Ratio, rates and similarity - practice paper 1

Name: _____ Date: _____

16 questions | 35 marks | 50 minutes

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

A scientific calculator may be used.

1. Simplify the ratio $18 : 30$. [1 mark]

2. Five exercise books cost 17.50 dollars at a fixed unit price. Find the cost of one. [1 mark]

3. $y = 4x$. Find y when $x = 6$. [1 mark]

4. Convert 36 km/h to m/s. [2 marks]

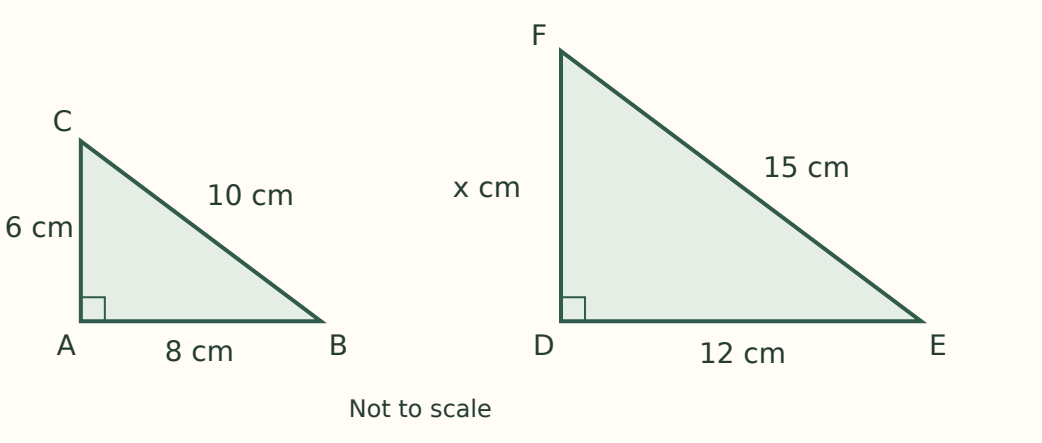
5. A map has scale $1:25\,000$. What real distance does 1 cm represent, in metres? [2 marks]

6. A recipe for four serves uses 300 g of rice. Find the rice needed for ten serves. [2 marks]

7. A runner travels 9 km in 45 minutes. Find the average speed in km/h. [2 marks]

8. In $\triangle ABC \sim \triangle DEF$, which side corresponds to BC? [1 mark]

9. Use the supplied similar triangles to find x. [3 marks]



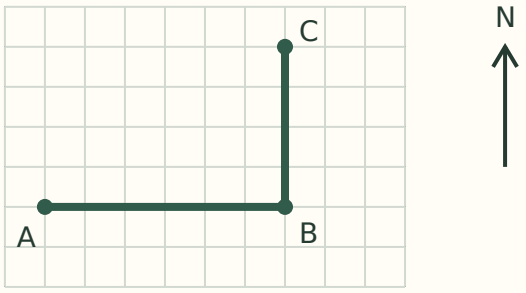
10. A 16 cm model represents an 8 m object. Find the scale. [2 marks]

11. Enlarge $(-3, 4)$ by factor 2 about the origin. [2 marks]

12. Similar triangles have perimeters 28 cm and 42 cm. Find the larger side corresponding to a 9 cm smaller side. [3 marks]

13. Compare 600 g for 4.20 dollars with 1 kg for 6.50 dollars. Which has the lower price per kg? [3 marks]

14. On the supplied map, find the actual route length A-B-C. [3 marks]



Each square is 1 cm on the map.
Scale 1 : 50 000

15. A taxi costs 5 dollars plus 2 dollars per km. A student says the fare is directly proportional to distance. Explain the error. [3 marks]

16. At the same time, a vertical 1.6 m marker has a 2 m shadow and a building has a 17.5 m shadow on level ground. [4 marks]

(a) Estimate the building height. [3 marks]

(b) State one geometric assumption used. [1 mark]