Name: _____

# GCSE (1 – 9)

# Estimation

**Instructions**

- Use **black** ink or ball-point pen.
- 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.**

**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

**1** Work out an estimate for the value of $\frac{48.7 \times 61.2}{11.3}$

$$\frac{50 \times 60}{10} = \frac{3000}{10} = 300$$

300

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

**2** Work out an estimate for the value of $\frac{41.2 \times 19.8}{0.49}$

$$\frac{40 \times 20}{0.5} = \frac{800}{0.5} = 1600$$

1600

**(Total for Question 2 is 3 marks)**

**3** Work out an estimate for the value of $\frac{28.4 \times 21.05}{5.9}$

$$\frac{30 \times 20}{6} = \frac{600}{6} = 100$$

100

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

**4** Work out an estimate for the value of $\frac{7.4 + 23.05}{0.196}$

$\frac{7+23}{0.2} = \frac{30}{0.2} = 150$

[ OR $\frac{7+20}{0.2} = \frac{27}{0.2} = 135$ ]

150

**(Total for Question 4 is 3 marks)**

**5** Work out an estimate for the value of $\frac{91.25 \times 4.87}{2.31}$

$\frac{90 \times 5}{2} = \frac{450}{2} = 225$

225

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

**6** Work out an estimate for the value of $\frac{18.3 + 62.8}{0.13}$

$\frac{20 + 60}{0.1} = \frac{80}{0.1} = 800$

800

**(Total for Question 6 is 3 marks)**

**7** Work out an estimate for the value of $\dfrac{21.75 + \sqrt{98.1}}{0.192}$

$$\frac{20 + \sqrt{100}}{0.2} = \frac{20+10}{0.2} = \frac{30}{0.2} = 150$$

150

**(Total for Question 7 is 3 marks)**

**8** Work out an estimate for the value of $\dfrac{8.3 \times 18.7}{0.52}$

$$\frac{8 \times 20}{0.5} = \frac{160}{0.5} = 320$$

320

**(Total for Question 8 is 3 marks)**

**9** Eddie and Ellen use a calculator to work out $\dfrac{431.1}{14.3 + 3.8^2}$

Eddie's answer is 1.5
Ellen's answer is 15

One of those answers is correct.

Use approximations to find out which answer is correct.

$$\frac{400}{14+4^2} \quad \left[\text{or } \frac{400}{10+4^2}\right]$$

$$\frac{400}{14+16} = \frac{40\cancel{0}}{3\cancel{0}}$$

$$= 13.\dot{3}$$

Ellen's answer is correct.

**(Total for Question 9 is 3 marks)**

40

**10** Ciara drives an average of 43.6 miles per week

52 weeks in a year

(a) Work out an estimate for the number of miles Ciara drives in a year.

$40 \times 50 = 2000$

2000 miles

(2)

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

underestimate – I rounded down the miles per week and the number of weeks in a year

(1)

**(Total for Question 10 is 3 marks)**

8

**11** Dennis gets paid £8.21 per hour he works.
Each week Dennis works 41 hours.

40

(a) Work out an estimate for the amount Dennis gets paid in a week.

$8 \times 40 = 320$

£320

(2)

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

underestimate – I rounded down the pay and number of hours

(1)

**(Total for Question 11 is 3 marks)**

**12** Mr Sykes wants to buy a calculator for every student in year 11.
There are 104 students in year 11.
Each calculator costs £6.05

100
6

(a) Work out an estimate for the amount of money Mr Sykes will spend on calculators.

100 x 6

£ 600

(2)

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

underestimate - I rounded down the number of students and the cost.

(1)

**(Total for Question 12 is 3 marks)**

3

**13** Phoebe's pays 2.8 pence per minute to use her phone.
On average Phoebe uses her phone for 77 minutes per day.

80

She pays he phone bill for 29 days.

30

(a) Work out an estimate for how much Phoebe pays.

3 x 80 x 30

80 x 90

7200 p

£ 72

(3)

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

overestimate - I rounded all the numbers up

(1)

**(Total for Question 13 is 4 marks)**

10

**14** A circle has a radius of 11 metres.

(a) Work out an estimate for the area of the circle.

$\text{Area} = \pi r^2$

$= 3 \times 10^2$

$= 3 \times 100$

$= 300$

300 $m^2$

OR 363 (3)

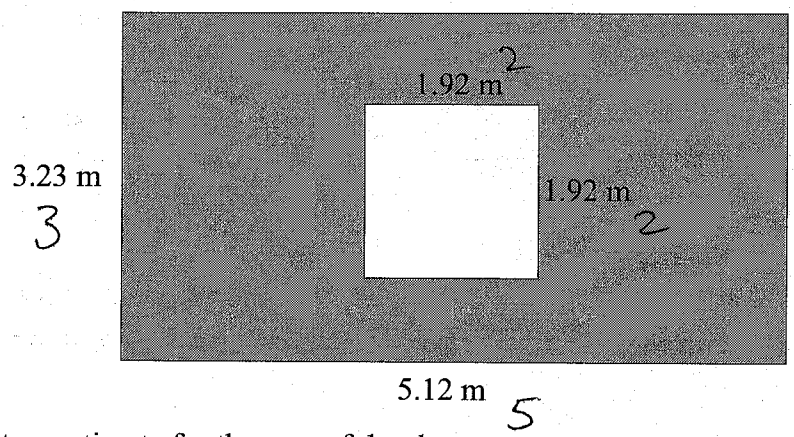
(b) Is your answer to part (a) an underestimate or an overestimate?
Give a reason for your answer.

underestimate - I rounded $\pi$ and the radius down.

(1)

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

**15** A shape is formed by cutting a square out of a rectangle.




(a) Work out an estimate for the area of the shape.

Big shape $3 \times 5 = 15\ m^2$

Small shape $2 \times 2 = 4\ m^2$

$15 - 4 = 11$

11 $m^2$

(3)

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

underestimate - the big shape will have a greater area and the small shape will have a smaller area.

(1)

**(Total for Question 15 is 4 marks)**

40

**16** A baby was born every 43 seconds in the UK in 2018

~~(a)~~ Work out an estimate for the total number of babies born in the UK in 2018.
You must show how you get your answer.

Number of seconds in a year

40

Number of seconds in a year = $60 \times 60 \times 24 \times 365$

$\approx 60 \times 60 \times 20 \times 400$

$3600 \times 8000$

$\approx 4000 \times 8000$

$32\,000\,000$

$\frac{32\,000\,000}{40}$

$800\,000$

800 000

**(Total for Question 16 is 4 marks)**

600 000 to 900 000