High School
Mathematics Test 2013

Year 9

Ratio and Rates

Non Calculator

Skills and Knowledge Assessed:

- Solve a range of problems involving rates and ratios, with and without digital technologies (ACMNA188)
- Solve problems involving direct proportion. Explore the relationship between graphs and equations corresponding to simple rate problems (ACMNA208)

Name_____

Section 1 Short Answer Section

Write all working and answers in the spaces provided on this test paper.

1. Simplify the ratio 125 : 75.

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2. There are 400 fiction books and 360 non-fiction books in Mr Jones library. What is the ratio of fiction to non-fiction books in simplest form?

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3. A transit lane on a highway is used by cars and buses in the ratio 15 : 2. On one morning it was used by 80 buses. How many cars used it on that morning?

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4. Simplify the ratio $2\frac{1}{2}$ minutes : 45 seconds.

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5. Mrs Keller gives an allowance to her two daughters. She gives $\frac{5}{8}$ of the total money to her eldest daughter. What is the ratio of the amounts she gives to the elder and younger daughters respectively?

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6. There were 240 customers at Karl's Kafe last week. They were divided into males and females in the ratio 2 : 3 respectively. How many males were there?

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7. Divide 1.5 litres of soft drink between Maya and Nat in the ratio 3 : 2 respectively.
(Give your answer in millilitres)

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8. A recipe uses flour, sugar and cocoa (measured in cups) in the ratio 5 : 3 : 1. Peta only has $\frac{1}{2}$ cup of cocoa. How much flour and sugar would she need?

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9. A car is uses fuel at a rate of 8.5 litres per 100 km. How many litres would it use when travelling 600 km?

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10. Quentin is having a fitness test. After running, he counts his heartbeat. In 15 seconds he counts 24 beats. What is his heart rate in beats/minute?

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11. Raylene ran a marathon (which is 42 km) in 4 hours. What was her speed in km/h?

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12. Steve ran in a sprint race and his speed was worked out as 5m/s.
What was his speed in km/h?

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Year 9

Calculator Allowed

Name_____

Section 2 Multiple Choice Section

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. In a class there are 30 students, 12 of whom are Koori. What is the ratio in simplest terms of Koori to Non-Koori students in the class?

   A. 2 : 3 B. 2 : 5 C. 3 : 2 D. 3 : 5

2. Marco is an artist and has created both paintings and sculptures in the ratio 3 : 7. He has created 18 paintings. How many sculptures has he completed?

   A. 6 B. 12 C. 42 D. 60

3. A newspaper provides both print and digital editions. The staff are allocated between the print and digital editions in the ratio 5 : 3. The newspaper currently has 72 staff. How many staff are allocated to the digital edition?

   A. 24 B. 27 C. 45 D. 48

4. What is the ratio **1.2 : 8** in simplest form?

   A. 1 : 5 B. 1 : 50 C. 3 : 2 D. 3 : 20

5. The time that Jack and Kayla take to finish their homework is $\frac{1}{2}$ an hour and $1\frac{1}{4}$ hours respectively. What is the ratio of the times they take to finish ?

   A. 1 : 3 B. 1 : 5 C. 2 : 3 D. 2 : 5

6. Layla is a guitarist and she only ever breaks the top three strings when she plays. The ratio with which she breaks the G, B and E strings is 2 : 3 : 5. Last month she broke 40 strings. How many of these were B strings?

   A. 8 B. 12 C. 20 D. 24

7. Mackenzie plays three different sports, Soccer, Tennis and Cricket. Last year the ratio of time she spent playing the three sports was 3 : 4 : 9 respectively. What fraction of the time she spent playing sport was spent playing Tennis?

A. $\frac{3}{16}$ B. $\frac{1}{3}$ C. $\frac{1}{4}$ D. $\frac{9}{16}$

8. Natalie makes cards to sell at the markets. She makes 27 cards in $2\frac{1}{4}$ hours. At what rate does she make the cards?

A. 12 cards/hr B. $13\frac{1}{2}$ cards/hr C. 24 cards/hr D. $60\frac{3}{4}$ cards/hr

9. Oliver is driving a truck from Broken Hill to Adelaide. He has 475 km still to travel and has been averaging 95 km/hr so far. If he can maintain this speed, how long will it take him to get there?

A. Another 3 hours. B. Another 4 hours.
C. Another $4\frac{1}{2}$ hours. D. Another 5 hours.

10. A car uses fuel at the rate of 12 km/litre. How far could it travel on 36 litres of fuel?

A. 3 km. B. 24 km. C. 432 km. D. 864 km.

11. The directions to dye clothes say to add 15 grams of dye granules to 600 millilitres of water. What is the rate for mixing the dye?

A. 4 grams/litre
B. 25 grams/litre
C. 40 grams/litre
D. 250 grams/litre

12. Dave and Ed have been prospecting and have found 2 kilograms of silver. They divide it between them in the ratio 5 : 3 respectively. How much silver does Ed receive?

A. 750 g. B. 900 g. C. 1 250 g. D. 1 500 g.

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Calculator Allowed

Name_____

Section 3 Longer Answer Section

Write all working and answers in the spaces provided on this test paper.

Marks

1. Among the spectators at a football match between the Tigers and the Storm, there are 4 500 Tigers supporters, and the ratio of Tigers supporters to Storm supporters is 3 : 7 respectively.

   a) How many Storm supporters are there at the match? **1**

   …….

   …….

   b) At the match, as well as the supporters there are also 3 000 fans who don't support either team in particular. How many spectators are there at the match altogether? **1**

   …….

   …….

   c) What is the ratio of the Tigers supporters to all of the spectators? **1**

   …….

   …….

   d) What is the ratio of the Storm supporters to Tigers supporters to other spectators? **2**

   …….

   …….

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Multiple Choice Answer Sheet

Name _____

Completely fill the response oval representing the most correct answer.

1.	A ⬭	B ⬭	C ⬭	D ⬭
2.	A ⬭	B ⬭	C ⬭	D ⬭
3.	A ⬭	B ⬭	C ⬭	D ⬭
4.	A ⬭	B ⬭	C ⬭	D ⬭
5.	A ⬭	B ⬭	C ⬭	D ⬭
6.	A ⬭	B ⬭	C ⬭	D ⬭
7.	A ⬭	B ⬭	C ⬭	D ⬭
8.	A ⬭	B ⬭	C ⬭	D ⬭
9.	A ⬭	B ⬭	C ⬭	D ⬭
10.	A ⬭	B ⬭	C ⬭	D ⬭

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ANSWERS

Section 1	
1.	$125 : 75 = \frac{125}{25} : \frac{75}{25} = 5 : 3$
2.	$400 : 360 = \frac{400}{40} : \frac{360}{40}$ $= 10 : 9$
3.	$15 : 2 = \square : 80$ $= \square : 40 \times 2$ $= 40 \times 15 : 40 \times 2$ No cars $= 40 \times 15 = 600$ cars
4.	$2\frac{1}{2}$ minutes : 45 seconds $= 150$ seconds : 45 seconds $= \frac{150}{15} : \frac{45}{15}$ $= 10 : 3$
5.	Eldest : Youngest $= \frac{5}{8} : \frac{3}{8}$ $= 5 : 3.$
6.	Males are $\frac{2}{2+3} = \frac{2}{5}$ of the customers. No Males $= \frac{2}{5} \times 240 = \frac{4}{10} \times 240 = 4 \times 24$ $= 96$ males
7.	Divide 1500 ml into 5 parts =300 ml. Maya gets $300 \times 3 = 900$ ml Nat gets $300 \times 2 = 600$ ml
8.	flour : sugar : cocoa = 5 : 3 : 1 $= \square : \square : 1 \div 2$ $= \frac{5}{2} : \frac{3}{2} : \frac{1}{2}$ flour $= \frac{5}{2} = 2\frac{1}{2}$ cups sugar $= \frac{3}{2} = 1\frac{1}{2}$ cups
9.	6 Lots of 100 km Fuel used $= 8.5 \times 6$ $= 51.0$ litres
10.	There are 4 lots of 15 sec in one minute. Heart rate $= 4 \times 24 = 96$ beats/minute.

11.	Speed $= 42 \div 4$ $= 10.5$ km/h
12.	5 m/s $= 5 \times 60 = 300$ m/min $= 300 \times 60 = 18\,000$ m/hr $= 18\,000 \div 1000 = 18$ km/h

Section 2	
1.	A
2.	C
3.	B
4.	D
5.	D
6.	B
7.	C
8.	A
9.	D
10.	C
11.	B
12.	A

Section 3	
1.	Tigers : Storm $= 3 : 7$ $= 4\,500 : \square$ $= 3 \times 1\,500 : 7 \times 1\,500$ Storm supporters $= 7 \times 1\,500$ $= 10\,500$
	Total at the match $= 4\,500 + 10\,500 + 3\,000$ $= 18\,000$
	Tigers : Total $= 4\,500 : 18\,000$ $= \frac{4500}{4500} : \frac{1800}{4500}$ $= 1 : 4$
	Storm : Tigers : Others $= 10\,500 : 4\,500 : 3\,000$ $= \frac{10500}{1500} : \frac{4500}{1500} : \frac{3000}{1500}$ $= 7 : 3 : 2$

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Multiple Choice Answer Sheet

Name Marking Sheet

Completely fill the response oval representing the most correct answer.

1.	A	●	B	○	C	○	D ○
2.	A	○	B	○	C	●	D ○
3.	A	○	B	●	C	○	D ○
4.	A	○	B	○	C	○	D ●
5.	A	○	B	○	C	○	D ●
6.	A	○	B	●	C	○	D ○
7.	A	○	B	○	C	●	D ○
8.	A	●	B	○	C	○	D ○
9.	A	○	B	○	C	○	D ●
10.	A	○	B	○	C	●	D ○
11.	A	○	B	●	C	○	D ○
12.	A	●	B	○	C	○	D ○