Name: _____

Mathematics Essential
Test 10, 2015
Topics – Rates and Ratios and Motion

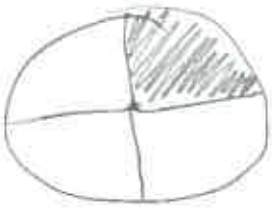
Total Time:	*60 minutes*
Total Reading:	*5 minutes*
Total Working:	*55 minutes*
Weighting:	*5% of the year.*
Equipment Allowed:	*Calculator*

____
55
=____ %

You must include all working out to receive full marks

CALCULATOR ASSUMED

1. (2 marks)
Design your own diagram for which the ratio of shaded area to unshaded area is 1:3.



✓✓

2. (4 marks: 2, 2)
Complete the following table:

Ratio	Fraction	Percentage
1:3	$\frac{1}{4}$ to $\frac{3}{4}$	25% to 75%
1:4 ✓	1/5 to 4/5 ✓	20% to 80%
2:3 ✓	$\frac{2}{5}$ to $\frac{3}{5}$	40% to 60%

3. (3 marks: 1, 1, 1)
Kim was absent from school on 8 days in Term 1. There were 44 school days in Term 1.
Write the following ratios in simplest form:

a) days absent to total days

8 : 44 2 : 11 ✓

b) days absent to days present

8 : 36 2 : 9 ✓

c) days present to total days

36 : 44 9 : 11 ✓

4. (2 mark)
Determine the scale ratio for the following: 4 cm on a scale drawing represent an actual distance of 2km.

4 : 200000
2 : 100000 ✓✓

5. (3 marks: 1, 1, 1)
Complete the table by filling in the missing values:

SCALE	DISTANCE ON THE MAP	REAL LIFE DISTANCE
1:100	4cm	400m ✓
1:50	18cm	900m ✓
1:1000	5cm ✓	5000m

6. (4 marks: 2, 2)
The following nutritional information is shown on the packaging of a loaf of bread:
Serving Size – 2 slices (80g)
Protein 7g
Fat 3.5g
Carbohydrates 33g

a) What is the ratio (in simplest form) of protein to fat?

7 : 3·5 ✓ 2 : 1 ✓

b) What percentage of the serving size is fat?

$\frac{7}{80} \times 100$ ✓ = 8·75% ✓

7. (3 marks)
The profit from a family business was shared by three brothers, Paul, Greg and John, in the ratio of 3:2:1 respectively. If the total profit was $48 000, what was each brothers share?

48000 ÷ 6 = 8000

Paul $24000 ✓ Greg $16000 ✓ John $8000 ✓

8. (2 marks: ½, ½, ½, ½)
Write typical units used for each of the following rates:

a) price of sausages

$ | kg ✓

b) petrol cost

c | L

c) driving speed

km | hr ✓

d) water usage in the shower

L | min

9. (2 marks)
What is the cost of paving a driveway that is 18m long and 4m wide, if the paving costs $35 per square metre?

$18 \times 4 = 72m^2$ ✓
$72 \times 35 = \$2520$ ✓

10. (3 marks: 2, 1)
Billy is trying to decide between two irrigation systems:
i) David Pump System: delivers 650L per hour
ii) Aquasmart System: delivers 200 mL per second

a) How many litres does the Aquasmart system deliver in an hour?
$200 \times 60 \times 60 = 720000$ mL ✓ 720 L/hr ✓

b) Which system delivers the greater amount of water?
Aquasmart ✓

11. (2 marks)
Tamara is paid at a fixed rate per hour. If she earns $136 for 5 hours work, how much will she earn for working 8 hours?

$\$136 \div 5 = \$27.20$ ✓
$\$27.20 \times 8 = \$217.60$ ✓

12. (2 marks)
If Noah takes a group of friends to the movies for his birthday, it would cost $62.50 for five tickets, how much would it cost if there were 12 people (including Noah) in the group?

$\$62.50 \div 5 = \$12.50$ ✓
$\$12.50 \times 12 = \$150$ ✓

13. (2 marks)
It is 30km from Margaret River to Karridale. How long will it take to drive from Karridale to Margaret River at an average speed of 75km/h?

$75 \div 30 = 2.5$ ✓ 2 1/2 hrs ✓

14. (2 marks: 1, 1)
Calculate the average speed, in km/h, of:
a) a sprinter running 200m in 20 seconds
600 m/min
0.6 km/m
36 km/hr ✓
b) a car travelling 180km in 3 hours.
60 km/hr ✓

15. (3 marks: 1, 1, 1)
A magazine listed fuel consumption rates for the following small cars:

Model	Fuel Consumption
Car 1	6.2L/ 100km
Car 2	6.6L/ 100km
Car 3	5.7L/ 100km

a) How much fuel would Car 1 use travelling a distance of 200km?

6·2 × 2 = 12·4L ✓

b) How much fuel would Car 2 use travelling a distance of 150km?

6·6 + 3·3 = 9·9L ✓

c) How much fuel would Car 3 use travelling a distance of 486km?

5·7 × 4·86 27·7L ✓

16. (2 marks)
Brian has to be travel to an appointment 24km away. He wants to be there in 30 minutes. What average speed does Brian need to travel 24km in exactly 30 minutes?

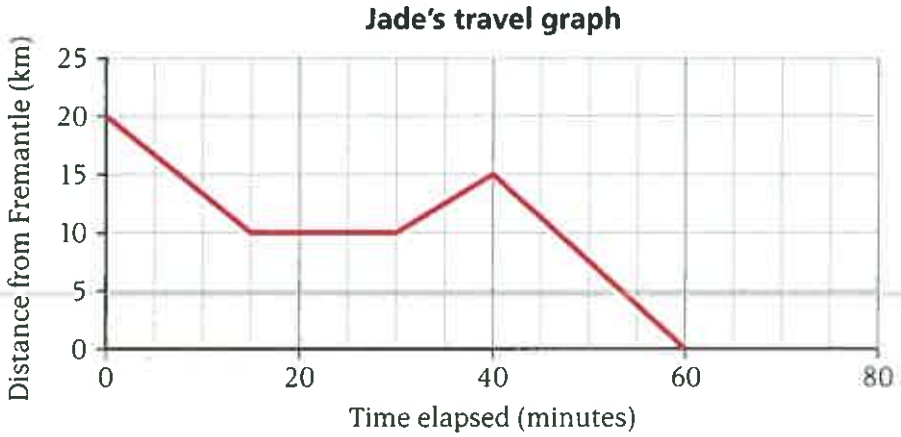
24 × 2 = 48 km/hr ✓ ✓

17. (2 marks)
An ambulance is travelling along the freeway to an accident at a speed of 120km/h. The accident is 15km from the ambulance station. How long will the ambulance take to travel from the station to the accident?

120 ÷ 15 = 8 ✓

7 1/2 min ✓

18. (5 marks: 1, 1, 1, 1, 1)
Jade travels from her home to Fremantle to go to work. The graph shows the distance Jade was from Fremantle as she travelled to work on Friday. Jade left home at 9:00 am to drive to Fremantle. She stopped at a café for a quick breakfast with her friend Aden. After breakfast, Jade dropped Aden back at his house before she continued her journey to work.



a) What was Jade's average speed on the way to the café in km/h?

10km in 15 min 40 km/hr ✓

b) How long did Jade and Aden take to have breakfast?

15min ✓

c) At what time did they leave the café?

10 am ✓

d) How far does Aden live from the café?

15 km ✓

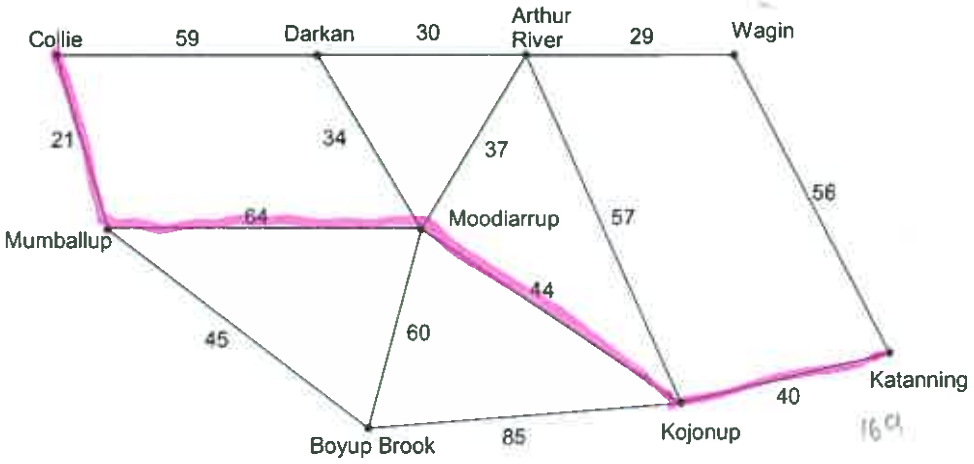
e) After dropping off Aden, what was Jade's average speed on the way to Fremantle in km/h?

15 km in 20 min

45 km/hr ✓

19. (7 marks: 2, 2, 1, 2)

The network below shows the road connections, in kilometres, of some South-West towns.



a) After playing golf in Collie, Jack wants to travel to Katanning. What is the shortest road distance from Collie to Katanning? 169 km ✓✓

b) Which towns would he pass through if he travels the shortest route?

Mumballup, Moodiarrup, Kojonup ✓✓

c) If petrol costs Jack 14 cents per kilometre by car, calculate the cost of his petrol for this shortest route.

169 × 0.14 = $23.66 ✓

d) Jack has heard there is a good restaurant at Arthurs River and wants to stop there for a break. What is now the shortest path and distance Jack can travel from Collie to Katanning?

174 km ✓✓