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GCSE MATHS

Ratio, proportion and rates of change

Edexcel 1MA1 | Subtopic collection Topic 34

# Direct and inverse proportion

## Foundation tier

Past paper question booklet

| 23 | 2012-2025 | Foundation |
| --- | --- | --- |
| question groups | available papers | tier |

### Before you begin

1. Show working and use units where appropriate.
2. Use extra paper if you need more space.
3. Print at actual size (100%) for measurement questions.

**Name** _____ **Date** _____

Whole questions are retained for context; some parts cover other points. Legacy sources are labelled.

**16** Here is a list of ingredients needed to make 12 scones.

**Ingredients for 12 scones**

220 g self-raising flour
40 g butter
150 m*l* milk
2 tablespoons sugar

Viv is making scones for 15 people.
She is making 2 scones for each person.

Work out the amount of each ingredient she needs.

Self-raising flour ..... g

Butter ..... g

Milk ..... m*l*

Tablespoons of sugar .....

**(Total for Question 16 is 3 marks)**

**23** Here are the ingredients needed to make 12 shortcakes.

**Shortcakes**

Makes **12** shortcakes

50 g of sugar
200 g of butter
200 g of flour
10 m*l* of milk

Liz makes some shortcakes.
She uses 25 m*l* of milk.

(a) How many shortcakes does Liz make?

.....

**(2)**

Robert has
500 g of sugar
1000 g of butter
1000 g of flour
500 m*l* of milk

(b) Work out the greatest number of shortcakes Robert can make.

.....

**(2)**

**(Total for Question 23 is 4 marks)**

**23** Here are the ingredients needed to make 16 gingerbread men.

Ingredients
to make **16** gingerbread men

180 g flour
40 g ginger
110 g butter
30 g sugar

Hamish wants to make 24 gingerbread men.

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

.....g flour

.....g ginger

.....g butter

.....g sugar

**(Total for Question 23 is 3 marks)**

**13** Here is a list of ingredients for making apple crumble for 2 people.

**Apple Crumble**
**for 2 people**

10 ounces apples
4 ounces flour
2 ounces sugar
1 ounce butter
1 tablespoon water
1 teaspoon baking powder

| | | |
|---|---|---|
| 1 ounce | = | 28 grams |
| 1 tablespoon | = | 15 m*l* |
| 1 teaspoon | = | 5 m*l* |

Anne is going to make apple crumble for 5 people.

(a) Work out how much flour she needs.
Give your answer in grams.

..... grams
**(3)**

David is making an apple crumble.
He uses 140 grams of butter.

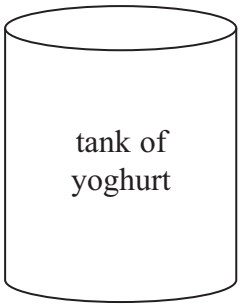
(b) Work out how many people he is making apple crumble for.

.....

**(2)**

**(Total for Question 13 is 5 marks)**

***14** A factory makes yoghurt in a tank.




Here are the weights of the ingredients needed to make a tank full of yoghurt.

| | |
|---|---|
| Milk | 80 kg |
| Skimmed milk powder | 2 kg |
| Sugar | 3 kg |
| Stabiliser | 1 kg |
| Fruit | 10 kg |

The yoghurt from the tank is put into pots.
Each 1 kg of the yoghurt is used to fill 8 pots.

Is there enough yoghurt in the tank to fill 750 pots?
You must show all your working.

**(Total for Question 14 is 4 marks)**

***22** Here is a list of ingredients for making 18 mince pies.

| **Ingredients for 18 mince pies** |
|---|
| 225 g of butter |
| 350 g of flour |
| 100 g of sugar |
| 280 g of mincemeat |
| 1 egg |

Elaine wants to make 45 mince pies.

Elaine has

1 kg of butter
1 kg of flour
500 g of sugar
600 g of mincemeat
6 eggs

Does Elaine have enough of each ingredient to make 45 mince pies?
You must show clearly how you got your answer.

**(Total for Question 22 is 4 marks)**

**17** Here are the ingredients needed to make 16 chocolate biscuits.

**Chocolate biscuits**

Makes **16** chocolate biscuits

100 g of butter
50 g of caster sugar
120 g of flour
15 g of cocoa

Sabrina has 250 g of butter
300 g of caster sugar
600 g of flour
and 60 g of cocoa

Work out the greatest number of chocolate biscuits Sabrina can make.
You must show your working.

.....

**(Total for Question 17 is 3 marks)**

**21** Suha has a full 600 m*l* bottle of wallpaper remover.
She is going to mix some of the wallpaper remover with water.

Here is the information on the label of the bottle.

**Wallpaper remover**
600 m*l*

Mix $\frac{1}{4}$ of the wallpaper remover
with 4500 m*l* of water

Suha is going to use 750 m*l* of water.

How many millilitres of wallpaper remover should Suha use?
You must show your working.

..... m*l*

**(Total for Question 21 is 4 marks)**

**20** Here are the ingredients needed to make 10 pancakes.

**Pancakes**

Ingredients to make **10** pancakes

| | |
|---|---|
| 300 m*l* | of milk |
| 120 g | of flour |
| 2 | eggs |

Matthew makes 30 pancakes.

(a) Work out how much flour he uses.

.....g

**(2)**

Tara makes some pancakes.
She uses 750 m*l* of milk.

(b) Work out how many pancakes she makes.

.....

**(2)**

**(Total for Question 20 is 4 marks)**

**19** Here are the ingredients needed to make **8** shortbread biscuits.

| Shortbread biscuits<br>makes **8** biscuits |
|---|
| 120 g butter<br>60 g caster sugar<br>180 g flour |

Tariq is going to make some shortbread biscuits.
He has the following ingredients

330 g butter  200 g caster sugar  450 g flour

Work out the greatest number of shortbread biscuits that Tariq can make with his ingredients.
You must show all your working.

..... biscuits

**(Total for Question 19 is 3 marks)**

**12** Breakfast cereal is put into packets.
1 kg of the cereal is used to fill 20 packets.

(a) Work out the number of **grams** of cereal in each packet.

..... g
**(2)**

Here are the weights of the ingredients needed to make 100 kg of the cereal.

| | |
|---|---|
| oats | 28 kg |
| wheat flakes | 19 kg |
| barley flakes | 15 kg |
| fruit | 19 kg |
| nuts | 8 kg |
| seeds | 4 kg |
| other | 7 kg |

(b) Work out the weight of oats needed to fill 5000 packets of the cereal.
Give your answer in kg.

..... kg
**(3)**

**(Total for Question 12 is 5 marks)**

**19** Here is a list of ingredients for making 16 flapjacks.

| **Ingredients for 16 flapjacks** |
| --- |
| 120 g butter<br>140 g brown sugar<br>250 g oats<br>2 tablespoons syrup |

Jenny wants to make 24 flapjacks.

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

butter ..... g

brown sugar ..... g

oats ..... g

syrup ..... tablespoons

**(Total for Question 19 is 3 marks)**

**17** Here is the list of ingredients for making 30 biscuits.

| Ingredients for 30 biscuits |
| --- |
| 225 g butter<br>110 g caster sugar<br>275 g plain flour<br>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.

.....

**(Total for Question 17 is 3 marks)**

**19** 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.

.....

**(Total for Question 19 is 3 marks)**

**28** The number of days, $d$, that it will take to build a house is given by

$$d = \frac{720}{n}$$

where $n$ is the number of workers used each day.

Ali's company will take 40 days to build the house.
Hayley's company will take 30 days to build the house.

Hayley's company will have to use more workers each day than Ali's company.

How many more?

.....

**(Total for Question 28 is 3 marks)**

**26** 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.

**(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.

.....

.....

.....

**(1)**

**(Total for Question 26 is 5 marks)**

**17** Heidi wants to make some biscuits using this recipe.

| Makes 12 biscuits |
| --- |
| 125 g butter<br>200 g flour<br>50 g sugar |

Heidi thinks that she has,

500 g butter
700 g flour
250 g sugar

Assuming that these weights are correct,

(a) work out the greatest number of biscuits Heidi can make.
You must show all your working.

.....

**(4)**

Heidi is wrong.
She has more than 250 g of sugar.

(b) Does this affect the greatest number of biscuits Heidi can make?
Give a reason for your answer.

.....

.....

.....

**(1)**

**(Total for Question 17 is 5 marks)**

**18** Here is a list of ingredients for making 10 scones.

**Ingredients for 10 scones**

| | |
|---|---|
| 75 g | butter |
| 350 g | self-raising flour |
| 40 g | sugar |
| 150 m*l* | milk |
| 2 | eggs |

Mia wants to make 25 scones.
Work out how much sugar she needs.

..... g

**(Total for Question 18 is 2 marks)**

**20** Here is a list of ingredients for making 10 scones.

| **Ingredients for 10 scones** |
| --- |
| 80 g butter |
| 350 g self-raising flour |
| 30 g sugar |
| 2 eggs |

Martin has

100 g butter
1 kg self-raising flour
50 g sugar
4 eggs

Martin wants to make 25 scones.
He has not got enough of some of the ingredients.

Work out how much more of each of these ingredients he needs.

**(Total for Question 20 is 4 marks)**

**16** Here is the list of ingredients for making 20 biscuits.

| Ingredients for 20 biscuits |
| --- |
| 150 g butter<br>100 g sugar<br>250 g flour |

Harry wants to make 60 biscuits.

How much flour does Harry need?

..... g

**(Total for Question 16 is 2 marks)**

**10** Here are the ingredients needed to make 20 peanut butter cookies.

| Makes 20 cookies |
| --- |
| 250 g peanut butter<br>200 g sugar<br>2 small eggs |

Derek wants to make 60 cookies.

He has 900 g of peanut butter.

Does Derek have enough peanut butter to make 60 cookies?
You must show how you get your answer.

**(Total for Question 10 is 3 marks)**

**17** Here are the ingredients needed to make 20 shortbread biscuits.

| **Ingredients for 20 shortbread biscuits** | |
|---|---|
| 120 g | of butter |
| 200 g | of flour |
| 50 g | of sugar |

Heidi wants to make 30 shortbread biscuits.

How much of each ingredient will Heidi need?

butter ..... g

flour ..... g

sugar ..... g

**(Total for Question 17 is 3 marks)**

**17** Sam wants to use this recipe to make 15 pancakes.

| **Ingredients for 10 pancakes** |
| --- |
| 100 g flour |
| 200 m*l* milk |
| 40 g butter |
| 2 eggs |

Sam has

200 g flour
250 m*l* milk
70 g butter
5 eggs

Does Sam have enough flour, enough milk, enough butter and enough eggs to make 15 pancakes?
You must show all your working.

**(Total for Question 17 is 3 marks)**