

Examination Practice Questions

You should have:

A ruler, protractor, compasses, a pen, pencil, eraser, calculator.
For some questions, you may need tracing paper.

Instructions

- Use **black** ink or ball-point pen.
- Answer the questions in the spaces provided – *there may be more space than you need.*
- **Calculators may be used.**

Information

- The marks for each question are shown in brackets.
- Use the number of marks for each question as a guide as to how much time to spend on each question. As a rough guide, you can multiply the number of marks by 1.2 to see how many minutes you should spend on a question.
- Questions been carefully compiled from or modelled on a variety of past papers and will generally get more challenging as the document progresses. Some of the later questions will go beyond the core grade level for this topic.

Advice

- Read each question carefully before you start to answer it.
- Don't forget to have fun.
- Check your answers at the end.

Q1.

AtoZrevision.com

$y = 1.8$ correct to 1 decimal place.

Calculate the lower bound for the value of $4y + 1$

$$1.75 \text{ L.B. } (M1) \\ (4 \times 1.75) + 1 = 8$$

(A1)
8

(2 marks)

Q2.

AtoZrevision.com

$e = 17$ correct to the nearest integer
 $f = 9.4$ correct to one decimal place

$$G = e - f \\ 17.5 \\ 9.35 \\ \text{EITHER FOR } (M1)$$

Work out the upper bound for the value of G .

$$17.5 - 9.35 =$$

8.15
(A1)

(2 marks)

Q3.

AtoZrevision.com

$a = 3.2$ and $b = 5.8$ are both correct to 1 decimal place.

Find the minimum possible value of $b - a$.

$$5.75 - 3.25 = 2.5$$

(1 mark)

Q4.

AtoZrevision.com

$$C = b - a$$

$a = 6$ correct to the nearest integer.

$b = 15$ correct to the nearest 5.

Work out the upper bound for the value of C .

$$5.5 \leq a < 6.5 \\ 12.5 \leq b < 17.5 \\ 17.5 - 5.5 (M1)$$

EITHER FOR (M1)

(A1)
12

(3 marks)

Steve measured the length and the width of a rectangle.
 He measured the length to be 645 mm correct to the nearest 5 mm.
 He measured the width to be 400 mm correct to the nearest 5 mm.

Calculate the lower bound for the area of this rectangle.
 Give your answer correct to 3 significant figures.

\downarrow
 642.5
 397.5
] **B1** FOR EITHER

$642.5 \times 397.5 =$
M1

A1
 255000 mm^2
 (3 marks)

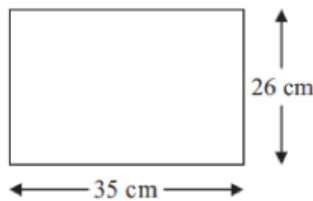


Diagram NOT accurately drawn

The length of the rectangle is 35 cm correct to the nearest cm.
 The width of the rectangle is 26 cm correct to the nearest cm.

Calculate the upper bound for the area of the rectangle.
 Write down all the figures on your calculator display.

\downarrow
 35.5
 26.5
] EITHER FOR **B1**

$35.5 \times 26.5 =$
M1

A1
 940.75 cm^2
 (3 marks)

Given that

$x = 3$ correct to 1 significant figure.

$y = 8.37$ correct to 3 significant figures.

$z = 5.3$ correct to 1 decimal place.

Calculate the upper bound of $x(y - z)$

$$\begin{array}{l}
 3.5 \\
 8.375 \\
 5.25
 \end{array}$$

ANY VALUE
 B1

$$3.5 (8.375 - 5.25) =$$

A1
 10.9

M1

(3 marks)

$$I = 5(v - u)$$

$v = 14$ correct to 2 significant figures

$u = 8.7$ correct to 2 significant figures

Work out the upper bound for the value of I .

$$\begin{array}{l}
 14.5 \\
 8.65
 \end{array}$$

B1

$$5 (14.5 - 8.65) =$$

A1
 29.25

M1

(3 marks)

Q11.

AtoZrevision.com

To the nearest centimetre, $p = 13$ cm and $q = 8$ cm.

Calculate the greatest value of $\frac{q}{p}$

$$\begin{array}{r} 12.5 \\ 8.5 \end{array}$$

$$\frac{8.5}{12.5} \quad M_1$$

A₁

$$0.68$$

(2 marks)

Q12.

AtoZrevision.com

Katy drove for 238 miles, correct to the nearest mile.
She used 27.3 litres of petrol, to the nearest tenth of a litre.

$$\text{Petrol consumption} = \frac{\text{Number of miles travelled}}{\text{Number of litres of petrol used}}$$

Work out the upper bound for the petrol consumption for Katy's journey.
Give your answer correct to 2 decimal places.

$$\begin{array}{r} 238.5 \\ 27.25 \end{array}$$

B₁

$$\frac{238.5}{27.25} =$$

M₁

A₁

$$8.75$$

(3 marks)

Q13.

AtoZrevision.com

$a = 3.2$ and $b = 5.8$ are both correct to 1 decimal place.

Find the maximum possible value of $\frac{b}{a}$. Give your answer to 5 decimal places.

$$\begin{array}{r} 5.85 \\ 3.15 \end{array}$$

$$\frac{5.85}{3.15} =$$

M₁

A₁

$$1.85714$$

(2 marks)

$$v = \sqrt{\frac{a}{b}}$$

$a = 6.43$ correct to 2 decimal places.

$b = 5.514$ correct to 3 decimal places.

Work out the lower bound of v .

$$\begin{array}{r} \underline{6.425} \\ 5.5145 \end{array}$$

(B₁)

$$\sqrt{\frac{6.425}{5.5145}}$$

(M₁)

$$= 1.08$$

(A₁)

.....

(3 marks)

$$p = \sqrt{\frac{2e}{f}}$$

$e = 6.8$ correct to 1 decimal place.

$f = 0.05$ correct to 1 significant figure.

Work out the upper bound for the value of p . Give your answer correct to 3 significant figures.

$$\begin{array}{r} 6.85 \\ 0.045 \end{array}$$

(B₁)

$$\sqrt{\frac{2 \times 6.85}{0.045}}$$

(M₁)

$$17.4$$

(A₁)

.....

(3 marks)

$$D = \frac{u^2}{2a}$$

$u = 26.2$ correct to 3 significant figures.

$a = 4.3$ correct to 2 significant figures.

Calculate the upper bound for the value of D . Give your answer correct to 6 significant figures.

$$\begin{array}{r} 26.25 \\ 4.25 \\ \hline \end{array}$$

(B1)

$$\frac{26.25^2}{2 \times 4.25}$$

(M1)

(A1)

$$81.0662$$

(3 marks)

The region between two rectangles is shaded. The measurements are given correct to the nearest cm.

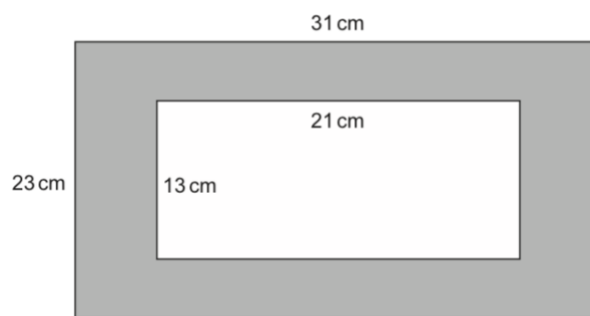


Diagram not drawn to scale

Calculate the greatest possible area of the shaded region.

$$\begin{array}{r} 31.5 \\ 23.5 \\ 20.5 \\ 12.5 \\ \hline \end{array}$$

(B1)

$$\begin{aligned} & (31.5 \times 23.5) - \\ & (20.5 \times 12.5) \\ & = \end{aligned}$$

(M1)

(A1)

$$484 \text{ cm}^2$$

(3 marks)

FOR ANY VALUE

The diagram shows rectangle $ABCD$ with rectangle $EFGH$ cut out to form the shaded region.

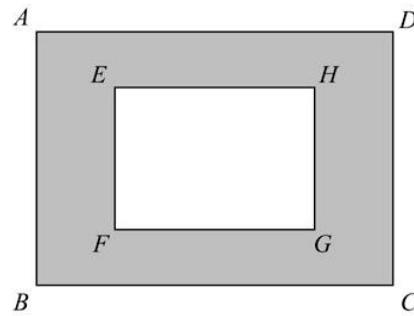


Diagram NOT
accurately drawn

$AD = 8.3$ cm correct to one decimal place

$DC = 7.2$ cm correct to one decimal place

$EH = 6.2$ cm correct to one decimal place

$HG = 5.3$ cm correct to one decimal place

Work out the upper bound of the area of the shaded region.

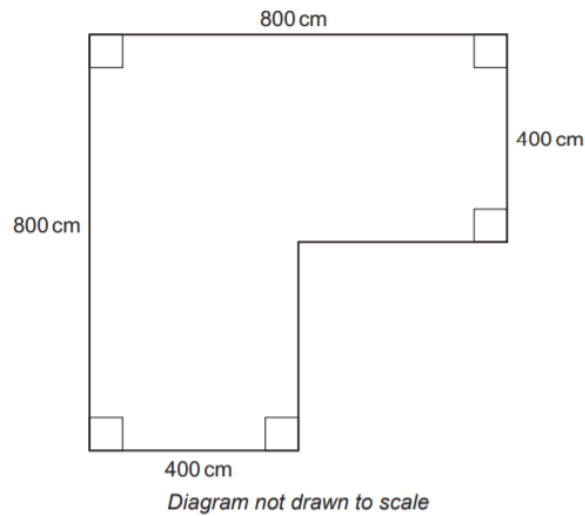
$$\begin{array}{l} 8.35, 7.25 \\ 6.15, 5.25 \end{array} \quad \left. \begin{array}{l} \text{FOR ANY} \\ \text{VALUE} \end{array} \right\} \text{M1}$$

$$\text{M1} \quad (8.35 \times 7.25) - (6.15 \times 5.25) =$$

$$\text{A1} \quad 28.25$$

(3 marks)

A plan view of Lowri's garden is shown below.



All the measurements are correct to the nearest 10 cm.

Calculate the greatest possible area of Lowri's garden.

$$\begin{array}{l} 805 \\ 405 \end{array} \left. \vphantom{\begin{array}{l} 805 \\ 405 \end{array}} \right\} B_1$$

$$M_1$$

$$(805 \times 405) + (405 \times 400)$$

$$= 488025 \text{ cm}^2$$

$$A_1$$

.....
(3 marks)

$$k = \frac{t}{a-h}$$

$t = 14$ correct to 2 significant figures
 $a = 7.8$ correct to 2 significant figures
 $h = 3.4$ correct to 2 significant figures.

Work out the lower bound for the value of k .
Show your working clearly.

$$\begin{array}{r}
 13.5 \\
 7.85 \\
 3.35 \\
 \hline
 \end{array}$$

$\frac{13.5}{7.85 - 3.35} = 3.0$

M1
A1
B1

(3 marks)

$$P = \frac{a}{m-x}$$

$x = 8$ correct to 1 significant figure
 $a = 4.6$ correct to 2 significant figures
 $m = 20$ correct to the nearest 10

Calculate the lower bound of P .

$$\begin{array}{r}
 4.55 \\
 25 \\
 7.5 \\
 \hline
 \end{array}$$

$\frac{4.55}{25 - 7.5} = 0.26$

M1
A1
B1

(3 marks)

$$a = \frac{v - u}{t}$$

$v = 9.6$ correct to 1 decimal place

$u = 3.8$ correct to 1 decimal place

$t = 1.84$ correct to 2 decimal places

Calculate the upper bound for the value of a .

Give your answer as a decimal correct to two decimal places.

$$\begin{array}{r} 9.65 \\ 3.75 \\ 1.835 \\ \hline 1.835 \end{array}$$

B1

$$\begin{array}{r} 9.65 - 3.75 \\ \hline 1.835 \end{array}$$

M1

$$\begin{array}{r} 3.22 \\ \hline \end{array}$$

A1

(3 marks)

$$a = \frac{p - q}{t}$$

$p = 8.4$ correct to 2 significant figures.

$q = 6.3$ correct to 2 significant figures.

$t = 0.27$ correct to 2 significant figures.

Work out the upper bound for the value of a .

Give your answer correct to 1 decimal place.

$$\begin{array}{r} 8.45 \\ 6.25 \\ 0.265 \\ \hline 0.265 \end{array}$$

B1

$$\begin{array}{r} 8.45 - 6.25 \\ \hline 0.265 \end{array}$$

M1

$$\begin{array}{r} 8.3 \\ \hline \end{array}$$

A1

(3 marks)

$$P = \frac{2a - c}{d}$$

$a = 58.4$ correct to 3 significant figures.

$c = 20$ correct to 2 significant figures.

$d = 3.6$ correct to 2 significant figures.

Work out the upper bound for the value of P .

Give your answer correct to 2 decimal places.

$$\begin{array}{r} \downarrow \\ 58.45 \\ 19.5 \\ 3.55 \\ \hline \end{array}$$

(B₁)

$$\frac{(2 \times 58.45) - 19.5}{3.55}$$

$$= 27.44$$

(3 marks)

$$A = w - \frac{x^2}{y}$$

$w = 3.45$ correct to 2 decimal places.

$x = 1.9$ correct to 1 decimal place.

$y = 5$ correct to the nearest whole number.

Work out the lower bound of the value of A

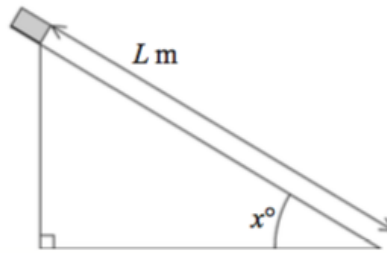
$$\begin{array}{r} 3.445 \\ 1.95 \\ 4.5 \\ \hline \end{array}$$

(B₁)

$$3.445 - \frac{1.95^2}{4.5}$$

$$= 2.6$$

(3 marks)



Elliot did an experiment to find the value of $g \text{ m/s}^2$, the acceleration due to gravity. He measured the time, T seconds, that a block took to slide $L \text{ m}$ down a smooth slope of angle x° .

He then used the formula below to calculate an estimate for g .

$$g = \frac{2L}{T^2 \sin x}$$

$T = 1.3$ correct to 1 decimal place.

$L = 4.50$ correct to 2 decimal places.

$x = 30$ correct to the nearest integer.

Use these answers to write down the value of g to a suitable degree of accuracy. Explain your reasoning.

UPPER BOUND

$$\frac{2 \times 4.505}{(1.25^2) \times \sin 29.5}$$

LOWER BOUND

$$\frac{2 \times 4.495}{(1.35)^2 \times \sin 30.5}$$

ACTUAL

$$\frac{2 \times 4.5}{(1.3^2) \times \sin 30}$$

ROUND UNTIL
ALL 3 ANSWERS
AGREE

BECAUSE THEY ALL
AGREE TO THIS LEVEL
OF ACCURACY.

10

(5 marks)

Jackson is trying to find the density, in g/cm^3 , of a block of wood.
The block of wood is in the shape of a cuboid.

He measures:

the length as 13.2 cm, correct to the nearest mm
the width as 16.0 cm, correct to the nearest mm
the height as 21.7 cm, correct to the nearest mm

He measures the mass as 1970 g, correct to the nearest 5 g.

By considering bounds, work out the density of the wood.
Give your answer to a suitable degree of accuracy.

UPPER BOUND (VOLUME)

$$13.25 \times 16.05 \times 21.75 = 4625.409$$

LOWER BOUND (VOLUME)

$$13.15 \times 15.95 \times 21.65 = 4540.925$$

UB DENSITY

$$\frac{1975}{4540.925} = 0.434382$$

LB DENSITY

$$\frac{1965}{4625.409} = 0.425367$$

BOTH ROUNDED TO 0.43
TO 2 D.P. (ALSO 2 S.F.)

0.43

(5 marks)

$$D = \frac{u^2}{2a}$$

$u = 26.2$ correct to 3 significant figures.

$a = 4.3$ correct to 2 significant figures.

By considering bounds, write down the value of D to a suitable degree of accuracy.

$$\begin{array}{r} \text{UR} \\ \hline 26.25^2 \\ \hline 2 \times 4.25 \\ \hline = 79.833 \end{array}$$

$$\begin{array}{r} \text{LB} \\ \hline 26.15^2 \\ \hline 2 \times 4.35 \\ \hline = 78.600 \end{array}$$

BOTH ROUND TO 80 TO
1 S.F.

80

(5 marks)

$$m = \frac{\sqrt{s}}{t}$$

$s = 3.47$ correct to 2 decimal places.

$t = 8.132$ correct to 3 decimal places.

By considering bounds, work out the value of m to a suitable degree of accuracy.

$$\begin{array}{r} \text{UB} \\ \hline \sqrt{3.475} \\ \hline 8.1315 \\ \hline = 0.2292 \end{array}$$

$$\begin{array}{r} \text{LB} \\ \hline \sqrt{3.465} \\ \hline 8.1325 \\ \hline = 0.2288 \end{array}$$

BOTH ROUND TO 0.229
TO 3 d.p.

0.229

(5 marks)