

# Calculations (F)

A collection of 9-1 Maths GCSE Sample and Specimen questions from AQA, OCR, Pearson-Edexcel and WJEC Eduqas.

Name:	
Total Marks:	

1. 8 identical pens cost £12

Work out the cost of 10 of these pens.

$$10 \begin{cases} 8 \Rightarrow 12 \\ 4 \Rightarrow 6 \\ 2 \Rightarrow 3 \end{cases} \Rightarrow 10 \Rightarrow 12 + 3 = 15$$

£.....15..... [2]

2. (a) Work out  $84 \div 3$

$$\begin{array}{r} 28 \\ 3 \overline{)84} \end{array}$$

.....28..... [1]

(b) Work out  $0.17 \times 6000$

$$\begin{array}{r} 0.17 \times 1000 \times 6 \\ 170 \times 6 \\ 1020 \end{array}$$

.....1020..... [1]

(c) Work out  $(-2)^3$

$$-2 \times -2 \times -2 = -8$$

.....-8..... [1]

3. One day Sally earned £60

She worked for 8 hours.

Work out Sally's hourly rate of pay.

$$8 \overline{)60.00} \Rightarrow 7.50$$

£.....7.50..... [2]

4. Circle the two statements that are false.

A If  $p$  is an integer then  $3p$  is a multiple of 3.

**B** If  $q$  is an even number then  $\frac{q}{2}$  is always an even number.

C If  $s$  is an integer then  $2s + 1$  is an odd number.

**D** If  $t$  is an even number then  $t^3$  is an odd number.  $2 \times 2 \times 2 = 8$

5. Work out.

(a)  $926 - 382$

$$\begin{array}{r} 926 \\ -382 \\ \hline 544 \end{array}$$

[2]

(a) ..... 544 [1]

(b)  $517 \times 16$

$$\begin{array}{r} 517 \\ \times 16 \\ \hline 3102 \\ 5170 \\ \hline 8272 \end{array}$$

(b) ..... 8272 [2]

6. Write these numbers in order of size, smallest first.

12                    -7                    -11                    -2  
 ..... -11 ..... -7 ..... -2 ..... 12 [1]

7. Write these temperatures in order.

Start with the lowest temperature.

~~7°C~~                    ~~-2°C~~                    10°C                    ~~-5°C~~                    ~~3°C~~  
 ..... -5°C                    -2°C                    3°C                    7°C                    10°C [1]

8. Tracy buys

2 coffees at £1.10 each

2.20

3 teas at 95p each

2.85

5 sandwiches at £2.15 each

10.75  
15.80

$$\begin{array}{r} 95 \\ \times 3 \\ \hline 285 \end{array} \quad \begin{array}{r} 2.15 \\ \times 5 \\ \hline 10.75 \end{array}$$

Tracy shares the total cost equally between 5 people.

How much does each person pay?

$$5 \overline{) 15.80} = 3.16$$

£ ..... 3.16 [4]

9. Coffee is sold in jars.

There are 200g of coffee in each jar.

Ben makes 8 cups of coffee each day.

He thinks he uses 2g of coffee to make each cup of coffee.

Ben wants to buy enough coffee for 28 days.

(a) How many jars of coffee does Ben need to buy?

$$2 \times 8 = 16g$$

$$\begin{array}{r} 28 \\ 16 \\ \hline 280 \\ 168 \\ \hline 448 \end{array}$$

so 3 jars..... [3]

Ben finds that he uses 2.5 g of coffee to make each cup of coffee.

(b) How does this affect the number of jars of coffee he needs to buy?

You must give a reason for your answer.

$$2.5 \times 8 = 20$$

$$28 \times 20 = 560g \quad \text{so still needs 3 jars.}$$

..... [2]

10. Alice makes cards.

Each card uses 42 cm of ribbon.

She has 1000 cm of ribbon.

(a) Work out the maximum number of cards she can make.

$$\begin{array}{r} 1 \ 42 \Rightarrow 3 \ 126 \\ 2 \ 84 \\ 4 \ 168 \\ 8 \ 336 \end{array}$$

$$42 \overline{)1000.00} \begin{array}{l} 23.8 \\ \underline{84} \\ 160 \\ \underline{126} \\ 340 \\ \underline{336} \\ 40 \end{array}$$

so 23 cards

$$\begin{array}{r} 126 \\ \underline{34} \\ 160 \end{array} \Rightarrow 34 \text{ cm left over} \quad [2]$$

(b) How much ribbon will be left over?

[1]

11. Liz buys a car for £7500

She pays a deposit of £1875

She pays the rest in 36 equal monthly payments.

Work out the amount of each monthly payment.  $\Rightarrow$  £156.25

$$\begin{array}{r} 1 \ 36 \\ 2 \ 72 \\ 4 \ 144 \quad 6 \ 216 \\ 8 \ 288 \\ 5 \ 180 \end{array}$$

$$36 \overline{)5625.00} \begin{array}{l} 156.25 \\ \underline{360} \\ 205 \\ \underline{180} \\ 250 \\ \underline{180} \\ 700 \\ \underline{360} \\ 340 \end{array}$$

$$\begin{array}{r} 7500 \\ - 1875 \\ \hline 5625 \end{array}$$

[3]

12. 110 students go on a school trip.



Pack of 6

$$\begin{array}{r} 18.3 \\ 6 \overline{) 110.0} \\ \underline{6} \phantom{0} \\ 50 \phantom{0} \\ \underline{30} \phantom{0} \\ 20 \phantom{0} \\ \underline{18} \phantom{0} \\ 20 \phantom{0} \\ \underline{18} \phantom{0} \\ 20 \phantom{0} \\ \underline{18} \phantom{0} \\ 20 \phantom{0} \end{array}$$

$$\begin{array}{r} 19 \\ 6 \\ \hline 114 \\ 5 \end{array}$$

Each student needs a bottle of water.  
How many of these packs are needed?

so 19 packs needed.

[3]

13. (a) Circle the value of  $2^4 = 2 \times 2 \times 2 \times 2 = 16$

[1]

6    8    16    24

(b) Circle the value of  $5^3 = 5 \times 5 \times 5$

[1]

15    25    53    125

(c) Circle the value of  $\sqrt{196}$

[1]

13    14    ~~16~~    98

$$\begin{array}{r} 16 \quad 14 \\ 16 \quad 14 \\ \hline 96 \quad 56 \\ 3 \phantom{0} \quad 0 \\ \hline 196 \end{array}$$

14. A hotel charges:

£59 per night for a room

£6.95 for breakfast

£12.50 for an evening meal.

Liz stays at the hotel for 5 nights.

She has 3 breakfasts and 1 evening meal.

How much does she pay altogether? £328.35

$$\begin{array}{r} 59 \\ \times 5 \\ \hline 295 \end{array}$$

$$\begin{array}{r} 6.95 \\ 3 \\ \hline 20.85 \\ 2 \phantom{0} \end{array}$$

$$\begin{array}{r} 295.00 \\ 20.85 \\ 12.50 \\ \hline 328.35 \end{array}$$

[4]

15. Jody's pay is £315 per week.

Jody wants to work out her yearly pay.

She says,

$$315 \times 52 = \begin{array}{r} 315 \\ \times 52 \\ \hline 630 \\ 15750 \\ \hline 16380 \end{array}$$

"There are 4 weeks in a month, so I will multiply £315 by 4

There are 12 months in a year, so I will multiply the answer by 12

$$£315 \times 4 \times 12 = £15\,120"$$

Does her method give the correct amount for her yearly pay?

Tick a box.

No, her yearly pay is more

Yes

No, her yearly pay is less

Show working to support your answer.

52 weeks in a year  $\Rightarrow 315 \times 52 = £16\,380$

[2]

16. How many DVDs do you get for £35?




DVDs  
£5 each

Buy 2 get 1 free



$$7 \times 5 = 35$$

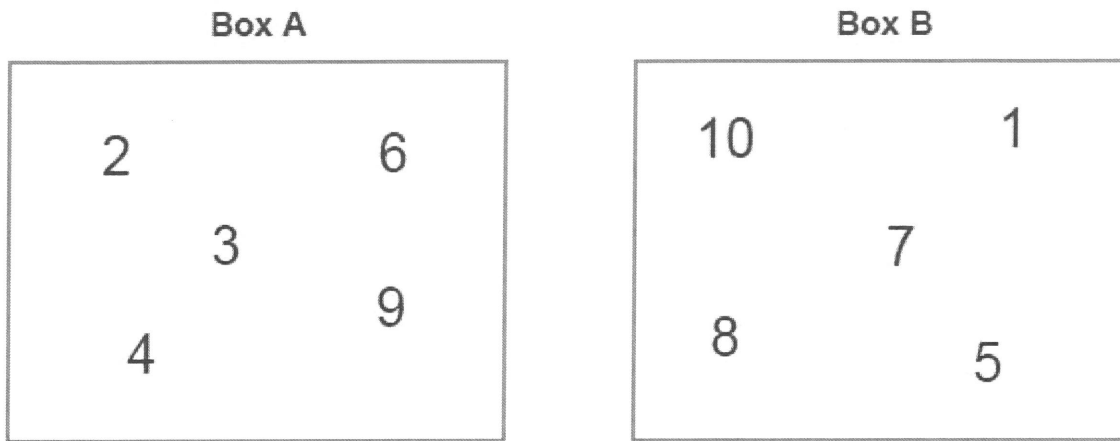
↓  
3 free

$$\frac{12}{1} \quad \frac{34}{1} \quad \frac{56}{1} \quad ?$$

$\Rightarrow 10$  DVD's

[3]

17. Two of the numbers move from Box A to Box B.



The total of the numbers in Box B is now four times the total of the numbers in Box A.

Which two numbers move?

$$2 + 3 + 4 + 6 + 9 = 24$$

$$24 - 4 - 9 = 11$$

$$10 + 8 + 7 + 1 = 26$$

$$26 + 5 = 31$$

$$31 + 4 + 9 = 44$$

$$11 \times 4 = 44.$$

[2]

18. The table shows the number of cars that used a town's car park during a period of one week.

Day	Mon	Tues	Wed	Thurs	Fri	Sat	Sun	TOTAL
Number of cars	104	43	112	163	116	182	80	800

(a) How many cars used this car park during the weekend (Saturday and Sunday)?

$$\begin{array}{r} 182 \\ 80 \\ \hline 262 \end{array}$$

$$262$$

[1]

(b) One of the days between Monday and Friday is the town's market day.

On another day, between Monday and Friday, the shops are only open in the morning.

Using the information given in the table, which days do you think they are?

Market day	Morning opening only
163 → Thurs	42 → Tues.

[2]

(c) The car park has space for 170 cars.

Explain how it was possible for 182 cars to have used the car park on Saturday.

They don't have to be there all at once - some arrive at different times.

[1]

The charge for using this car park is displayed on the notice shown below.

**CAR PARK**

Monday to Friday: £2 per day  
Free parking on Saturday and Sunday

(No time limit)

(d) How much money was spent on parking at this car park for the week shown in the table?

$$\begin{array}{r}
 104 \\
 43 \\
 112 \\
 163 \\
 116 \\
 \hline
 538
 \end{array}
 \quad
 \begin{array}{r}
 538 \\
 2 \\
 \hline
 1076
 \end{array}
 \Rightarrow \text{£}1076$$

[2]

(e) The town council is considering a new system for the way it charges for parking.

The new system is

- reducing the charge to £1.50
- and
- charging this amount on all seven days of the week
- and
- allowing free parking for those who stay for less than one hour.

That week, a quarter ( $\frac{1}{4}$ ) of the cars stayed for less than one hour.

Using this information, decide whether this new system would collect more or less money for the council.

You must show all your working.

$$\begin{aligned}
 \frac{1}{4} \text{ of } 800 &= 200 \\
 \Rightarrow 600 \times 1.50 &= \text{£}900 \quad \text{so would get less money.}
 \end{aligned}$$

[3]

State an assumption you have made in part (e) and explain how your results would change if this assumption had not been made.

Assumed the same number of cars arrived - if more came then more money would be raised. Vice versa.

[2]

19. A piece of wood is 32 cm long.

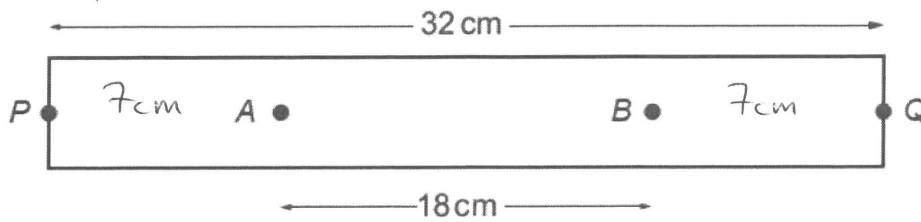


Diagram not drawn to scale

Alan wants to drill two holes in the wood at points A and B, where  $AB = 18\text{cm}$ .

The distance PA and QB must be equal.

Diagram not drawn to scale

Calculate the length PA.  $\Rightarrow 7\text{cm}$

$$\begin{array}{r} 28 \\ - 18 \\ \hline 10 \end{array} \quad \frac{14}{2} = 7\text{cm}$$

20. On an island there are two companies that hire out fishing boats to visitors.

<p><b>Fishing Boats R Us</b></p> <p><b>Hire charges</b></p> <p><b>£45 for first hour</b> <b>then £30 per hour</b> <b>(or part of an hour)</b></p>
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<p><b>Ocean Blue Boats</b></p> <p><b>Hire charges</b></p> <p><b>£32 per hour</b> <b>(or part of an hour)</b></p>
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Robert wants to hire a boat to go fishing with his friends.

He needs the boat from 9:15 a.m. to 5:30 p.m.

Which company would you advise Robert to use?

Show all your working and give a reason for your answer.

9:15  $\rightarrow$  5:15 = 8hrs  $\Rightarrow$  9hrs.  
 |||||

Fishing Boats R Us:

$$45 + 8 \times 30 \Rightarrow \begin{array}{r} 240 \\ 45 \\ \hline \pounds 285 \end{array}$$

Ocean Blue Boat

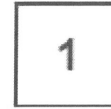
$$\begin{array}{r} 32 \\ \times 9 \\ \hline \pounds 288 \end{array}$$

so choose Fishing Boats R Us.

[5]



21. Here are four cards.



There is a number on each card.

- (a) Write down the largest 4-digit even number that can be made using each card only once.

.....5421..... [2]

- (b) Write down all the 2-digit numbers that can be made using these cards.

54 45 25 15  
52 42 24 14  
51 41 21 12

..... [2]

22. Work out  $247 \times 63$

	2	4	7	
1	1	2	4	6
	2	4	2	
5	0	1	2	3
	6	2	1	
	5	6	1	

$\Rightarrow 15561$

[3]

23. A unit of gas costs 4.2 pence.

On average Ria uses 50.1 units of gas a week.  
She pays for the gas she uses in 13 weeks.

- (a) Work out an estimate for the amount Ria pays.

$50 \times 10 = 500$   
 $500 \times 4 = 2000$   
 $\approx \pounds 20.00$

50.1	6513	
13	42	
501.0	260520	
150.3	33026	
651.3	2735.46	..... [3]

$\Rightarrow \pounds 27.35$

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

Give a reason for your answer.

so underestimate by  $\pounds 7.35$

[1]

24. A shop sells milk in 1 pint bottles and in 2 pint bottles.

Each 1 pint bottle of milk costs 52p.

Each 2 pint bottle of milk costs 93p.

Martin has no milk.

He assumes that he uses, on average,  $\frac{3}{4}$  of a pint of milk each day.

Martin wants to buy enough milk to last for 7 days.

(a) Work out the smallest amount of money Martin needs to spend on milk.

You must show all your working.

$$\frac{7}{1} \times \frac{3}{4} = \frac{21}{4} = 5\frac{1}{4} \text{ pt.}$$

$$\begin{aligned} 3 \times 2 \text{ pt} &\Rightarrow 93 \times 3 = \pounds 2.79 \\ 2 \times 2 \text{ pt} + 2 \times 1 \text{ pt} &= 1.86 + 1.04 \\ &= \pounds 2.90 \\ 6 \times 1 \text{ pt} &= 6 \times 52 = \pounds 3.12 \end{aligned}$$

$$\pounds 2.79 \dots \dots \dots [3]$$

Martin actually uses more than  $\frac{3}{4}$  of a pint of milk each day.

(b) Explain how this might affect the amount of money he needs to spend on milk.

*Depending on how much more - cost will go up.*

[1]

25. Michelle and Wayne have saved a total of £458 for their holiday.

Wayne saved £72 more than Michelle.

How much did Wayne save?

$$\begin{array}{r} 229 \\ 2 \overline{)458} \end{array}$$

$$\frac{72}{2} = 36$$

$$\begin{array}{r} 229 \\ 36 \\ \hline 265 \\ \phantom{0} \\ \hline 193 \end{array}$$

so £265

[2]

26. Work out  $\frac{30 + 12}{5 + 3} = \frac{42}{8} = 5\frac{1}{4}$

[1]

27. In a quiz, teams are asked 20 questions. Teams score

3 points for a correct answer

0 points for questions not attempted

-2 points for an incorrect answer.

a) Team A has these results.

	Correct	Not attempted	Incorrect
Number of questions	12 $\times 3 = 36$	5 0	3 $\times -2 = -6$

Work out the total number of points Team A scores.  $36 - 6 = 30$

b) Team B answers 16 out of 20 questions correctly.  $\frac{16}{20} = \frac{80}{100} = 80\%$  [2]

Work out the percentage of questions Team B answers correctly.

[2]

c) After 17 questions, Team C has 35 points.

After 20 questions, Team C has 34 points.

How many of the last three questions are answered correctly, not attempted or answered incorrectly?

$$3 \rightarrow -1$$

$$1\checkmark = 3$$

$$2x = \frac{-4}{-1}$$

Correct 1

Not attempted 0

Incorrect 2

[2]

28. 82 children visit a sports centre.

50 of the children swim.  $\begin{matrix} 12 & 24 & 36 & 48 & 50 \\ 1 & 2 & 3 & 4 & 5 \end{matrix}$

At least one adult is needed for every 12 children who swim.

The other 32 children dance.  $\begin{matrix} 15 & 30 & 32 \\ 1 & 2 & 3 \end{matrix}$   $\Rightarrow 8 \text{ adults.}$

At least one adult is needed for every 15 children who dance.

Work out the minimum number of adults needed for the 82 children.

[4]

29. Jack works out the answer to  $\frac{\sqrt{98.5} - 12.1}{-0.8} \approx \frac{\sqrt{100} - 12}{-0.8} = \frac{-2}{-0.8} = +$

He says the answer is negative.

Is he correct?

You must show your working. *so he is wrong.*

*-ve ÷ -ve = +ve*

[2]

30. 15 rulers cost £3 → 5 cost £1 → 40 cost £8

How much do 40 rulers cost?

[2]

31. Which statement is true? Circle your answer.

-6 is greater than -2

-2 is greater than -6

-6 is greater than 2

-2 is greater than 6

[1]

32. Here are some cards.

+8.3

+8.9

-8.9

-8.3

a) Choose a card so that the answer is as small as possible.

Work out the answer.

-3.5

+ -8.9

=

-12.4

$$\begin{array}{r} 8.9 \\ 3.5 \\ \hline 12.4 \end{array}$$

?  
↓

b) Choose a card so that the answer is as small as possible.

Work out the answer.

[2]

$$\boxed{-3.5} - \boxed{+8.9} = \underline{-12.4}$$

[2]