



# Ratios (inc Scales)

## Question Paper 5

Level	IGCSE
Subject	Maths (0580)
Exam Board	Cambridge International Examinations (CIE)
Paper Type	Extended
Topic	Number
Sub-Topic	Ratios (inc Scales)
Booklet	Question Paper 5

**Time Allowed:** 72 minutes

**Score:** /60

**Percentage:** /100

**Grade Boundaries:**

A*	A	B	C	D	E	U
>85%	75%	60%	45%	35%	25%	<25%

- 1 The scale on a map is 1 : 20 000.  
The area of a lake on the map is 1.6 square centimetres.

Calculate the actual area of the lake.

Give your answer in square metres.

.....m<sup>2</sup> [3]

2 Aasha, Biren and Cemal share \$640 in the ratio 8 : 15 : 9.

(a) Show that Aasha receives \$160.

[1]

(b) Calculate the amount that Biren and Cemal receive.

Biren \$ .....

Cemal \$ ..... [2]

(c) Aasha uses her \$160 to buy some books.  
Each book costs \$15.25 .

Find the greatest number of books that she can buy.

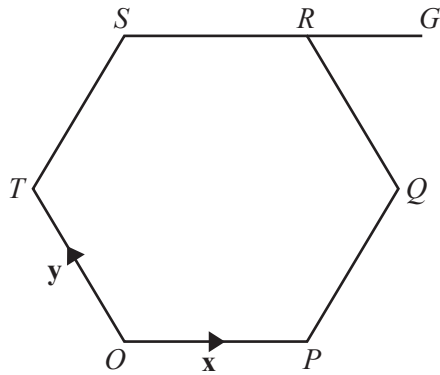
..... [2]

(d) Biren spends  $\frac{3}{8}$  of his share on clothes and  $\frac{1}{3}$  of his share on a computer.

Find the fraction of his share that he has left.  
Write your fraction in its lowest terms.

..... [3]

3



NOT TO SCALE

$O$  is the origin and  $OPQRST$  is a regular hexagon.

$\vec{OP} = \mathbf{x}$  and  $\vec{OT} = \mathbf{y}$ .

(a) Write down, in terms of  $\mathbf{x}$  and/or  $\mathbf{y}$ , in its simplest form,

(i)  $\vec{OR}$ ,

$\vec{OR} = \dots\dots\dots$  [1]

(ii)  $\vec{PQ}$ ,

$\vec{PQ} = \dots\dots\dots$  [1]

(iii) the position vector of  $S$ .

$\dots\dots\dots$  [2]

(b) The line  $SR$  is extended to  $G$  so that  $SR : RG = 2 : 1$ .

Find  $\vec{GQ}$ , in terms of  $\mathbf{x}$  and  $\mathbf{y}$ , in its simplest form.

$\vec{GQ} = \dots\dots\dots$  [2]

(c)  $M$  is the midpoint of  $OP$ .

(i) Find  $\vec{MG}$ , in terms of  $\mathbf{x}$  and  $\mathbf{y}$ , in its simplest form.

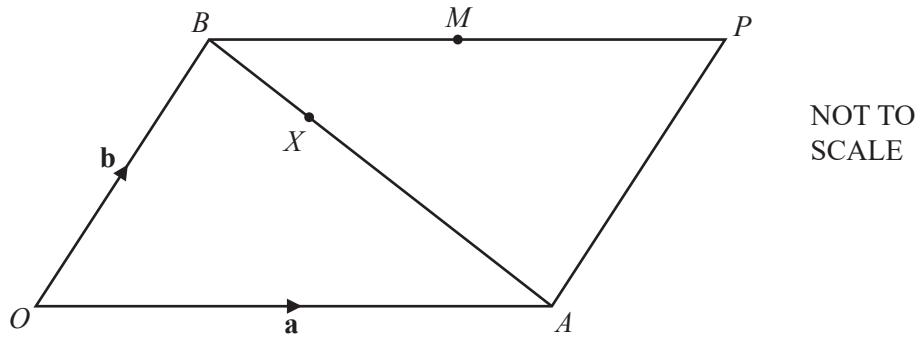
$\vec{MG} = \dots\dots\dots$  [2]

(ii)  $H$  is a point on  $TQ$  such that  $TH : HQ = 3 : 1$ .

Use vectors to show that  $H$  lies on  $MG$ .

[2]

4



$OAPB$  is a parallelogram.  
 $O$  is the origin,  $\vec{OA} = \mathbf{a}$  and  $\vec{OB} = \mathbf{b}$ .  
 $M$  is the midpoint of  $BP$ .

(a) Find, in terms of  $\mathbf{a}$  and  $\mathbf{b}$ , giving your answer in its simplest form,

(i)  $\vec{BA}$ ,

Answer(a)(i)  $\vec{BA} = \dots\dots\dots$  [1]

(ii) the position vector of  $M$ .

Answer(a)(ii)  $\dots\dots\dots$  [1]

(b)  $X$  is on  $BA$  so that  $BX:XA = 1:2$ .

Show that  $X$  lies on  $OM$ .

Answer(b)

[4]

- 5 12 000 vehicles drive through a road toll on one day.  
The ratio cars : trucks : motorcycles = 13 : 8 : 3.

(a) (i) Show that 6500 cars drive through the road toll on that day.

*Answer(a)(i)*

[1]

(ii) Calculate the number of trucks that drive through the road toll on that day.

*Answer(a)(ii)* ..... [1]

(b) The toll charges in 2014 are shown in the table.

Vehicle	Charge
Cars	\$2
Trucks	\$5
Motorcycles	\$1

Show that the total amount paid in tolls on that day is \$34 500.

*Answer(b)*

[2]

- (c) This total amount is a decrease of 8% on the total amount paid on the same day in 2013.  
Calculate the total amount paid on that day in 2013.

*Answer(c)* \$ ..... [3]

- (d) 2750 of the 6500 car drivers pay their toll using a credit card.

Write down, in its simplest terms, the fraction of car drivers who pay using a credit card.

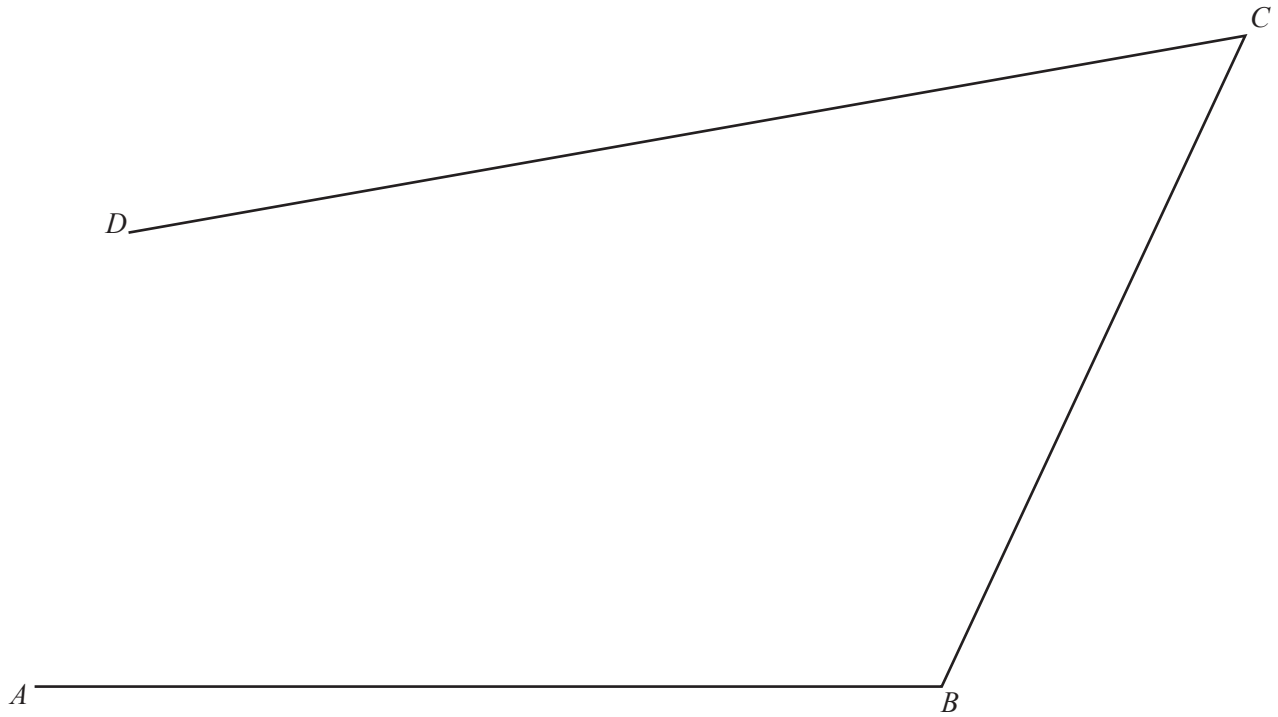
*Answer(d)* ..... [2]

- (e) To the nearest thousand, 90 000 cars drive through the road toll in one week.

Write down the lower bound for this number of cars.

*Answer(e)* ..... [1]

- 6 The diagram is a scale drawing of three straight roads,  $AB$ ,  $BC$  and  $CD$ .  
The scale is 1 : 5000.



Scale 1 : 5000

- (a) Find the actual length of the road  $BC$ .  
Give your answer in metres.

*Answer(a)* ..... m [2]

- (b) Another straight road starts at  $M$ , the midpoint of  $AB$ .  
This road is perpendicular to  $AB$  and it meets the road  $CD$  at  $X$ .

Using a straight edge and compasses only, construct  $MX$ .

[2]



(c) There is a park in the area enclosed by the four roads.

The park is

- less than 290 m from  $B$
- and
- nearer to  $CD$  than to  $CB$ .

**Using a ruler and compasses only**, construct the boundaries of the park.

Leave in all your construction arcs and label the park  $P$ .

[5]

[www.megalecture.com](http://www.megalecture.com)

7 (a) The Martinez family travels by car to Seatown.  
The distance is 92 km and the journey takes 1 hour 25 minutes.

(i) The family leaves home at 07 50.  
Write down the time they arrive at Seatown.

*Answer(a)(i)* ..... [1]

(ii) Calculate the average speed for the journey.

*Answer(a)(ii)* ..... km/h [2]

(iii) During the journey, the family stops for 10 minutes.

Calculate 10 minutes as a percentage of 1 hour 25 minutes.

*Answer(a)(iii)* ..... % [1]

(iv) 92 km is 15% more than the distance from Seatown to Deecity.

Calculate the distance from Seatown to Deecity.

*Answer(a)(iv)* ..... km [3]

(b) The Martinez family spends \$150 in the ratio

$$\text{fuel : meals : gifts} = 11 : 16 : 3.$$

(i) Show that \$15 is spent on gifts.

*Answer (b)(i)*

[2]

(ii) The family buys two gifts.  
The first gift costs \$8.25.

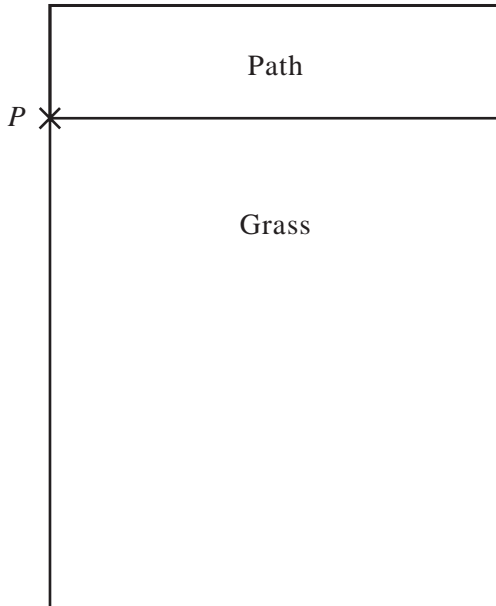
Find the ratio

$$\text{cost of first gift : cost of second gift.}$$

Give your answer in its simplest form.

*Answer(b)(ii)* ..... : ..... [2]

8



The diagram, drawn to a scale of 1 cm to 1 m, shows a garden made up of a path and some grass. A goat is attached to a post, at the point  $P$ , by a rope of length 4 m.

(a) Draw the locus of all the points in the **garden** that the goat can reach when the rope is tight. [1]

(b) Calculate the area of the **grass** that the goat can eat.

Answer(b) ..... m<sup>2</sup> [2]