

Name

Class

# MATHS TEACHER HUB

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## Estimation

(9 – 1) Topic booklet

These questions have been collated from previous years GCSE Mathematics papers.

**You must have:** Ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser.

Total Marks

### Instructions

- Use **black** ink or ball-point pen.
- Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided  
– *there may be more space than you need.*
- Diagrams are NOT accurately drawn, unless otherwise indicated.
- You must **show all your working out.**
- If the question is a **1F** question you are not allowed to use a calculator.
- If the question is a **2F** or a **3F** question, you may use a calculator to help you answer.

### Information

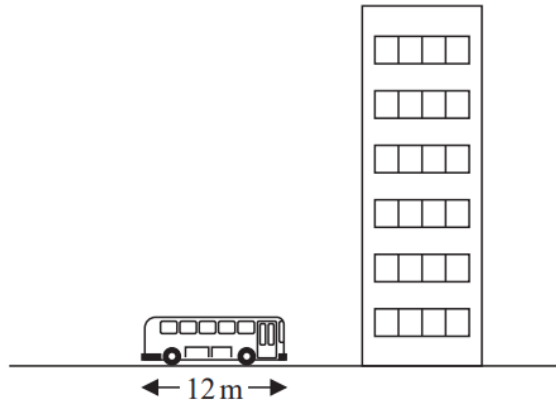
- The marks for **each** question are shown in brackets  
– *use this as a guide as to how much time to spend on each question.*

### Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end.

**Answer ALL questions**  
**Write your answers in the space provided.**  
**You must write down all the stages in your working.**

8



The picture shows a bus next to a building.  
The bus has a length of 12 m.

The bus and the building are drawn to the same scale.

Work out an estimate for the height, in metres, of the building.

..... m

8 Jayne writes down the following

$$3.4 \times 5.3 = 180.2$$

Without doing the exact calculation, explain why Jayne's answer cannot be correct.

.....

.....

Specimen 1 – Paper 3F

**(Total for Question 8 is 1 mark)**

**12** Rehan is on holiday in the USA.

He has \$200 to spend on clothes.

Rehan buys

1 pair of trainers costing \$60

3 T-shirts costing \$25 each.

He also wants to buy a jacket costing \$80

(a) Has Rehan got enough money to buy the jacket?

You must show how you get your answer.

(3)

The trainers cost \$60

The exchange rate is  $\$1 = \pounds 0.749$

Rehan says,

“The trainers cost less than  $\pounds 40$ ”

Rehan is wrong.

(b) Using a suitable approximation, show working to explain why.

(2)

13 The diagram shows a tree and a man.



The man is of average height.  
The tree and the man are drawn to the same scale.

(a) Write down an estimate for the real height, in metres, of the man.

..... metres  
(1)

(b) Find an estimate for the real height, in metres, of the tree.

..... metres  
(2)

**13** Paul organised an event for a charity.

Each ticket for the event cost £19.95

Paul sold 395 tickets.

Paul paid costs of £6000

He gave all money left to the charity.

(a) Work out an estimate for the amount of money Paul gave to the charity.

£.....  
(3)

(b) Is your answer to (a) an underestimate or an overestimate?  
Give a reason for your answer.

.....  
.....  
(1)

**14** A unit of gas costs 4.2 pence.

On average Ria uses 50.1 units of gas a week.  
She pays for the gas she uses in 13 weeks.

(a) Work out an estimate for the amount Ria pays.

.....  
(3)

(b) Is your estimate to part (a) an underestimate or an overestimate?  
Give a reason for your answer.

.....  
.....  
(1)

Specimen 1 – Paper 1F

**(Total for Question 14 is 4 marks)**

- 15** (a) Work out an estimate for the value of  $92 \times 1.63$   
You must show all your working.

.....  
(2)

Given that

$$2.96 \times 3.2 = 9.472$$

- (b) find the value of  $29.6 \times 32$

.....  
(1)

June 2022 – Paper 1F

**(Total for Question 15 is 3 marks)**

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**16** Berenika wants to buy 35 T-shirts.

Each T-shirt costs £5.80

Berenika does the calculation  $40 \times 6 = 240$  to estimate the cost of 35 T-shirts.

(a) Explain how Berenika's calculation shows the actual cost will be less than £240

.....  
.....  
(1)

There is a special offer.

T-shirts £5.80 each.  Buy 30 or more T-shirts. Get 10% off the total cost.
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(b) Work out the actual cost of buying 35 T-shirts using the special offer.

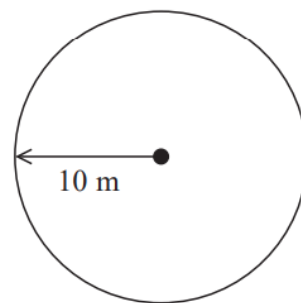
£.....  
(4)

**18** Balena has a garden in the shape of a circle of radius 10 m.  
He is going to cover the garden with grass seed to make a lawn.

Grass seed is sold in boxes.

Each box of grass seed will cover  $46 \text{ m}^2$  of garden.

Balena wants to cover all the garden with grass seed.



- (a) Work out an estimate for the number of boxes of grass seed Balena needs.  
You must show your working.

.....  
(4)

- (b) Is your estimate for part (a) an underestimate or an overestimate?  
Give a reason for your answer.

.....  
.....  
.....  
.....  
(1)

**18** Work out an estimate for  $\frac{790 \times 289}{49}$

**20** Ami and Josh use a calculator to work out  $\frac{595}{4.08^2 + 5.3}$

Ami's answer is 27.1115

Josh's answer is 271.115

One of these answers is correct.

Use approximations to find out which answer is correct.

**22** A cycle race across America is 3069.25 miles in length.

Juan knows his average speed for his previous races is 15.12 miles per hour.  
For the next race across America he will cycle for 8 hours per day.

(a) Estimate how many days Juan will take to complete the race.

.....  
(3)

Juan trains for the race.  
The average speed he can cycle at increases.  
It is now 16.27 miles per hour.

(b) How does this affect your answer to part (a)?

.....  
.....  
(1)

**24** A plane travels at a speed of 213 miles per hour.

(a) Work out an estimate for the number of seconds the plane takes to travel 1 mile.

..... seconds

(3)

(b) Is your answer to part (a) an underestimate or an overestimate?  
Give a reason for your answer.

.....

.....

(1)

**24** Lara is a skier.

She completed a ski race in 1 minute 54 seconds.  
The race was 475 m in length.

Lara assumes that her average speed is the same for each race.

- (a) Using this assumption, work out how long Lara should take to complete a 700 m race.  
Give your answer in minutes and seconds.

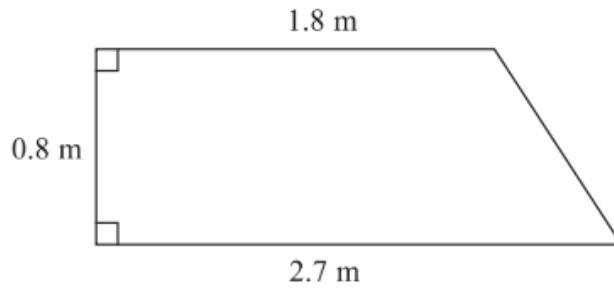
..... minutes ..... seconds  
(3)

Lara's average speed actually increases the further she goes.

- (b) How does this affect your answer to part (a)?

.....  
.....  
(1)

25 The diagram shows part of a wall in the shape of a trapezium.



Karen is going to cover this part of the wall with tiles.  
Each rectangular tile is 15 cm by 7.5 cm

Tiles are sold in packs.  
There are 9 tiles in each pack.

Karen divides the area of the wall by the area of a tile to work out an estimate for the number of tiles she needs to buy.

(a) Use Karen's method to work out an estimate for the number of packs of tiles she needs to buy.

.....  
(5)

Karen is advised to buy 10% more tiles than she estimated.  
Buying 10% more tiles will affect the number of the tiles Karen needs to buy.

She assumes she will need to buy 10% more packs of tiles.

(b) Is Karen's assumption correct?  
You must show your working.

(2)