High School
Mathematics Test 2015

Year 8

Ratio Rates and Proportion

Non Calculator Section

Skills and Knowledge Assessed:

- Recognise and solve problems involving simple ratios (ACMNA173)
- Solve a range of problems involving rates and ratios, with and without digital technologies (ACMNA188)
- Investigate, interpret and analyse graphs from authentic data (ACMNA180)

Name_____

Answer all questions in the spaces provided on this test paper by:

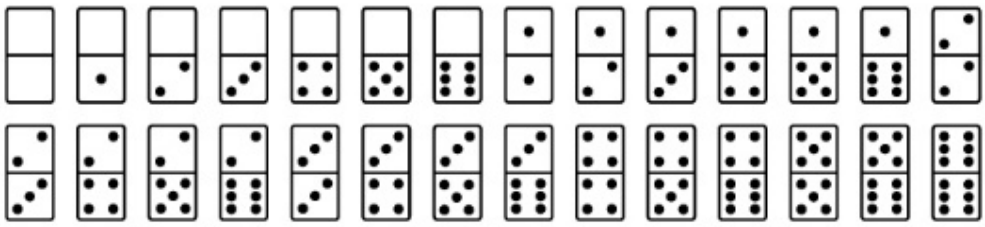
Writing the answer in the box provided.

or

Shading in the bubble for the correct answer from the four choices provided.

Show any working out on the test paper. Calculators are **not** allowed.

Questions 1 – 3 refer to the set of dominos shown below.



1. Some dominos are called *Doubles* because they have the same number of dots on both halves. The *Doubles* range from *Double Blank* to *Double Six*.

   What is the ratio of *Double* dominos to *Non-Double* dominos?

   ☐ : ☐

2. What is the ratio of *Double* dominos to the full set dominos?

   ☐ : ☐

3. What is the ratio of dominos with only one *Blank* to dominos with only one *Six*?

   ☐ : ☐

4. There are 45 channels available on Jamie's TV.

There are 34 entertainment channels and the rest are shopping channels.

What is the ratio of shopping channels to entertainment channels?

☐ 11 : 34 ☐ 11 : 45 ☐ 34 : 45 ☐ 34 : 79

5. The ratio 16 : 10 when written in simplest form is:

☐ 2 : 5 ☐ 4 : 5 ☐ 8 : 5 ☐ 12 : 5

6. A painter can coat a wall that measures 48 m^2 in 3 hours.

What is this as a rate in m^2/ hour?

7. A car travels at 90 km/h. How many hours would be needed to travel 540 km?

8. Petra owns 80 movies. There are 55 comedies and the rest are dramas.

What is the ratio of comedies to dramas?
(answer in simplest form)

9. Which ratio is equivalent to 2 : 5?

☐ 10 : 20 ☐ 10 : 25 ☐ 12 : 25 ☐ 25 : 100

10. Write the ratio 60 : 42 in simplest form.

☐ : ☐

11. Complete the statement below.

$$48 : 36 = 8 : \square$$

12. What is the ratio 40 cm : 1 metre when written in simplest form.

☐ 1 : 25 ☐ 1 : 40 ☐ 1 : 250 ☐ 2 : 5

13. Divide 600 kg in the ratio 2 : 1.

☐ : ☐

14. Water runs from a tank which holds 2 000 litres at a rate of 40 litres/ minute.
How long would it take for the tank to empty?

☐ 5 minutes. ☐ 20 minutes. ☐ 50 minutes. ☐ 80 minutes.

15. Michelle plays a musical piece at 40 beats per minute. If the piece goes for 3 minutes and 15 seconds, how many beats are there in the piece?

☐

16. What is the ratio 1.6 : 0.24 in simplest form?

☐ 2 : 3 ☐ 2 : 30 ☐ 10 : 3 ☐ 20 : 3

17. What is the ratio *18 hours : 2½ days* in simplest form ?

☐ 3 : 10 ☐ 3 : 20 ☐ 9 : 25 ☐ 18 : 25

18. Divide 300 marbles in the ratio 2 : 5 : 8.

☐ : ☐ : ☐

19. A bricklayer lays 552 bricks in 6 hours of work.

How many hours of work would it take to lay 920 bricks?

☐

20. In a recipe, Hannah uses flour, water and milk (measured in cups) in the ratio 4 : 2 : 1.

If she uses 12 cups of liquid (milk and water), how many cups of flour will she need?

☐ 8 cups.
☐ 16 cups.
☐ 24 cups.
☐ 48 cups.

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Calculator Allowed Short Answer Section

Name_____

Answer all questions in the spaces provided on this test paper by:

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Shading in the bubble for the correct answer from the four choices provided.

Show any working out on this test paper. Calculators are allowed.

1. The Mountains Pet Resort is currently boarding 45 dogs and 30 cats.
What is the ratio of dogs to cats in simplest form?

☐ : ☐

2. Simplify the ratio 60 : 75.

☐ : ☐

3. What is the ratio 2.5 : 10 in simplest form?

○ 1 : 2 ○ 1 : 4 ○ 1 : 5 ○ 5 : 2

4. The ratio of swimmers to surfers at a beach is 25 : 9.

Altogether there are 340 swimmers and surfers on the beach.

How many of them are surfers?

5. To make a paint, Jose mixes 150g of ochre with 20 ml of water.

What is the rate of the mixture in g/ml?

☐ 7.5 g/ml ☐ 15 g/ml ☐ 22.5 g/ml ☐ 30 g/ml

6. The new garden beds at Hillsborough College have native plants and exotic plants in the ratio 15 : 4.

There are 36 exotic plants..

How many native plants are there?

7. A plan of a house is drawn at a scale of 1 : 50.

Liza measures the width of the house on the plan to be 410 mm.

What is the actual width of the house?

☐ 8.2 m ☐ 16.8 m ☐ 20.5 m ☐ 2 500 m

8. The ratio 36 minutes : 2½ hours in simplest form, without using units, is;

☐ 1 : 3 ☐ 1 : 25 ☐ 3 : 50 ☐ 6 : 25

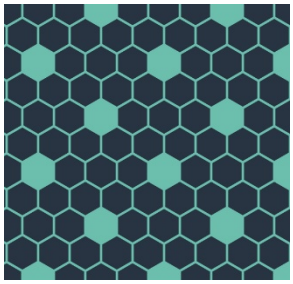
9. Alex is a cricketer who has a batting strike rate of 6.4 runs/over.

How many runs could he be expected to get in 2.5 overs?

10. The ratio of black tiles to grey tiles in a pattern is 13 : 2.

There are 300 tiles needed altogether.

How many black tiles are needed?



11. Liam is training for a triathlon.

Each week he trains for 6 hours on swimming, 15 hours on running and 18 hours on cycling.

What is the ratio, in simplest terms, of time spent on Swimming : Running : Cycling.

12. Which of these ratios is equivalent to 5 : 6?

☐ $\frac{3}{8} : \frac{4}{5}$ ☐ $\frac{2}{3} : \frac{4}{5}$ ☐ $\frac{3}{4} : \frac{4}{5}$ ☐ $\frac{7}{8} : \frac{4}{5}$

13. A farm can support 5 head of cattle per hectare in good times and 2 head of cattle per hectare during drought.

A farm has had 6 000 head of cattle during a drought. How many *extra* cattle could it support when the drought ends?

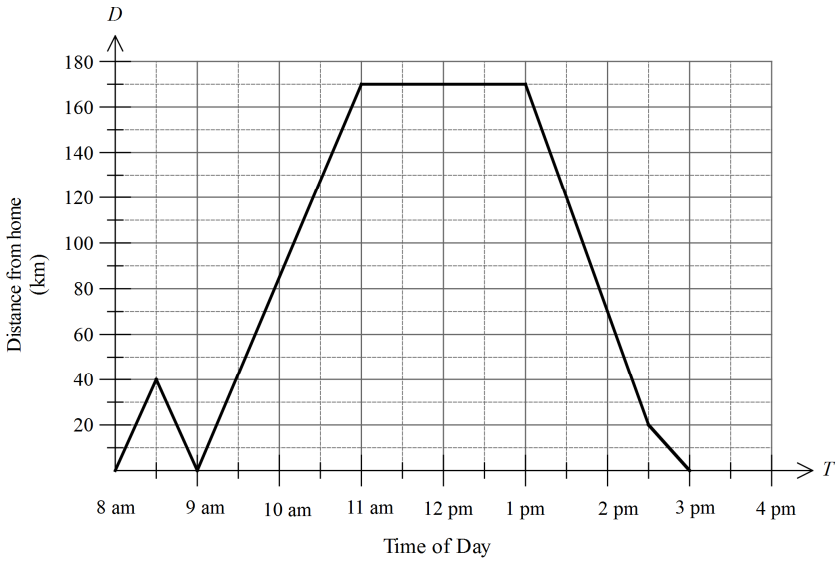
14. On a trip, Meghan drives her car for 5 hours at an average speed of 80 km/h.
Her car uses fuel at a rate of 8 litres/100km.
How many litres of fuel will she use on the trip?

15. The payment for a job is divided between Judy, Kathy and Louise in the ratio 1 : 2 : 4.
If the total payment was $490, how much did Kathy receive?

☐ $ 70.00 ☐ $122.50 ☐ $140.00 ☐ $245.00

Questions 16 - 18 refer to the following.

The distance-time graph represents Tegan's journey from her home in Perth to Bunbury for a meeting and then back home.



16. After Tegan left home she had to turn back when she realised she had forgotten her phone.
At what time did she turn back?

☐ 8:30 am ☐ 9:00 am ☐ 11:00 am ☐ 12:00 pm

17. At what average speed (in km/h) did Tegan travel when she resumed her trip to Bunbury?

18. On her journey home, she had a good run, until heavy traffic slowed her journey.
By how much was her speed lowered by the heavy traffic?

- ☐ The speed dropped from 90 km/h to 20 km/h.
- ☐ The speed dropped from 100 km/h to 20 km/h.
- ☐ The speed dropped from 100 km/h to 40 km/h.
- ☐ The speed dropped from 120 km/h to 40 km/h.

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Non Calculator Section

ANSWERS

No.	WORKING	ANSWER
1.	*Double* dominos : *Non-Double* dominos = 7 : 21 = 1 : 3	7 : 21 = 1 : 3
2.	*Double* dominos : *Full set* dominos = 7 : 28 = 1 : 4	7 : 28 = 1 : 4
3.	One Blank : One Six = 6 : 6 = 1 : 1	6 : 6 = 1 : 1
4.	Number of shopping channels = 45 – 34 = 11 shopping channels : entertainment channels 11 : 34	1st answer
5.	16 : 10 = 8 : 5	3rd answer
6.	Rate = 48 m^2 ÷ 3 hours = 16 m^2/h	16 m^2/ hour
7.	Number of Hours = 540 ÷ 90 = 6 hours	6 hours
8.	Number Dramas = 80 – 55 = 25 Comedies : Dramas = 55 : 25 = 11 : 5	11 : 5
9.	10 : 25 = 2 : 5 (dividing both by 5)	2nd answer
10.	60 : 42 = 10 : 7 (dividing both by 6)	10 : 7

11.	48 : 36 = 8 : ☐ (dividing by 6) So ☐ = 36 ÷ 6 = 6	6
12.	40 cm : 1 m = 40 cm : 100 cm = 4 : 10 = 2 : 5	4th answer
13.	In ratio of 2 : 1 is into 3 parts. Each part = 600 ÷ 3 = 200 Ratio = 2 × 200 : 1 × 200 = 400 : 200	400 : 200
14.	Time = $\frac{2000}{40}$ = 50 minutes	3rd answer
15.	In 3 minutes would do 40 × 3 = 120 beats and 15 sec = $\frac{1}{4}$ minute so 40 × $\frac{1}{4}$ = 10 beats so altogether = 120 + 10 = 130 beats	130
16.	1.6 : 0.24 = 160 : 24 = 20 : 3	4th answer
17.	*18 hours : 2½ days = 18 hours : 60 hours* *= 3 : 10*	1st answer
18.	2 + 5 + 8 = 15 parts Each part = 300 ÷ 15 = 20 Ratio 40 : 100 : 160	400 : 100 : 160
19.	Rate = $\frac{552}{6}$ = 92 " bricks / hour" Time = 920 ÷ 92 = 10 hours	10 hours
20.	In one ration there are 7 cups altogether of which liquid is 3 cups. 12 cups liquid = 4 lots of liquid ration, so 4 lots of flour needed Flour = 4 × 4 cups = 16 cups	2nd answer

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Calculator Allowed
Short Answer
Section

ANSWERS

No.	WORKING	ANSWER
1.	$45 : 30 = 9 : 6 = 3 : 2$	3 : 2
2.	$60 : 72 = 5 : 6$	5 : 6
3.	$2.5 : 10 = 25 : 100 = 1 : 4$	2nd answer
4.	$25 + 9 = 34$ parts $340 \div 34$ parts $= 10$ for each part Surfers $= 9$ parts $= 9 \times 10 = 90$	90
5.	Rate $= 150 \div 20 = 7.5$ g/ml	1st answer
6.	$N : E = 15 : 4$ $= N : 36$ (multiplied by 9) $N = 15 \times 9$ $= 135$ or $N : E = 15 : 4$ $\frac{N}{36} = \frac{15}{4}$ $N = \frac{15 \times 36}{4}$ $= 135$	135
7.	Plan : Real $= 1 : 50$ $= 410 : R$ (multiplied by 410) $R = 50 \times 410$ $= 20500$ mm $= 20.5\ m$ or Scale $1 : 50$ Real $= 50 \times$ plan $= 50 \times 410$mm $= 20500$ mm $= 20.5\ m$	3rd answer
8.	36 min : 2.5 hours $=$ 36 min : 150 min $=$ 12 : 50 $=$ 6 : 25	4th answer

9.	Number of runs = 6.4×2.5 $= 16$ runs	16
10.	Ratio of Grey : Black = 13 : 2 so 15 tiles in total in one pattern . 300 needed, so $300 \div 15 = 20$ lots of pattern. 13 black in pattern, so need $20 \times 13 = 260$ black tiles	260
11.	$S : R : C = 6 : 15 : 18$ $= 2 : 5 : 6$	2 : 5 : 6
12.	$A.\ \frac{3}{8} : \frac{4}{5} = \frac{15 : 32}{40} = 15 : 32 \neq 5 : 6$ $B.\ \frac{2}{3} : \frac{4}{5} = \frac{10 : 12}{15} = 5 : 6$ $C.\ \frac{3}{4} : \frac{4}{5} = \frac{15 : 16}{20} = 15 : 16 \neq 5 : 6$ $D.\ \frac{7}{8} : \frac{4}{5} = \frac{35 : 32}{40} = 35 : 32 \neq 5 : 6$	2nd Answer
13.	In drought it has 6000 head at 2 per hectare, so there are 3000 ha. After drought can manage 5 per ha so $5 \times 3000 = 15000$ Extra cattle = 15000 – 6000 = 9 000	9000
14.	5 hours at 80 km / h gives a distance of 400 km. Uses fuel at 8 litres / 100 km fo 400 km so 4 lots of 8 litres = 32 litres	32
15.	Total parts to divide payment = $1 + 2 + 4 = 7$ Payment = \$490, so each part = $\frac{490}{7} = 70$ Kathy receives 2 parts, so $2 \times 70 =$ \$140	3rd answer
16.	Where graph goes up then back down again, at 8:30 am	1st answer
17.	Travelled between 9am and 11 am, so 2 hours. Distance = 170 km Average speed $= \frac{170}{2} = 85$ km/h	85 km/h

18.	First part of return trip, travelled between 1:00 pm and 2:30 pm, so 1½ hours. Distance = 170 -20 = 150 km $\text{Average speed} = \frac{150}{1.5} = 100 \text{ km/h}$ Second part of return trip, travelled between 2:30 pm and 3:00 pm, so ½ hour. Distance = 20 km $\text{Average speed} = \frac{20}{0.5} = 40 \text{ km/h}$ The speed dropped from 100 km/h to 40 km/h.	3rd answer