constant speed. [4 marks]

14. A digital image has 2.4×10^6 pixels. Each pixel uses 3 bytes. An album contains 250 images. Find its size in bytes, ignoring extra file data. [4 marks]

15. A student multiplies $(2 \times 10^3)(6 \times 10^4)$ and writes 12×10^{12}. Correct both errors. [4 marks]

16. A model assumes that a download rate of 4×10^6 bytes/s stays constant. A file has 1.2×10^9 bytes. Find the predicted time and name one reason the real time could be longer. [4 marks]