Measurement topic test 4

Name: _____ Date: _____

10 questions | 55 marks | 75 minutes

Models, scale and uncertainty. Use a scientific calculator, show working and include units. Sketches are not to scale.

A scientific calculator may be used.

1. Three readings of a 1.000 kg reference mass are 0.996 kg, 0.997 kg and 0.996 kg. [5 marks]

(a) Calculate the mean reading to six decimal places. [2 marks]

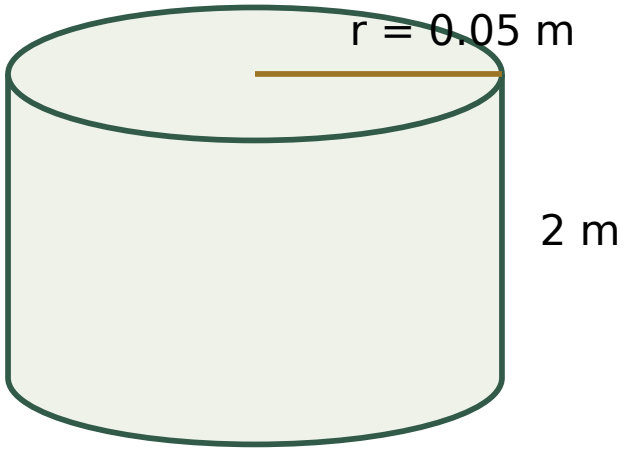
(b) Find percentage error of the mean to two decimal places and comment. [3 marks]

2. A rectangular room is drawn 4 cm by 2.5 cm at scale 1:200. Carpet tiles cover 1.6 m^2 per box. Add 10% area for cuts; each box costs AUD 33.50. [5 marks]

(a) Find the real floor area. [2 marks]

(b) Find box count and cost. [3 marks]

3. Four identical pipes each have outside radius 0.05 m and length 2 m. Only the curved outer surfaces are painted. [5 marks]



Sketch not to scale

(a) Find total painted area to three decimal places. [3 marks]

(b) Explain why the circular cross-sections are not added. [2 marks]

4. A 1:500,000 map shows a journey with sections 3.2 cm and 4.4 cm long. Travel is at a constant 76 km/h, with no stops. [5 marks]

(a) Find total real distance. [2 marks]

(b) Find travel time in minutes and state one limitation. [3 marks]

5. A new shower flows at 8 L/min rather than 12 L/min. Four people each shower for 6.5 minutes daily. [5 marks]

(a) Find daily water use with each shower. [3 marks]

(b) Find the saving over 30 days in litres and cubic metres. [2 marks]

6. One hundred closed cube boxes each have side 2.5 cm. Allow 12% extra wrapping area for overlap. [5 marks]

(a) Find the total box surface area in square centimetres. [2 marks]

(b) Find wrapping area including allowance, in square metres. [3 marks]

7. A pool is 12 m long and 5 m wide. Its depth increases uniformly along the length from 1 m to 2 m. [5 marks]

(a) Explain why the average depth is 1.5 m under this model. [2 marks]

(b) Find the water volume when filled to the stated depths. [3 marks]

8. A 4 m by 3 m rectangular sandpit includes an internal border 0.2 m wide on every side. [5 marks]

(a) Find the inner sand area. [3 marks]

(b) Find sand volume for a uniform depth of 0.3 m. [2 marks]

9. A rectangle measures 6.2 m by 4.8 m, each rounded to the nearest 0.1 m. [6 marks]

(a) Find the minimum possible area. [3 marks]

(b) Find an upper bound for its area and state whether it is included. [3 marks]

10. An open V-shaped trough is 6 m long. Its triangular cross-section has top width 2 m, perpendicular depth 1 m and two sloping sides each $\sqrt{2}$ m. Both triangular ends are closed. [9 marks]

(a) Find full capacity. [3 marks]

(b) Find the material area, excluding the open top. Give two decimal places. [3 marks]

(c) At half the full depth, find the water volume. [3 marks]