Direct/Indirect Proportion Worksheet

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Questions in past papers often come up combined with other topics.
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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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
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.

....

(Total for Question 5 is 2 marks)

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.

....

....

....

(1)

(Total for Question 14 is 1 mark)

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?

....

(Total for Question 6 is 2 marks)

16 y is inversely proportional to the square of x.

$y = 8$ when $x = 2.5$

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

....

(Total for Question 16 is 3 marks)

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)

14 T is directly proportional to the cube of r

$T = 21.76$ 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)

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)

13 d is inversely proportional to c

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

Find the value of d when $c = 350$

$d = $ ....

(Total for Question 13 is 3 marks)

17 Q is directly proportional to the square root of d

$Q = 4.5$ when $d = 324$

Find a formula for Q in terms of d

....

(Total for Question 17 is 3 marks)

17 F is inversely proportional to the square of r

$F = 36$ 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)

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)

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)

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)

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)

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)

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)

17 y is directly proportional to the cube of x

$y = 20h$ when $x = h$ $(h \neq 0)$

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

$y = $..

(3)

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

Give your answer in its simplest form.

$x = $..

(2)

(Total for Question 17 is 5 marks)

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.

....

(Total for Question 2 is 4 marks)

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)

(Total for Question 3 is 9 marks)

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

(Total for Question 20 is 4 marks)

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 = $ ....

(Total for Question 20 is 4 marks)

16 R is proportional to t^2

The graph shows the relationship between R and t for $0 \leqslant t \leqslant 4$
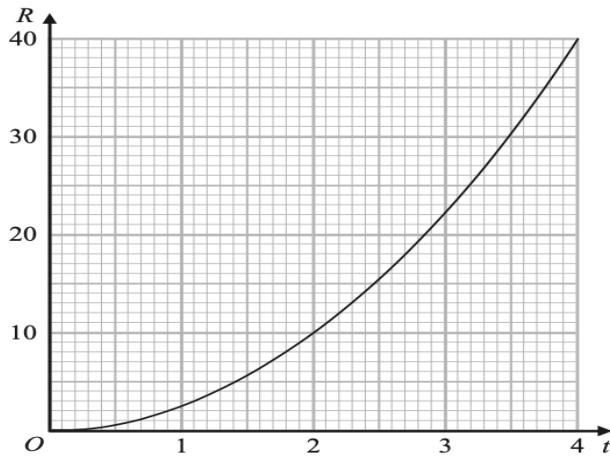
(a) Find a formula for R in terms of t.

....

(3)

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

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

(2)

(Total for Question 16 is 5 marks)