# Upper and Lower Bounds Past Paper Questions GCSE Edexcel - Calculator

**1.**

Jarek uses the formula

$$\text{Area} = \frac{1}{2}ab\sin C$$

to work out the area of a triangle.

For this triangle,

$a = 7.8$ cm correct to the nearest mm.
$b = 5.2$ cm correct to the nearest mm.
$C = 63°$ correct to the nearest degree.

Calculate the lower bound for the area of the triangle.

..... $cm^2$

**(Total for Question 1 is 3 marks)**

**2.**

The value of $p$ is 4.3
The value of $q$ is 0.4

Both $p$ and $q$ are given correct to the nearest 0.1

(a) Write down the lower bound for $p$.

.....

(1)

$$r = p + \frac{1}{q}$$

(b) Work out the upper bound for $r$.
You must show all your working.

.....

(3)

**(Total for Question 2 is 4 marks)**

**3.**

A road is 4530 m long, correct to the nearest 10 metres.
Kirsty drove along the road in 205 seconds, correct to the nearest 5 seconds.

The average speed limit for the road is 80 km/h.

Could Kirsty's average speed have been greater than 80 km/h?
You must show your working.

**(Total for Question 23 is 5 marks)**

**4.**

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

$s = 3.47$ 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.

You must show all your working and give a reason for your final answer.

**(Total for Question 4 is 5 marks)**

**5.**

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

$v = 37.6$ correct to 3 significant figures.
$u = 11.3$ correct to 3 significant figures.
$t = 8.4$ correct to 2 significant figures.

Work out the upper bound for the value of $a$.
Show your working clearly.

.....

**(Total for Question 5 is 3 marks)**

**6.**

$I = 5(v - u)$

$v = 14$ correct to 2 significant figures
$u = 8.7$ correct to 2 significant figures

Work out the upper bound for the value of $I$.
You must show your working.

.....

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

**7.**

Steve travelled from Ashton to Barnfield.

He travelled 235 miles, correct to the nearest 5 miles.
The journey took him 200 minutes, correct to the nearest 5 minutes.

Calculate the lower bound for the average speed of the journey.
Give your answer in **miles per hour**, correct to 3 significant figures.
You must show all your working.

..... mph

**(Total for Question 7 is 4 marks)**

**8.**

Dan does an experiment to find the value of $\pi$.
He measures the circumference and the diameter of a circle.

He measures the circumference, $C$, as 170 mm to the nearest millimetre.
He measures the diameter, $d$, as 54 mm to the nearest millimetre.

Dan uses $\pi = \frac{C}{d}$ to find the value of $\pi$.

Calculate the upper bound and the lower bound for Dan's value of $\pi$.

upper bound = .....

lower bound = .....

**(Total for Question 8 is 4 marks)**