

Rounding and Estimation

GCSE Mathematics • Foundation Tier • Grades 1–3 • Non-calculator

WORKED SOLUTIONS

Name: _____ *worked example* _____

Class: _____

Total: _____ *41* _____ / 41

Show all your working. Marks are given for correct method as well as the final answer.

1. Round 3 472 to the nearest 100. [1 mark]

look at the tens digit: 7
 $7 \geq 5$ so round up

Answer: _____ *3500* _____

2. Round 8 149 to the nearest 1 000. [1 mark]

hundreds digit is 1
 $1 < 5$ so round down

Answer: _____ *8000* _____

3. Round 6.37 to 1 decimal place. [1 mark]

second decimal is 7
round the 3 up to 4

Answer: _____ *6.4* _____

4. Round 0.0842 to 2 decimal places. [2 marks]

third decimal is 4
 $4 < 5$ so leave the 8

Answer: _____ *0.08* _____

5. Round 12.96 to 1 decimal place. [2 marks]

second decimal is 6, round up
 $12.9 + 0.1 = 13.0$
write 13.0, not 13

Answer: _____ *13.0* _____

6. Round 47 382 to 1 significant figure. [2 marks]

first significant figure is 4
next digit 7, round up
keep the place value: 50000

Answer: _____ *50000* _____

7. Round 0.00728 to 2 significant figures. [2 marks]

leading zeros are NOT significant
first s.f. is 7, second is 2
next digit 8, round up
count from the first non-zero

Answer: _____ *0.0073* _____

8. Round 3 059 to 2 significant figures. [2 marks]

first two s.f.: 3 and 0

next digit 5, round up

Answer: _____ 3100 _____

9. Round 0.4961 to 3 significant figures.

[2 marks]

*4, 9, 6 are the first three
next digit 1, round down*

Answer: _____ 0.496 _____

10. Estimate 41×19 by rounding each number to 1 significant figure.

[2 marks]

*41 $\rightarrow$ 40
19 $\rightarrow$ 20
40 $\times$ 20 = 800*

Answer: _____ 800 _____

11. Estimate $\frac{612}{29}$.

[2 marks]

*612 $\rightarrow$ 600
29 $\rightarrow$ 30
600 $\div$ 30 = 20*

Answer: _____ 20 _____

12. Estimate 8.7×3.2 .

[2 marks]

*8.7 $\rightarrow$ 9
3.2 $\rightarrow$ 3
9 $\times$ 3 = 27*

Answer: _____ 27 _____

13. Estimate $\frac{39.4 \times 5.1}{9.8}$.

[3 marks]

*40 $\times$ 5 = 200
200 $\div$ 10 = 20*

Answer: _____ 20 _____

14. Estimate $\sqrt{78}$.

[2 marks]

*8² = 64, 9² = 81
78 is close to 81
so just under 9*

Answer: _____ about 9 _____

15. Estimate the value of $\frac{\sqrt{101}}{4.9}$.

[3 marks]

*$\sqrt{101} \approx 10$
4.9 $\rightarrow$ 5
10 $\div$ 5 = 2*

Answer: _____ 2 _____

16. Rob estimates 29×41 as $30 \times 40 = 1200$. Is this an over- or under-estimate? Explain.

[2 marks]

*29 rounded UP to 30
41 rounded DOWN to 40 (smaller effect)
actual = 1189, so 1200 is bigger
an over-estimate*

Answer: _____ *over-estimate* _____

17. A coach holds 52 people. 314 students need transport. Work out how many coaches are needed. [2 marks]

*$314 \div 52 = 6.04...$
round UP -- 6 coaches leaves people behind*

Answer: _____ *7 coaches* _____

18. A number n is 4.6 to 1 decimal place. Write down the smallest possible value of n . [2 marks]

*anything from 4.55 up rounds to 4.6
4.55 itself is included*

Answer: _____ *4.55* _____

19. Round 2.9963 to 2 decimal places. [2 marks]

*third decimal is 6, round up
 $2.99 + 0.01 = 3.00$
the carry rolls all the way over*

Answer: _____ *3.00* _____

20. A rectangle measures 19.2 cm by 4.8 cm.

- (a) Estimate its area. [2 marks]

*$19.2 \rightarrow 20$
 $4.8 \rightarrow 5$
 $20 \times 5 = 100 \text{ cm}^2$*

- (b) Explain whether your estimate is bigger or smaller than the true area. [2 marks]

*both numbers rounded UP
so the estimate is bigger
true area = 92.16 cm^2*

Answer: *100 cm^2 , an over-estimate*