Ratio, rates and similarity - practice paper 2

Name: _____ Date: _____

16 questions | 37 marks | 50 minutes

Practise proportional rules, unit conversions, map scales, similar figures and enlargements, with reasoning questions.

A scientific calculator may be used.

1. Write $7:4$ as an equivalent ratio whose second entry is 20. [1 mark]

2. A cost is directly proportional to mass. 2.5 kg costs 9 dollars. Find the price per kg. [1 mark]

3. Use $C = 3.6m$ to find the cost of 4 kg. [1 mark]

4. Convert 12 m/s to km/h. [2 marks]

5. A floor plan is drawn at $1:50$. Find the drawing length of a 6 m wall. [2 marks]

6. A drink contains juice and water in the ratio $2:5$. How much juice is in 1.4 L of drink? [3 marks]

7. A train travels 180 km at a constant 90 km/h. Find the journey time. [2 marks]

8. If $\triangle LMN \sim \triangle XYZ$, identify the side corresponding to LN. [1 mark]

9. Similar rectangles have corresponding lengths 12 cm and 18 cm. The larger width is 10.5 cm. Find the smaller width. [3 marks]

10. Two points are 6.4 cm apart on a $1:125\,000$ map. Find their actual separation. [3 marks]

11. Reduce $(10,\ -6)$ by factor 0.5 about the origin. [2 marks]

12. An enlargement about $C(1, 2)$ with factor 3 takes $P(3, 5)$ to which point? [3 marks]

13. A pump transfers 24 L in 80 seconds. Find its rate in L/min. [3 marks]

14. A triangle has side lengths 6, 8, 10. Another has lengths 9, 12, 16. Are the triangles similar? Explain. [3 marks]

15. A map is printed at $1:80\,000$ then reduced to half its original linear size. State the new scale. [3 marks]

16. A paint model uses 7.2 L for 54 square metres. [4 marks]

(a) Find the amount used per square metre. [1 mark]

(b) Predict the amount needed for 75 square metres. [2 marks]

(c) State one condition that could make this prediction unreliable. [1 mark]