

# Direct/Indirect Proportion Worksheet

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Topic tags have been given for each question to enable you to know if you can do the question or whether you need to wait to cover the additional topic(s).

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Direct Proportion

Paper: Paper-1H-Non-Calculator / Series: 2022-November / Difficulty: Easy / Question Number: 5

**5** 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
<b>A</b>	23
<b>B</b>	15
<b>C</b>	30
<b>D</b>	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.

**(Total for Question 5 is 2 marks)**

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Direct Proportion, Substitution

Paper: Paper-2H-Calculator / Series: Specimen-Set-2 / Difficulty: Easy / Question Number: 14

**14**  $D$  is directly proportional to the cube of  $n$ .

Mary says that when  $n$  is doubled, the value of  $D$  is multiplied by 6

Mary is wrong.

Explain why.

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(1)

**(Total for Question 14 is 1 mark)**

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Inverse Proportion

Paper: Paper-3H-Calculator / Series: 2023-November / Difficulty: Medium / Question Number: 6

**6** A company orders a large number of plates from a factory.

It would take 30 hours to make all the plates using 4 machines.

How many machines are needed to make all the plates in 6 hours?

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**(Total for Question 6 is 2 marks)**

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Substitution, Inverse Proportion

Paper: Paper-3H-Calculator / Series: 2019-November / Difficulty: Medium / Question Number: 16

**16**  $y$  is inversely proportional to the square of  $x$ .

$$y = 8 \text{ when } x = 2.5$$

Find the negative value of  $x$  when  $y = \frac{8}{9}$

(Total for Question 16 is 3 marks)

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Qualification: IGCSE Edexcel A Higher

Areas: Ratio and Proportion

Subtopics: Direct Proportion, Substitution

Paper: Paper-2H / Series: 2022-June / Difficulty: Medium / Question Number: 17

**17**  $M$  varies directly as the cube of  $h$

$M = 4$  when  $h = 0.5$

Find the value of  $h$  when  $M = 500$

.....  
**(Total for Question 17 is 4 marks)**

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Qualification: IGCSE Edexcel A Higher

Areas: Ratio and Proportion

Subtopics: Direct Proportion

Paper: Paper-1H / Series: 2019-January / Difficulty: Medium / Question Number: 14

**14**  $T$  is directly proportional to the cube of  $r$

$$T = 21.76 \text{ when } r = 4$$

(a) Find a formula for  $T$  in terms of  $r$

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

(b) Work out the value of  $T$  when  $r = 6$

.....  
**(1)**

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

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Inverse Proportion, Substitution

Paper: Paper-1H-Non-Calculator / Series: Specimen-Set-2 / Difficulty: Medium / Question Number: 10

**10**  $y$  is inversely proportional to  $x$

When  $x = 1.5$ ,  $y = 36$

Find the value of  $y$  when  $x = 6$

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

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Inverse Proportion, Substitution

Paper: Paper-2H-Calculator / Series: Sample-Set-2 / Difficulty: Medium / Question Number: 13

**13**  $d$  is inversely proportional to  $c$

When  $c = 280$ ,  $d = 25$

Find the value of  $d$  when  $c = 350$

$d = \dots$

**(Total for Question 13 is 3 marks)**

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Qualification: IGCSE Edexcel A Higher

Areas: Ratio and Proportion

Subtopics: Direct Proportion, Substitution

Paper: Paper-2H / Series: 2024-June / Difficulty: Medium / Question Number: 17

**17**  $Q$  is directly proportional to the square root of  $d$

$$Q = 4.5 \text{ when } d = 324$$

Find a formula for  $Q$  in terms of  $d$

(Total for Question 17 is 3 marks)

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Qualification: IGCSE Edexcel A Higher

Areas: Ratio and Proportion

Subtopics: Inverse Proportion, Substitution

Paper: Paper-1HR / Series: 2023-June / Difficulty: Medium / Question Number: 17

**17**  $F$  is inversely proportional to the square of  $r$

$$F = 36 \text{ when } r = 4$$

(a) Find a formula for  $F$  in terms of  $r$

.....  
(3)

(b) Work out the value of  $F$  when  $r = 48$

.....  
(1)

**(Total for Question 17 is 4 marks)**

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Qualification: IGCSE Edexcel A Higher

Areas: Ratio and Proportion

Subtopics: Inverse Proportion, Substitution, Direct Proportion

Paper: Paper-1HR / Series: 2023-January / Difficulty: Medium / Question Number: 19

**19**  $P$  is inversely proportional to  $y^2$   
 When  $y = 4$ ,  $P = a$

(a) Find a formula for  $P$  in terms of  $y$  and  $a$

.....  
 (3)

Given also that  $y$  is directly proportional to  $x$   
 and when  $x = a$ ,  $P = 4a$

(b) find a formula for  $P$  in terms of  $x$  and  $a$

.....  
 (3)

**(Total for Question 19 is 6 marks)**

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Inverse Proportion, Money Problems

Paper: Paper-2H-Calculator / Series: 2017-November / Difficulty: Medium / Question Number: 9

9 Yesterday it took 5 cleaners  $4\frac{1}{2}$  hours to clean all the rooms in a hotel.

There are only 3 cleaners to clean all the rooms in the hotel today.

Each cleaner is paid £8.20 for each hour or part of an hour they work.

How much will each cleaner be paid today?

£ .....

**(Total for Question 9 is 3 marks)**

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Direct Proportion

Paper: Paper-1H-Non-Calculator / Series: 2019-June / Difficulty: Medium / Question Number: 2

**2** 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.

..... 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?

.....  
(2)

**(Total for Question 2 is 5 marks)**

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Inverse Proportion

Paper: Paper-2H-Calculator / Series: 2022-June / Difficulty: Medium / Question Number: 11

**11** Kieron has 13 workers he can use for a job.

He knows that 6 workers would take  $14\frac{1}{2}$  days to complete this job.

Show that Kieron has enough workers to finish this job in less than 7 days.

**(Total for Question 11 is 3 marks)**

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Direct Proportion, Spotting Errors In Working Out

Paper: Paper-2H-Calculator / Series: 2022-November / Difficulty: Medium / Question Number: 15

**15** Faiza is studying the population of rabbits in a park.  
She wants to estimate the number of rabbits in the park.

On Monday she catches a random sample of 20 rabbits in the park, marks each rabbit with a tag and releases them back into the park.

On Tuesday she catches a random sample of 42 rabbits in the park.  
12 of the rabbits are marked with a tag.

(a) Find an estimate for the number of rabbits in the park.

.....  
(3)

Albie is studying the population of rabbits in a wood.

One day, he catches 55 rabbits and finds that 40 of these rabbits are marked with a tag.

Albie estimates there are 50 rabbits in the wood.

(b) Explain why Albie's estimate cannot be correct.

.....  
.....  
.....  
(1)

**(Total for Question 15 is 4 marks)**

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Direct Proportion, Percentages - Percentage Change

Paper: Paper-1H-Non-Calculator / Series: 2020-November / Difficulty: Somewhat Challenging / Question Number: 18

**18**  $x$  is proportional to  $\sqrt{y}$  where  $y > 0$

$y$  is increased by 44%

Work out the percentage increase in  $x$ .

.....%

**(Total for Question 18 is 3 marks)**

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Qualification: IGCSE Edexcel A Higher

Areas: Ratio and Proportion

Subtopics: Direct Proportion, Substitution

Paper: Paper-2H / Series: 2019-June / Difficulty: Somewhat Challenging / Question Number: 17

**17**  $y$  is directly proportional to the cube of  $x$

$$y = 20h \text{ when } x = h \quad (h \neq 0)$$

(a) Find a formula for  $y$  in terms of  $x$  and  $h$

$$y = \dots$$

(3)

(b) Find  $x$  in terms of  $h$  when  $y = 67.5h$

Give your answer in its simplest form.

$$x = \dots$$

(2)

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

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Qualification: IGCSE Edexcel A Higher

Areas: Ratio and Proportion

Subtopics: Direct Proportion, Probability

Paper: Paper-1H / Series: 2020-November / Difficulty: Somewhat Challenging / Question Number: 2

2 Toy cars are made in a factory.  
The toy cars are made for 15 hours each day.  
5 toy cars are made every 12 seconds.

For the toy cars made each day, the probability of a toy car being faulty is 0.002

Work out an estimate of the number of faulty toy cars that are made each day.

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(Total for Question 2 is 4 marks)

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Qualification: GCSE Edexcel Higher

Areas: Number

Subtopics: Direct Proportion, Profit Calculation, Money Problems, Percentages

Paper: Paper-2H-Calculator / Series: Sample-Set-1 / Difficulty: Somewhat Challenging / Question Number: 3

3 Jane made some almond biscuits which she sold at a fête.

She had:

5 kg of flour  
3 kg of butter  
2.5 kg of icing sugar  
320 g of almonds

Here is the list of ingredients for making 24 almond biscuits.

Ingredients for 24 almond biscuits  
150 g flour  
100 g butter  
75 g icing sugar  
10 g almonds

Jane made as many almond biscuits as she could, using the ingredients she had.

(a) Work out how many almond biscuits she made.

(3)

Jane sold 70% of the biscuits she made for 25p each.

She sold the other 30% at 4 for 55p.

The ingredients Jane used cost her £45 and the total of all other costs was £27

(b) Work out the percentage profit.

(6)

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(Total for Question 3 is 9 marks)

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Qualification: GCSE Edexcel Higher

Areas: Ratio and Proportion

Subtopics: Inverse Proportion, Direct Proportion, Substitution

Paper: Paper-1H-Non-Calculator / Series: 2019-June / Difficulty: Hard / Question Number: 20

**20**  $h$  is inversely proportional to  $p$   
 $p$  is directly proportional to  $\sqrt{t}$

Given that  $h = 10$  and  $t = 144$  when  $p = 6$   
find a formula for  $h$  in terms of  $t$

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

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Qualification: IGCSE Edexcel A Higher

Areas: Ratio and Proportion

Subtopics: Inverse Proportion, Direct Proportion, Substitution, Surds

Paper: Paper-2HR / Series: 2022-January / Difficulty: Hard / Question Number: 20

**20**  $y$  is inversely proportional to  $\sqrt{x}$   
 $x$  is directly proportional to  $T^3$

Given that  $y = 8$  when  $T = 25$

find the exact value of  $T$  when  $y = 27$

$T = \dots$

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

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Qualification: IGCSE Edexcel A Higher

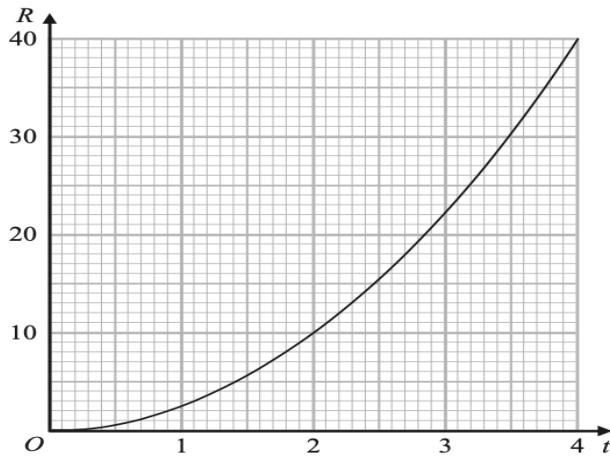
Areas: Ratio and Proportion

Subtopics: Proportion Graphs, Direct Proportion

Paper: Paper-2H / Series: 2018-June / Difficulty: Hard / Question Number: 16

**16**  $R$  is proportional to  $t^2$

The graph shows the relationship between  $R$  and  $t$  for  $0 \leq t \leq 4$



(a) Find a formula for  $R$  in terms of  $t$ .

(3)

Given also that  $R = \frac{8}{5x}$

(b) show that  $t$  is inversely proportional to  $\sqrt{x}$  for  $t > 0$

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(2)

(Total for Question 16 is 5 marks)



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