

# LINEAR PROPORTION

DATE OF SOLUTIONS: 15/05/2018

MAXIMUM MARK: 57

# SOLUTIONS

GCSE (+ IGCSE) EXAM QUESTION PRACTICE

1. [Edexcel, 2004]

Direct and Inverse Proportion [2 Marks]

The total weight of 3 identical video tapes is 525 g.  
Work out the total weight of 5 of these video tapes.

$$\begin{aligned} 1 \text{ TAPE} &= \frac{525}{3} \\ &= 175 \end{aligned}$$

→

$$\begin{aligned} 5 \text{ TAPES} &= 175 \times 5 \\ &= \underline{\underline{875}} \\ &= \dots\dots\dots 875 \text{ g} \end{aligned}$$

(B1)

(A1)

Here is a list of ingredients for making Apple and Raspberry Crumble for 6 people.

### Apple and Raspberry Crumble

Ingredients for 6 people

120 grams	plain flour
230 grams	apples
200 grams	raspberries
160 grams	soft brown sugar
90 grams	butter

Sam wants to make Apple and Raspberry Crumble for 15 people.  
She has enough plain flour, soft brown sugar and butter.

Work out the amount of apples and the amount of raspberries Sam needs.

$$\frac{230}{6} \times 15 = \underline{\underline{575}}$$

$$\frac{200}{6} \times 15 = \underline{\underline{500}}$$

(mi)

apples ..... 575 (AD) ..... grams  
raspberries ..... 500 (AD) ..... grams

Here is a list of ingredients needed to make quiche for 6 people.

**Ingredients for 6 people.**

250 g plain flour

120 g butter

400 ml single cream

150 g cheese

6 rashers of bacon

4 Eggs

- (a) Jasper wants to make quiche for 4 people.  
Work out the amount of butter he needs.

$$\frac{120}{6} = 20 \text{ (ml)}$$

$$20 \times 4 = \underline{\underline{80}} \text{ (AI)}$$

- (b) Kirsty wants to make quiche for 15 people.  
Work out the amount of plain flour she needs.

$$\frac{250}{6} = 41.\dot{6} \text{ (ml)}$$

$$41.\dot{6} \times 15 = \underline{\underline{625}} \text{ (AI)}$$

- (c) Tommy makes quiche for a group of his friends.  
He uses 325 g of cheese.  
Work out the number of friends in the group.

$$\frac{325}{150} = 2.1\dot{6} \text{ (ml)}$$

$$2.1\dot{6} \times 6 = \underline{\underline{13}} \text{ (AI)}$$

1 euro = 120 yen
£1 = 1.2 euros

Change £50 to yen.

$$£1 = 1.2 \text{ EUROS}$$

$$£50 = 1.2 \times 50$$

$$= \underline{\underline{60 \text{ EUROS}}}$$

(B1)

$$1 \text{ EURO} = 120 \text{ YEN}$$

$$60 \text{ EURO} = 120 \times 60$$

$$= \underline{\underline{7200 \text{ YEN}}}$$

(A1)

..... yen

Eric travels from the UK to India every year.

In 2010, the exchange rate was £1 = 67.1 rupees.

In 2012, the exchange rate was £1 = 82.5 rupees.

In 2010 Eric changed £600 into rupees.

How many pounds (£) did Eric have to change to rupees in 2012 to get the same number of rupees as he did in 2010?

2010

$$600 \times 67.1 = 40260 \text{ (M)}$$

2012

$$\text{NEEDS } 40260 \text{ RUPEES} = \frac{40260}{82.5} \text{ (M)}$$

$$= \underline{\underline{£488}} \text{ (A)}$$

Here are the ingredients needed to make Apple Fool for 6 people.

Apple Fool
Ingredients for 6 people
900 g cooking apples
100 g sugar
300 ml double cream

(a) Work out the amount of sugar needed to make Apple Fool for 15 people.

$$\frac{100}{6} \times 15 \quad (m)$$

$$\begin{array}{r} 250 \\ \hline \end{array} \text{g} \quad (A)$$

(2)

(b) Work out the amount of cooking apples needed to make Apple Fool for 5 people.

$$\frac{900}{6} \times 5 \quad (m)$$

$$\begin{array}{r} 750 \\ \hline \end{array} \text{g} \quad (A)$$

(2)

1 euro = £0.72
£1 = 221 Sri Lankan rupees

Change 50 euros to Sri Lankan rupees.

$$\begin{aligned} 50 \text{ euros} &= 50 \times 0.72 \\ &= \underline{\underline{£36}} \quad (A1) \end{aligned}$$

$$\begin{aligned} \text{£}36 &= 36 \times 221 \text{ rupees} \\ &= \underline{\underline{7956}} \end{aligned}$$

$$\dots\dots\dots 7956 \quad (A1) \text{ Sri Lankan rupees}$$

Here is a list of the ingredients needed to make leek and potato soup for 6 people.

Leek and Potato Soup
Ingredients for 6 people
900 ml chicken stock
900 ml water
750 g leeks
350 g potatoes
350 g onions

(a) Ainsley wants to make leek and potato soup for 13 people.

Work out the amount of chicken stock he needs.

$$\frac{900}{6} = 150 \quad (BI)$$

$$150 \times 13 =$$

$$\begin{array}{r} 1950 \\ \hline \hline \end{array} \quad (AI) \quad \text{ml} \\ (2)$$

(b) Delia makes leek and potato soup for a group of people.

She uses 1250 g of leeks.

Work out the number of people in the group.

$$(MI) \quad \frac{1250}{750} = 1.\dot{6}$$

$$1.\dot{6} \times 6 =$$

$$\underline{\underline{10}} \quad (AI)$$



$$£1 = 2.61 \text{ New Zealand dollars}$$

$$£1 = 1.45 \text{ euros}$$

Change 630 New Zealand dollars to euros.

$$\begin{aligned} \$630 &= \frac{630}{2.61} \\ &= \text{£}241.379\dots \\ &= 241.379 \times 1.45 \\ &= \underline{\underline{350 \text{ euros}}} \end{aligned}$$

$$\dots\dots\dots 350 \text{ euros}$$

Here is a list of the ingredients needed to make lentil soup for 6 people.

Lentil Soup (for 6 people)
120 g lentils
300 g carrots
800 ml vegetable stock
3 onions

Jenny wants to make lentil soup for 24 people.

(a) Work out the amount of vegetable stock she needs.

$$\frac{800}{6} \times 24 \text{ ml}$$

$$\begin{array}{r} 3200 \text{ ml} \\ \hline (2) \end{array} \text{ (A)}$$

Ravi is going to make lentil soup.  
He uses 450 g of carrots.

(b) How many people is Ravi making the lentil soup for?

$$\frac{450}{300} = 1.5 \text{ ml}$$

$$6 \times 1.5 = 9$$

$$\begin{array}{r} 9 \\ \hline (2) \end{array} \text{ (A)}$$

Here are the ingredients needed to make 12 muffins.

Ingredients to make 12 muffins
300 g flour
150 g sugar
250 ml milk
100 g butter
2 eggs

Sarah makes 60 muffins.  $\rightarrow 12 \times 5!$

(a) Work out how much sugar she uses.

$$\begin{array}{r} 5 \times 150 \\ \hline \end{array}$$

(m)

$$\begin{array}{r} 750 \\ \hline \end{array} \text{ g}$$

(2) (A1)

James makes some muffins.  
He uses 625 ml of milk.

(b) How many muffins did he make?

$$\text{(m)} \left[ \frac{625}{250} = 2.5 \text{ BATCHES} \right]$$

$$= 2.5 \times 12 \longrightarrow \begin{array}{r} 30 \\ \hline \end{array}$$

(2) (A1)

Here is a list of ingredients needed to make 16 cookies.

Ingredients for 16 cookies
120 g butter
150 g sugar
240 g flour
170 g chocolate
1 egg

Max wants to make 40 cookies.

(a) How much flour does Max need?

$$\frac{240}{16} \times 40 \quad (M1)$$

$$\begin{array}{r} 600 \quad (A1) \\ \hline (2) \end{array} \text{ g}$$

Abby made cookies to sell at a school fair.  
She used 600 g of butter.

(b) How many cookies did she make?

$$\frac{600}{120} \times 16 \quad (M1)$$

$$\begin{array}{r} 80 \quad (A1) \\ \hline (2) \end{array}$$

(c) Find the ratio of the weight of sugar to the weight of flour in the list of ingredients.  
Give your answer in the form 1 : n

$$\begin{array}{l} S : F \\ 150 : 240 \\ \div 150 \quad \left( \begin{array}{l} \swarrow \\ \searrow \end{array} \right) \quad \div 150 \quad (M1) \\ 1 : 1.6 \end{array}$$

$$1 : \begin{array}{r} 1.6 \quad (A1) \\ \hline (2) \end{array}$$

1 US Dollar = £0.65
£1 = 1.35 Euro
£1 = 11.60 Norwegian Krona

(a) Change 200 US Dollars into Norwegian Krona.

$$\begin{aligned}
 200 \text{ USD} &= 200 \times 0.65 \\
 &= \text{£}130 \text{ (M)} \\
 \text{£}130 &= 130 \times 11.6 \\
 &= \underline{\underline{1508 \text{ Nok}}} \text{ (A)}
 \end{aligned}$$

(b) Change 750 Norwegian Krona into Euros.

$$\begin{aligned}
 750 \text{ Nok} &= \frac{750}{11.6} \\
 &= \text{£}64.655 \dots \text{ (M)} \\
 &\rightarrow = 64.655 \times 1.35 \\
 &= 87.2844 \\
 &= \underline{\underline{87.28 \text{ EURO}}} \text{ (A)} \\
 &\dots\dots\dots (2)
 \end{aligned}$$

(c) Change 500 Euros into US Dollars.

$$\begin{aligned}
 500 \text{ EURO} &= \frac{500}{1.35} \\
 &= \text{£}370.37 \text{ (M)} \\
 &\rightarrow = \frac{370.37}{0.65} \\
 &= 569.8005 \dots \\
 &= \underline{\underline{\$569.80}} \text{ (A)} \\
 &\dots\dots\dots (2)
 \end{aligned}$$

Jalin lives in England.

He does a search on the internet and sees the same type of camera on sale in France and in America.

In France, the camera costs 126 euros.

In America, the camera costs \$165.24

Jalin finds out these exchange rates.

**Exchange rates**

1 euro = £0.89

£1 = \$1.62

How much cheaper is the camera in America than in France?  
Give your answer in pounds (£).

IN FRANCE

$$€ 126 = 126 \times 0.89$$

$$= \underline{\underline{£112.14}} \text{ (B1)}$$

IN AMERICA

$$\$ 165.24 = \frac{165.24}{1.62}$$

$$= \underline{\underline{£102.00}} \text{ (B1)}$$

AMERICA IS

CHEAPER BY (M1)

$$112.14 - 102$$

$$= \underline{\underline{£10.14}} \text{ (A1)}$$

John changes £450 to euros.

The exchange rate is £1 = 1.16 euros.

(a) Change £450 to euros.

$$450 \times 1.16 \quad (\text{M1})$$

$$\begin{array}{r} 522 \quad (\text{A1}) \\ \hline \end{array} \text{ euros} \\ (2)$$

When in Amsterdam, John uses his credit card to pay for a ring costing 850 euros.

He has to pay a bank charge of £3.50 for using his credit card in addition to the cost of the ring.

(b) Work out the total cost, in pounds (£), of the ring and the bank charge.

$$(\text{M1}) \quad \left| \frac{850}{1.16} = 732.76 \right.$$

$$732.76 + \frac{3.50}{(\text{M1})} = \underline{\underline{£736.26}} \quad (\text{A1})$$

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Sometimes a method used in these solutions might be unfamiliar to You. If You are able to use a different method to obtain the correct answer then You should consider to keep using your existing method and not change to the method that is used here. However, the choice of method is always up to You and it is often useful if You know more than one method to solve a particular type of problem.

Within these solutions there is an indication of where marks **might** be awarded for each question. B marks, M marks and A marks have been used in a similar, but **not identical**, way that an exam board uses these marks within their mark schemes. This slight difference in the use of these marking symbols has been done for simplicity and convenience. Sometimes B marks, M marks and A marks have been interchanged, when compared to an examiners’ mark scheme and sometimes the marks have been awarded for different aspects of a solution when compared to an examiners’ mark scheme.

B1 - This is an unconditional accuracy mark (the specific number, word or phrase must be seen. This type of mark cannot be given as a result of ‘follow through’).

M1 - This is a method mark. Method marks have been shown in places where they might be awarded for the method that is shown. If You use a different method to get a correct answer, then the same number of method marks would be awarded but it is not practical to show all possible methods, and the way in which marks might be awarded for their use, within these particular solutions. When appropriate, You should seek clarity and download the relevant examiner mark scheme from the exam board’s web site.

A1 - These are accuracy marks. Accuracy marks are typically awarded after method marks. If the correct answer is obtained, then You should normally (but not always) expect to be awarded all of the method marks (provided that You have shown a method) and all of the accuracy marks.

Note that some questions contain the words ‘show that’, ‘show your working out’, or similar. These questions require working out to be shown. Failure to show sufficient working out is likely to result in no marks being awarded, even if the final answer is correct.

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