

# GCSE & High School Topic Questions

## Estimation

### Learn by heart

- An estimate is an approximate answer; not the exact answer.
- To estimate: try rounding numbers to 1 significant figure before calculating.
- Dividing by 0.5 is the same as multiplying by 2.
- Remember dividing by a number is the same as multiplying by its reciprocal.
- $\approx$  means “is approximately equal to”  
= means “is exactly equal to”.

### Examples

→ Estimate  $\frac{38.7 \times 5.8}{10.25} \approx \frac{40 \times 6}{10}$

$$= \frac{240}{10} = 24$$

→ Estimate  $\frac{19.2 + \sqrt{81}}{0.48} \approx \frac{20 + \sqrt{81}}{0.5}$

$$= \frac{20 + 9}{0.5}$$

$$= \frac{29}{0.5}$$

$$= 58$$

(Dividing by 0.5 is the same as multiplying by 2)

## GCSE &amp; High School Topic Questions

## Estimation

→ Estimate  $\sqrt{42}$

**Solution**  $\sqrt{36} = 6$  ,  $\sqrt{49} = 7$

so  $\sqrt{42} \approx 6.5$

→ Ellen drives an average of 43.6 miles per week.  
(a) Work out an estimate for the number of miles Ellen drives in a year.

**Solution**

$$43.6 \approx 40$$

There are 52 weeks in a year

$$\text{so } 52 \approx 50$$

$$40 \times 50 = 2000$$

Ellen drives approximately 2000 miles in a year.

(b) Is your answer to part (a) an underestimate or an overestimate?

Give a reason for your answer.

Answer of part (a) is an underestimate because I rounded down the miles per week and the number of miles in a year.

## GCSE &amp; High School Topic Questions

## Estimation

- 1 Work out an estimate for the value of  $\frac{38.7 \times 64.2}{11.3}$   
(3 marks)
- 
- 2 Work out an estimate for the value of  $\frac{5.4 + 24.05}{0.49}$   
(3 marks)
- 
- 3 Work out an estimate for the value of  $\frac{19.3 + 52.8}{0.12}$   
(3 marks)
- 
- 4 Work out an estimate for the value of  $\frac{27.75 + \sqrt{49}}{0.192}$   
(3 marks)
- 
- 5 Work out an estimate for the value of  $\frac{4.93 \times \sqrt{99}}{(2.03)^3}$   
(3 marks)
- 
- 6 Work out an estimate for the value of  $\frac{6.8 - 2.9}{0.53}$   
(3 marks)
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# GCSE & High School Topic Questions

## Estimation

- 7 Sara gets paid £7.21 per hour she works.  
Each week Sara works 31 hours.

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

(b) Is your answer to part (a) an underestimate or an overestimate?

Give a reason for your answer.

(3 marks)

- 
- 8 In a cinema there are 39 rows and in each row there are 23 seats.  
Each ticket cost £9.10  
Work out an estimate for the total income from the ticket sales.

(3 marks)

- 
- 9 Alice buys 63 apples at 32p each.  
(a) Work out an estimate for the total cost of apples.  
(b) Is your answer to part (a) an underestimate or an overestimate?  
Give a reason for your answer.

(3 marks)

## GCSE & High School Topic Questions

### Estimation

- 10 Mr. Ronaldo wants to buy a computer for every students in year 12.

There are 197 students in year 12.

Each computer cost £725.

a) Work out an estimate for the amount of money Mr. Ronaldo spent on computers.

(b) Is your answer to part (a) an underestimate or an overestimate?

Give a reason for your answer.

(3 marks)

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- 11 James wants to buy some printers and ink cartridges.

Estimate the total cost of 22 printers at £197 each and 78 ink cartridges at £ 31.10 each.

(3 marks)

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- 12 A roll of wallpaper costs £ 8.95.

Suzi buys 29 rolls of wallpaper

Work out an estimate for the total cost of wallpapers.

(3 marks)

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# GCSE & High School Topic Questions

## Estimation

### answers

- 1 Work out an estimate for the value of  $\frac{38.7 \times 64.2}{11.3}$

**Solution:**

$$\frac{38.7 \times 64.2}{11.3} \approx \frac{40 \times 60}{10}$$

$$= \frac{2400}{10}$$

$$= 240$$


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- 2 Work out an estimate for the value of  $\frac{5.4 + 24.05}{0.49}$

**Solution:**

$$\frac{5.4 + 24.05}{0.49} \approx \frac{5+24}{0.5}$$

$$= \frac{29}{0.5}$$

$$= 58 \quad (29 \times 2)$$


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- 3 Work out an estimate for the value of  $\frac{19.3 + 52.8}{0.12}$

**Solution:**

$$\frac{19.3 + 52.8}{0.12} \approx \frac{20 + 50}{0.1}$$

$$= \frac{70}{0.1}$$

$$= 700 \quad (70 \times 10)$$


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# GCSE & High School Topic Questions

## Estimation

### answers

- 4 Work out an estimate for the value of  $\frac{27.75 + \sqrt{49}}{0.192}$   
**Solution:**

$$\begin{aligned}\frac{27.75 + \sqrt{49}}{0.192} &\approx \frac{30 + 7}{0.2} \\ &= \frac{37}{0.2} \\ &= 185 \quad (37 \times 5)\end{aligned}$$

- 5 Work out an estimate for the value of  $\frac{4.93 \times \sqrt{99}}{(2.03)^3}$   
**Solution:**

$$\begin{aligned}\frac{4.93 \times \sqrt{99}}{(2.03)^3} &\approx \frac{5 \times 10}{(2)^3} \\ &= \frac{50}{8} \\ &= 6.25\end{aligned}$$

- 6 Work out an estimate for the value of  $\frac{6.8 - 2.9}{0.53}$   
**Solution:**

$$\begin{aligned}\frac{6.8 - 2.9}{0.53} &\approx \frac{7 - 3}{0.5} \\ &= \frac{4}{0.5} \\ &= 8 \quad (4 \times 2)\end{aligned}$$

## GCSE & High School Topic Questions

### Estimation

### answers

- 7 Sara gets paid £7.21 per hour she works.  
Each week Sara works 31 hours.
- (a) Work out an estimate for the amount Sara gets paid in a week.
- (b) Is your answer to part (a) an underestimate or an overestimate? Give a reason for your answer.

#### Solution:

- (a)  $7 \times 30 = \text{£}210$  (Sara gets paid in a week)
- (b) Underestimate because I rounded down the pay and number of hours.

- 8 In a cinema there are 39 rows and in each row there are 23 seats.  
Each ticket cost £9.10  
Work out an estimate for the total income from the ticket sales.

#### Solution:

number of rows  $\approx 39 = 40$

number of seats  $\approx 23 = 20$

one ticket cost =  $9.10 \approx \text{£}9$

Total seats =  $40 \times 20 = 800$

Total income =  $800 \times 9 = \text{£}7200$

## GCSE & High School Topic Questions

### Estimation

### answers

9 Alice buys 63 apples at 32p each.

(a ) Work out an estimate for the total cost of apples.

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

**Solution:**

number of apples =  $63 \approx 60$

one apple cost =  $32p \approx 30p$

(a): Total cost of apples =  $60 \times 30 = 180p$

(b): Underestimate because I rounded down both values.

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10 Mr. Ronaldo wants to buy a computer for every students in year 12. There are 197 students in year 12. Each computer cost £725.

a) Work out an estimate for the amount of money Mr. Ronaldo spent on computers.

(b) Is your answer to part (a) an underestimate or an overestimate?

**Solution:** number of students =  $197 \approx 200$

one computer cost =  $\text{£}725 \approx \text{£}700$

(a): Total money spent =  $200 \times 700 = \text{£}140000$

(b): Overestimate because I rounded up the number of students.

# GCSE & High School Topic Questions

## Estimation

## answers

- 11 James wants to buy some printers and ink cartridges.  
Estimate the total cost of 22 printers at £197 each and 78 ink cartridges at £31.10 each.

**Solution:**

1 printer cost= £197  $\approx$  £200

number of printers= 22  $\approx$  20

1 ink cartridges cost = £31.10  $\approx$  £30

number of ink cartridges= 78  $\approx$  80

Total cost=(20x200) + (30 x 80)

Total cost=4000 + 2400 = £6400

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- 12 A roll of wallpaper costs £8.95.  
Suzi buys 29 rolls of wallpaper  
Work out an estimate for the total cost of wallpapers.

**Solution:**

one roll cost= £8.95  $\approx$  £9

number of rolls= 29  $\approx$  30

Total cost=9 x 30 = £270