Name: SOLUTIONS

GCSE (1 - 9)

Buy me a coffee

Direct and Inverse Proportion

Solutions by
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These questions are compiled from *released* Pearson Edexcel GCSE maths exam papers
They contain exam questions from up until the ***Summer 2023*** exam series
More recent exam papers do exist but are withheld for mock exams
As new exam papers are released these worksheets will gradually be updated
The ***most current*** version of these worksheets will always be available at: kennethstafford.co.uk
These worksheets were made using examq.co.uk

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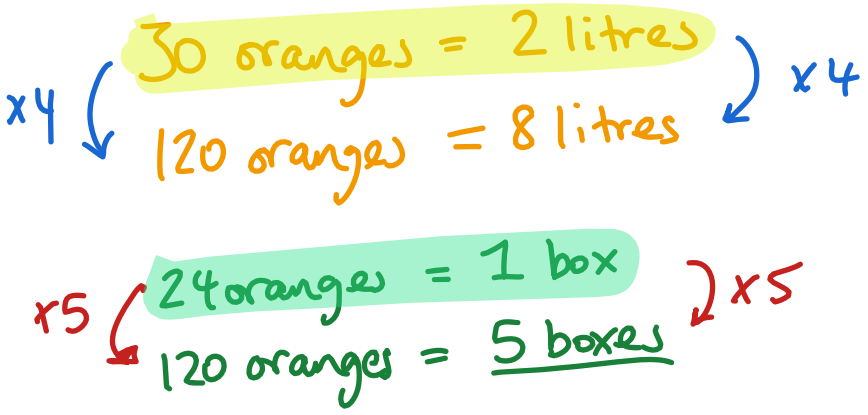
1

Scott wants to make orange juice.
He is going to buy boxes of oranges.

There are 24 oranges in each box of oranges.
30 oranges make 2 litres of orange juice.

Scott needs to buy enough oranges to make 8 litres of orange juice.

(a) Work out the number of boxes of oranges that Scott needs to buy.
You must show all your working.

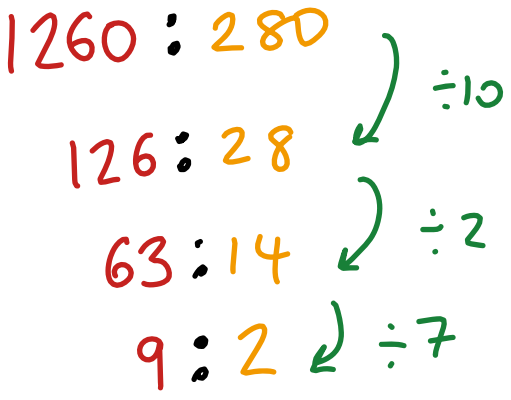


5 boxes

(3)

Scott also buys
1260 apples
280 bananas

(b) Write down the ratio of the number of apples that Scott buys to the number of bananas that he buys.
Give your ratio in its simplest form.



9 : 2

(2)

(Total for Question 17 is 5 marks)

[Edexcel, GCSE, Autumn 2020, Paper 2F, Q17]

2

Here are the costs of the same type of batteries in two shops.

Shop **A**	Shop **B**
Pack of 4 batteries £1.60	Pack of 6 batteries £2.70

Harry needs to buy at least 30 batteries.
He assumes that he has to buy batteries in whole packs.
Harry wants to buy the batteries as cheaply as possible from the same shop.

(a) Which shop should he buy the batteries from, shop **A** or shop **B**?
You must show all your working.

Shop A

4 batteries = £1.60 (×8)
32 batteries = £12.80 (×8)

Shop B

6 batteries = £2.70 (×5)
30 batteries = £13.50 (×5)

Shop A

(4)

Harry's assumption is wrong.
He can buy single batteries for 40p each in shop **A** and for 45p each in shop **B**.

(b) Does this affect which of these two shops Harry should buy the batteries from?
Give a reason for your answer.

No. Shop A was already cheaper. It would now be £1.50 cheaper for 30 batteries.

(1)

(Total for Question 15 is 5 marks)

[Edexcel, GCSE, Autumn 2020, Paper 3F, Q15]

3

Maisie knows that she needs 3 kg of grass seed to make a rectangular lawn 5 m by 9 m.

Grass seed is sold in 2 kg boxes.

Maisie wants to make a rectangular lawn 10 m by 14 m.
She has 5 boxes of grass seed.

(a) Has Maisie got enough grass seed to make a lawn 10 m by 14 m?
You must show all your working.

$5 \times 9 = 45 m^2$

$45 m^2 = 3 kg$

$15 m^2 = 1 kg$

Her lawn : $10 \times 14 = 140 m^2$

$140 \div 15 = 9.3 kg$ needed

5 boxes : $5 \times 2 = 10 kg$

Yes. She has enough.

(4)

Maisie opens the 5 boxes of grass seed.

She finds that 4 of the boxes contain 2 kg of grass seed.
The other box contains 1 kg of grass seed.

(b) Does this affect whether Maisie has enough grass seed to make her lawn?
Give a reason for your answer.

Yes. She now only has 9kg of seed and she needs 9.3kg.

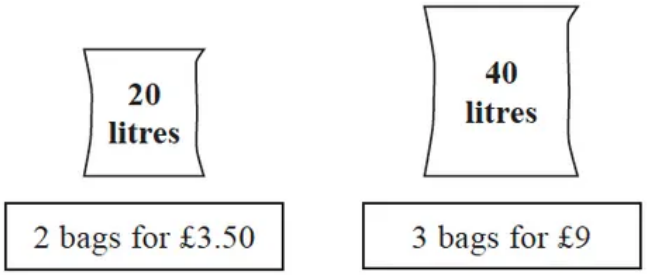
(1)

(Total for Question 26 is 5 marks)

[Edexcel, GCSE, Autumn 2020, Paper 3F, Q26]

4

A shop sells compost in 20 litre bags and in 40 litre bags.
One day the shop had two special offers for the compost.



Which offer is the better value for money?
You must show how you get your answer.

20

2 bags = 40L = £3.50

40L = £3.50

40

3 bags = 120L = £9

120L = £9

40L = £3 ÷3

3 bags for £9

(Total for Question 14 is 3 marks)

[Edexcel, GCSE, Autumn 2019, Paper 2F, Q14]

5

Here are the ingredients needed to make 16 biscuits.

Biscuits
Ingredients to make **16** biscuits
175 g of butter 75 g of sugar 250 g of flour

Anna has

500 g of butter
300 g of sugar
625 g of flour

Work out the greatest number of biscuits Anna can make.

Butter = $500 \div 175 = 2.857142\dot{}$

Sugar = $300 \div 75 = 4$

Flour = $650 \div 250 = 2.6$

$2.6 \times 16 = 41.6$ biscuits

41

(Total for Question 19 is 3 marks)

[Edexcel, GCSE, Autumn 2019, Paper 2F, Q19]

6

Deon needs 50 g of sugar to make 15 biscuits.

She also needs

three times as much flour as sugar
two times as much butter as sugar

Deon is going to make 60 biscuits.

(a) Work out the amount of flour she needs.

15

60

50g sugar

150g flour

100g butter

x 4 → 600g

x 4 → 400g

600 g

(3)

Deon has to buy all the butter she needs to make 60 biscuits.
She buys the butter in 250 g packs.

(b) How many packs of butter does Deon need to buy?

400g butter needed

1 pack = 250g

2 packs = 500g

2 packs

(2)

(Total for Question 23 is 5 marks)

[Edexcel, GCSE, Summer 2019, Paper 1F, Q23]

7

There are 84 calories in 100 g of banana.
There are 87 calories in 100 g of yogurt.

Priti has 60 g of banana and 150 g of yogurt for breakfast.

Work out the total number of calories in this breakfast.

Banana

100g = 84
÷5 ↓ ↓ ÷5
20g = 16·8
×3 ↓ ↓ ×3
60g = 50·4

Yoghurts

100g = 87
×1·5 ↓ ↓ ×1·5
150g = 130·5

50·4 + 130·5 = 180·9

180·9

(Total for Question 17 is 4 marks)

[Edexcel, GCSE, Summer 2019, Paper 2F, Q17]

8

Machine A and machine B both make car parts.

Machine A makes 6 parts every 10 minutes.
Machine B makes 13 parts every 15 minutes.

On Monday
machine A makes parts for 12 hours
machine B makes parts for 10 hours

Work out the total number of parts made by the two machines on Monday.

Machine A

10 mins = 6 parts (x 6)
1 hour = 36 parts (x 12)
12 hours = 432 parts

Machine B

15 mins = 13 parts (x 4)
1 hour = 52 parts (x 10)
10 hours = 520 parts

432 + 520 = 952

952

(Total for Question 18 is 4 marks)

[Edexcel, GCSE, Summer 2019, Paper 2F, Q18]

9

Shahid is going to use these instructions to make a fizzy drink.

> Mix 5 parts of orange juice
> with 2 parts of lemonade

Shahid thinks that he has 300 m*l* of orange juice and 200 m*l* of lemonade.

(a) If Shahid is correct, what is the greatest amount of fizzy drink he can make?

Orange Juice

300 ÷ 5 = 60ml (1 part)

Lemonade

60ml x 2 = 120ml

300 + 120 = 420 ml

(3)

Shahid has 300 m*l* of orange juice but he only has 160 m*l* of lemonade.

(b) Does this affect the greatest amount of fizzy drink he can make?
Give a reason for your answer.

No. He can only use 120ml of lemonade.

(1)

(Total for Question 15 is 4 marks)

[Edexcel, GCSE, Autumn 2018, Paper 1F, Q15]

10

It would take 120 minutes to fill a swimming pool using water from 5 taps.

(a) How many minutes will it take to fill the pool if only 3 of the taps are used?

÷5 ↓ 5 taps = 120 mins ↓ ×5 (inverse)

1 tap = 600 mins

÷3 ↓ 3 taps = 200 mins ↓ ×3

200 minutes

(2)

(b) State one assumption you made in working out your answer to part (a).

All the taps work at the same rate.

(1)

(Total for Question 23 is 3 marks)

[Edexcel, GCSE, Autumn 2018, Paper 1F, Q23]

11

Adrian is going to make concrete.
He is going to use

180 kg of cement
375 kg of sand
1080 kg of stone

Cement, sand and stone are sold in bags.

1 bag cement	1 bag sand	1 bag stone
25 kg	22.5 kg	50 kg

Adrian already has

10 bags of cement
20 bags of sand
20 bags of stone

Work out what bags he needs to buy to make the concrete.

Cement = 10 x 25 = 250kg (has enough)

Sand = 20 x 22.5 = 450kg (has enough)

Stone = 20 x 50 = 1000kg (needs 80kg - 2bags)

2 bags of stone needed.

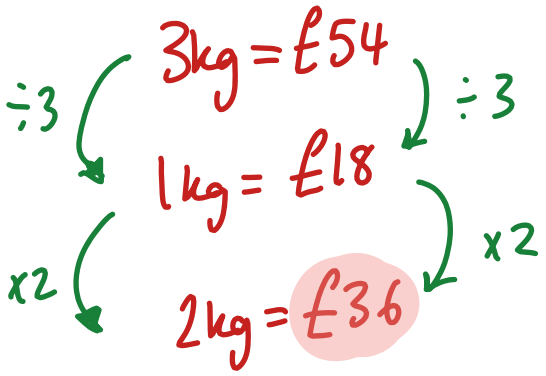
(Total for Question 17 is 3 marks)

[Edexcel, GCSE, Summer 2018, Paper 2F, Q17]

12

3 kg of meat costs £54
Nina buys 2 kg of the meat.

Work out how much Nina pays.



£ 36

(Total for Question 8 is 2 marks)

[Edexcel, GCSE, Summer 2018, Paper 1F, Q8]

13

Neil buys 30 pens, 30 pencils, 30 rulers and 30 pencil cases.

Price list	
pens	6 for 82p
pencils	15 for 45p
rulers	10 for £1.25
pencil cases	37p each

What is the total amount of money Neil spends?

Pens
6 = 82p
30 = £4.10

Pencils
15 = 45p
30 = £0.90

Rulers
10 = £1.25
30 = £3.75

Pencil case
1 = £0.37
30 = £11.10

4.10 + 0.90 + 3.75 + 11.10 = £19.85

£ 19.85

(Total for Question 8 is 5 marks)

[Edexcel, GCSE, Summer 2018, Paper 2F, Q8]

14

Here is the list of ingredients for making 30 biscuits.

Ingredients for 30 biscuits
225 g butter
110 g caster sugar
275 g plain flour
75 g chocolate chips

Lucas has the following ingredients.

900 g butter
1000 g caster sugar
1000 g plain flour
225 g chocolate chips

What is the greatest number of biscuits Lucas can make?
You must show your working.

Butter : 900 ÷ 225 = 4

Sugar : 1000 ÷ 110 = 9.09

Flour : 1000 ÷ 275 = 3.6

Choc : 225 ÷ 75 = 3

3 x 30 = 90

90

(Total for Question 17 is 3 marks)

[Edexcel, GCSE, Summer 2018, Paper 2F, Q17]

15

There are 30 children in a nursery school.
At least 1 adult is needed for every 8 children in the nursery.

(a) Work out the least number of adults needed in the nursery.

$30 \div 8 = 3.75$

so 4

(2)

2 more children join the nursery.

(b) Does this mean that more adults are needed in the nursery?
You must give a reason for your answer.

No. There are now 32 children.
4 adults can look after 32 children.

(1)

(Total for Question 11 is 3 marks)

[Edexcel, GCSE, Autumn 2017, Paper 1F, Q11]

16

Here is a list of ingredients for making 16 flapjacks.

Ingredients for 16 flapjacks

120 g butter
140 g brown sugar
250 g oats
2 tablespoons syrup

Jenny wants to make 24 flapjacks.

Work out how much of each of the ingredients she needs.

$\frac{24}{16} = 1.5$

120×1.5 butter = 180 g

140×1.5 brown sugar = 210 g

250×1.5 oats = 375 g

2×1.5 syrup = 3 tablespoons

(Total for Question 19 is 3 marks)

[Edexcel, GCSE, Autumn 2017, Paper 1F, Q19]

17

Thais has a large bottle of shampoo.
There are 2 litres of shampoo in the large bottle.

Thais also has some empty small bottles.
Each small bottle can be completely filled with 150 ml of shampoo.

How many small bottles can be completely filled with shampoo from the large bottle?

2 litres = 2000 mL

2000 ÷ 150 = 13.3̇

13

(Total for Question 5 is 3 marks)

[Edexcel, GCSE, Autumn 2017, Paper 3F, Q5]

18

2.5 kg of apples cost £3.60

Work out the cost of 3.5 kg of apples.

2.5kg = £3.60
÷2.5 ↓
1kg = £1.44
×3.5 ↓
3.5kg = £5.04

£ 5.04

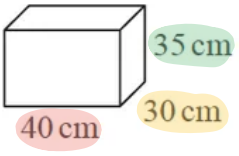
(Total for Question 12 is 2 marks)

[Edexcel, GCSE, Autumn 2017, Paper 3F, Q12]

19

Chloe has a van.

She is going to use the van to deliver boxes.
Each box is a cuboid, 40 cm by 30 cm by 35 cm.



The space for boxes in the van has

maximum length	2.4 m	240 ÷ 40 = 6
maximum width	1.5 m	150 ÷ 30 = 5
maximum height	1.4 m	140 ÷ 35 = 4

The space for boxes is empty.
Chloe wants to put as many boxes as possible into the van.

6 x 5 x 4 = 120 boxes

She can put 3 boxes into the van in one minute.
Assume that the space for boxes is in the shape of a cuboid.

(a) Work out how many minutes it should take Chloe to put as many boxes as possible into the van.

120 ÷ 3 = 40minutes

40 minutes

(4)

The space for boxes might **not** be in the shape of a cuboid.

(b) Explain how this could affect the time it would take Chloe to put as many boxes as possible into the van.

If there is les space it will take fewer boxes so the time will be quicker.

It may take longer as a different arrangement will be required.

(1)

(Total for Question 16 is 5 marks)

[Edexcel, GCSE, Autumn 2017, Paper 3F, Q16]

20

In London, 1 litre of petrol costs 108.9p
In New York, 1 US gallon of petrol costs $2.83

1 US gallon = 3.785 litres
£1 = $1.46

In which city is petrol better value for money, London or New York?
You must show your working.

1 gallon = 3.785 litres

3.785 litres = $2.83

÷ 1.46

3.785 litres = £1.94

÷ 3.785

1 litre = £0.51

Petrol is better value in New York

(Total for Question 20 is 3 marks)

[Edexcel, GCSE, Autumn 2017, Paper 3F, Q20]

21

Sean works for a company.
His normal rate of pay is £12 per hour.

When Sean works more than 8 hours a day, he is paid overtime for each hour he works more than 8 hours.

Sean's rate of overtime pay per hour is $1\frac{1}{4}$ times his normal rate of pay per hour.

On Monday Sean worked for 10 hours. 8 + 2

Work out the total amount of money Sean earned on Monday. 12 x 1¼ = £15

(normal) 8 hours x £12 = £96

(overtime) 2 hours x £15 = £30

96 + 30 = £126

£ 126

(Total for Question 9 is 4 marks)

[Edexcel, GCSE, Autumn 2017, Paper 1F, Q9]

22

It takes 14 hours for 5 identical pumps to fill a water tank.

How many hours would it take 4 of these pumps to fill another water tank of the same size?

÷5 ↓ 5 pumps = 14 hours ↓ x5

1 pump = 70 hours ↓ ÷4

x4 ↓ 4 pumps = 17.5 hours

17.5 hours

(Total for Question 23 is 2 marks)

[Edexcel, GCSE, Summer 2023, Paper 3F, Q23]

23

Lava flows from a volcano at a constant rate of $11.9\,m^3/s$

How many days does it take for $67\,205\,600\,m^3$ of lava to flow from the volcano?
Give your answer correct to the nearest day.

$11.9\,m^3$ = 1 second

$714\,m^3$ = 1 minute

$42,840\,m^3$ = 1 hour

$1,028,160\,m^3$ = 1 day

$67,205,600 \div 1,028,160 = 65.365$

65 days

(Total for Question 25 is 3 marks)

[Edexcel, GCSE, Summer 2023, Paper 3F, Q25]

24

A car factory is going to make four different car models **A**, **B**, **C** and **D**.

80 people are asked which of the four models they would be most likely to buy.

The table shows information about the results.

Car model	Number of people
A	23
B	15
C	30
D	12

The factory is going to make 40 000 cars next year.

Work out how many model **B** cars the factory should make next year.

$\frac{15}{80} \times 40{,}000 = 7500$

7500

(Total for Question 23 is 2 marks)

[Edexcel, GCSE, November 2022, Paper 1F, Q23]

25

Water flows through each of the pipes that fill a lake at the same rate.
It takes 4 of the pipes 12 hours to fill the lake.

Work out how many hours it would take 6 pipes to fill $\frac{1}{4}$ of the lake.

÷4 ↓ 4 pipes = 12 hours ↓ ×4
1 pipe = 48 hours ↓ ÷6
×6 ↓ 6 pipes = 8 hours (whole lake)

6 pipes = 2 hours (¼ of the lake)

2 hours

(Total for Question 16 is 3 marks)

[Edexcel, GCSE, November 2022, Paper 2F, Q16]