

WA3 Practice Paper

Percentage, ratio, rate and angles

25 marks | Suggested time: 40 minutes

Name: Class: Date:

Answer all questions. Show your working. A scientific calculator may be used. Give non-exact answers to 3 significant figures unless stated otherwise. Give money to 2 decimal places. Use a ruler and protractor for the construction question.

School WA topic coverage may differ. The suggested solutions start after the question paper.

1. Combining ratios [1 marks]

If $a : b = 2 : 3$ and $b : c = 4 : 5$, find $a : b : c$.

Answer: [1]

2. Ratio [2 marks]

$x : y = 3 : 2$ and $z : x = 3 : 4$. Find $y : z$.

Answer: [2]

3. Hourly pay [3 marks]

A cashier earns \$108 for 8 hours of weekday work. The weekend hourly rate is \$5 higher.

(a) Find the weekday hourly wage. [1]

Answer: [1]

(b) The cashier earns \$74 on Sunday. Find the hours worked. [2]

Answer: [2]

4. Simple interest [3 marks]

Mr Koh borrowed money at 6% simple interest per annum. After 5 years, the total repayment was \$62,400. How much did he borrow?

Answer: [3]

5. Service charge and GST [3 marks]

A set meal costs \$19.90 before a 10% service charge and 9% GST. Kyra and two friends order one set meal each. Calculate their total bill. GST is applied after the service charge.

Answer: [3]

6. Speed [5 marks]

A train travels at a constant speed of 60 km/h.

(a) Convert 60 km/h into m/s. [2]

Answer: [2]

(b) The train is 70 m long and the tunnel is 35.5 km long. Calculate the time for the train to pass completely through the tunnel, in minutes and seconds, to the nearest second. [3]

Answer: [3]

7. Regular polygon [4 marks]

A regular polygon has interior angle : exterior angle = 3 : 2.

(a) Calculate its number of sides. [3]

Answer: [3]

(b) Name the polygon. [1]

Answer: [1]

8. Geometrical construction [3 marks]

(a) Using a ruler and protractor, construct triangle ABC with $AB = 7$ cm, $AC = 10.2$ cm and angle $BAC = 36^\circ$. Draw AB yourself. [2]

Answer: [2]

(b) Measure angle ABC, to the nearest degree. [1]

Answer: [1]

9. Exterior angle [1 marks]

Find the exterior angle of a regular 20-sided polygon.

Answer: [1]

End of question paper

WA3 Suggested Worked Solutions

Use these solutions after attempting the paper. Other mathematically valid methods may be accepted. The mark allocations are suggestions for this practice paper, not an official school marking scheme.

1. Combining ratios [1]

Make the b terms equal to 12.

$$a : b = 2 : 3 = 8 : 12$$

$$b : c = 4 : 5 = 12 : 15$$

$$a : b : c = 8 : 12 : 15$$

Suggested marking: 1 for the combined ratio.

2. Ratio [2]

Make the x terms equal to 12.

$$x : y = 3 : 2 = 12 : 8$$

$$z : x = 3 : 4 = 9 : 12$$

Therefore y has 8 parts and z has 9 parts.

$$y : z = 8 : 9$$

Suggested marking: 1 for matching x, 1 for the answer.

Watch out: Keep track of the order: the second given ratio is z : x.

3. Hourly pay [3]

(a)

$$\text{Weekday rate} = \frac{108}{8} = \$13.50 \text{ per hour}$$

(b)

$$\text{Sunday rate} = 13.50 + 5 = \$18.50 \text{ per hour}$$

$$\text{Hours worked} = \frac{74}{18.50} = 4 \text{ hours}$$

Suggested marking: (a) 1; (b) 1 for the Sunday rate and 1 for the hours.

4. Simple interest [3]

Simple interest is calculated on the original principal throughout.

$$\text{Five-year interest} = 6\% \times 5 = 30\% \text{ of principal}$$

The repayment is therefore $100\% + 30\% = 130\%$ of the amount borrowed.

$$\text{Principal} = \frac{62400}{1.30} = \$48,000$$

Check: interest = $\$48,000 \times 0.06 \times 5 = \$14,400$; total = $\$62,400$.

Suggested marking: 1 for 30%, 1 for the repayment factor 1.30, 1 for the principal.

Watch out: The $\$62,400$ includes the original loan; it is not just the interest.

5. Service charge and GST [3]

$$\text{Cost of three meals} = 3 \times \$19.90 = \$59.70$$

$$\text{After service charge} = \$59.70 \times 1.10 = \$65.67$$

$$\text{After GST} = \$65.67 \times 1.09 = \$71.5803$$

Total bill = $\$71.58$.

Suggested marking: 1 for the three meals, 1 for service charge, 1 for GST and final amount.

Watch out: Apply the charges successively. Adding 10% and 9% as a single 19% gives a different result.

6. Speed [5]

(a) Convert kilometres to metres and hours to seconds.

$$60 \text{ km/h} = \frac{60 \times 1000}{3600} \text{ m/s} = \frac{50}{3} \text{ m/s}$$

Speed = 16.7 m/s to 3 significant figures.

(b) The back of the train must leave the tunnel, so the train travels the tunnel length plus its own length.

$$\text{Total distance} = 35,500 + 70 = 35,570 \text{ m}$$

$$\text{Time} = \frac{35570}{\frac{50}{3}} = 2134.2 \text{ s}$$

$$2134 \text{ s} = 35 \times 60 \text{ s} + 34 \text{ s}$$

Time = 35 minutes 34 seconds.

Suggested marking: (a) 1 for conversion, 1 for the answer; (b) 1 for distance, 1 for time, 1 for minutes and seconds.

Watch out: Use $50/3$ m/s in part (b), not the rounded 16.7 m/s.

7. Regular polygon [4]

(a) An interior angle and its adjacent exterior angle add to 180° . The ratio has $3 + 2 = 5$ parts.

$$\text{Exterior angle} = \frac{2}{5} \times 180^\circ = 72^\circ$$

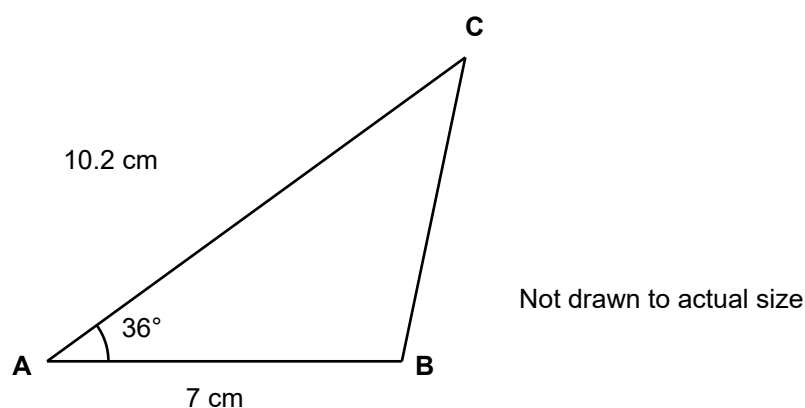
$$\text{Number of sides} = \frac{360^\circ}{72^\circ} = 5$$

(b) Pentagon.

Suggested marking: (a) 1 for 180° , 1 for 72° , 1 for five sides; (b) 1 for the name.

8. Geometrical construction [3]

(a) Draw $AB = 7$ cm. Place the protractor at A and draw a ray at 36° to AB. Measure 10.2 cm along the ray to locate C. Join B to C.



(b) Place the protractor at B, aligning its baseline with BA. Measure the interior angle between BA and BC.

Angle $ABC \approx 101.80^\circ$, hence 102° to the nearest degree.

Suggested marking: (a) 2 for an accurate labelled construction; (b) 1 for 102° . Suggested measurement tolerance: $\pm 1^\circ$. A reflected construction is valid.

Watch out: Angle B is obtuse. Reading 78° uses the wrong protractor scale.

9. Exterior angle [1]

$$\text{Exterior angle} = \frac{360^\circ}{20} = 18^\circ$$

Suggested marking: 1 for 18° .

Watch out: Use 360° for the sum of exterior angles, not 180° .