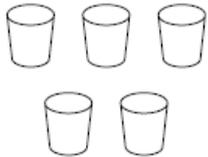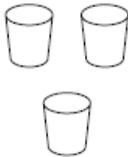# Ratio and Proportion (H)

Intervention Booklet

Best Buys

Things to remember:
- Work out the price per unit of each item.
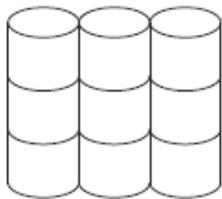- Select the cheapest one!

Questions:

1. Two shops, Food Mart and Jim's Store, both sell Kreemy Yoghurts.

At which shop are Kreemy Yoghurts the better value for money? You must show all your working.

(3 marks)

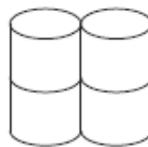**2.** A pack of 9 toilet rolls costs £4.23   A pack of 4 toilet rolls costs £1.96

Which pack gives the better value for money? You must show all your working.

(3 marks)

3. T-shirts normally cost £12 each.
Two shops have a special offer on these T-shirts.

Special Offer 1/3 off normal price	**Special Offer** Pay for two T-shirts and get one free Pay for five T-shirts and get three free

Stephen wants to buy 30 T-shirts.
Work out at which shop, Stephen will get the better deal. You must show clearly how you got your answer.

(4 marks)

4. Radox Handwash cost is on offer at Boots and Superdrug.
Boots   500ml bottles on offer at 3 for 2
Superdrug   300ml bottles on offer at buy one get one free
Where is the handwash better value, at Boots or Superdrug? You must show your working.

(4 marks)

5. Diet Coke is on offer at Morrisons and Sainsburys.
Morrisons: 2 litre bottles on offer 3 for £4.50
Sainsburys: 24 cans x 330ml on offer for £8.85

(4 marks)

6. Thomas wants to buy an iPod.
The iPod that Thomas wants is sold in two different shops.

Pod Direct 15% off usual price of £120	**Music City** £84 plus VAT at 17½%

Work out the difference in the cost of the iPod at the two shops..

7. Railtickets and Cheaptrains are two websites selling train tickets.
Each of the websites adds a credit card charge and a booking fee to the ticket price.

Railtickets	**Cheaptrains**
Credit card charge: 2.25% of ticket price Booking fee: 80 pence	Credit card charge: 1.5% of ticket price Booking fee: £1.90

Nadia wants to buy a train ticket.
The ticket price is £60 on each website. Nadia will pay by credit card.
Will it be cheaper for Nadia to buy the train ticket from Railtickets or from Cheaptrains?

Recipes

Things to remember:
- Work out the scale factor first.
- Multiply each quantity of ingredients by the scale factor.

Questions:

1. Here is a list of ingredients for making 10 Flapjacks.

> **Ingredients for 10 Flapjacks**
>
> 80 g rolled oats
> 60 g butter
> 30 m*l* golden syrup
> 36 g light brown sugar

Work out the amount of each ingredient needed to make 15 Flapjacks.

.... g rolled oats

.... g butter

.... ml golden syrup

.... g light brown sugar

(Total 3 marks)

2. Fred has a recipe for 30 biscuits.
Here is a list of ingredients for 30 biscuits.

Self-raising flour:	230g
Butter:	150g
Caster sugar:	100g
Eggs:	2

Fred wants to make 45 biscuits.

(a) Complete his new list of ingredients for 45 biscuits.

Self-raising flour: …………………

Butter: …………………

Caster sugar: …………………

Eggs: …………………

(3)

Gill has only 1 kilogram of self-raising flour. She has plenty of the other ingredients.

(b)   Work out the maximum number of biscuits that Gill could bake.

....
(3)
(6 marks)

3.   Here is a list of ingredients for making 12 small cakes.

Ingredients for 12 small cakes
180 g margarine
180 g sugar
200 g plain flour
1 teaspoon baking powder
2 eggs

Joe is going to make 24 of the small cakes.

(a)   Work out how much margarine he needs.

.... g
(2)

Sharon is going to make 18 of the small cakes.

(b)   Work out how much flour she needs.

.... g
(2)
(Total for Question = 4 marks)

4. This is a list of ingredients for making a pear & almond crumble for 4 people.

> Ingredients for 4 people:
>
> 80 g plain flour
>
> 60 g ground almonds
>
> 90 g soft brown sugar
>
> 60 g butter
>
> 4 ripe pears

Jessica wants to make a pear & almond crumble for 10 people.
Here is a list of the amount of each ingredient Jessica has in her cupboard.

> 250 g plain flour
> 100 g ground almonds
> 200g soft brown sugar
> 150 g butter
> 8 ripe pears

Work out which ingredients Jessica needs to buy more of. You must show all of your working.

(Total for Question = 4 marks)

5. 225 grams of flour are needed to make 9 cakes.
Marian wants to make 20 of these cakes. She has 475 grams of flour.
Does Marian have enough flour to make 20 cakes? You must show all your working.

(Total for Question = 3 marks)

Exchange Rates

Things to remember:
- Foreign currency = British currency x exchange rate.

Questions:

1. Jamie goes on holiday to Florida.
The exchange rate is £1 = 1.70 dollars. He changes £900 into dollars.
(a) How many dollars should he get?

.... dollars

(2)

After his holiday Jamie changes 160 dollars back into pounds. The exchange rate is still £1 = 1.70 dollars.
(b) How much money should he get?
Give your answer to the nearest penny.

£ ....

(2)

(4 marks)

2. Tania went to Italy.
She changed £325 into euros (€). The exchange rate was £1 = €1.68
(a) Change £325 into euros (€).

€ ....

(2)

When she came home she changed €117 into pounds.
The new exchange rate was £1 = €1.50
(b) Change €117 into pounds.

£ ....

(2)

(4 marks)

3. A British family are on holiday in San Francisco.
At a café they order 3 hot dogs and 1 chicken salad. The exchange rate is £1 = $1.44
Work out their total bill in pounds (£).

£ ………………
(4 marks)

4. A student bought a pair of sunglasses in the USA. He paid $35.50
In England, an identical pair of sunglasses costs £26.99 The exchange rate is £1 = $1.42
In which country were the sunglasses cheaper, and by how much? Show all your working.

(4 marks)

5. Hugh went on holiday to Italy.
While on holiday, he went shopping. He bought a belt and a hat.
The belt cost 25 euros. The hat cost 14 euros.
The exchange rate was £1 = 1.56 euros.
Work out the total cost of the belt and the hat. Give the total cost in pounds.

£ ....
(4 marks)

6. Linda is going on holiday to the Czech Republic. She needs to change some money into koruna.
She can only change her money into 100 koruna notes. Linda only wants to change up to £200 into koruna.
She wants as many 100 koruna notes as possible. The exchange rate is £1 = 25.82 koruna.
How many 100 koruna notes should she get?

....
(6 marks)

7. Tim is travelling home from holiday by plane. He buys some food and drink on the plane.

Price List

Cheese Roll	£3.50
Crisps	£1.20
Chocolate bar	£1.30
Coffee	£2.50
Tea	£2.00
Orange Juice	£2.20

Exchange rate £1 = 1.25 euros

Tim buys two cheese rolls, a coffee and an orange juice. He pays part of the cost with a 10 euro note.
He pays the rest of the cost in pounds (£). How much does Tim pay in pounds?

£ ....
(4 marks)

8. Esther went to France.
She changed £300 into Euros (€). The exchange rate was £1 = €1.25
(a)   How many Euros did she get?

€ ....
(2)

Esther went shopping in France. She bought
     2 necklaces for €2.60 each
     1 hat for €6.40 1 bag for €9.80
The exchange rate was £1 = €1.25
(b)   Work out her total bill in pounds (£).

£ ....
(4)
(6 marks)

9. Rosie and Jim are going on holiday to the USA.
Jim changes £350 into dollars ($).
The exchange rate is £1 = $1.34
(a)   Work out how many dollars ($) Jim gets.

$ ....
(2)

In the USA Rosie sees some jeans costing $67 In London the same make of jeans costs
£47.50 The exchange rate is still £1 = $1.34
(b)   Work out the difference between the cost of the jeans in the USA and in London.
Give your answer in pounds (£).

£ ....
(3)
(5 marks)

Proportion

Things to remember:
- Start by checking the question for squares, cubes and roots;
- "x is directly proportional to y" looks like **x α y** or **x = ky**
- "x is inversely proportional to y" looks like **x α $\frac{1}{y}$** or **x = $\frac{k}{y}$**

Questions:

1. The shutter speed, *S*, of a camera varies inversely as the square of the aperture setting, *f*.
When *f* = 8, *S* = 125
(a) Find a formula for *S* in terms of *f*.

....
(3)

(b) Hence, or otherwise, calculate the value of *S* when *f* = 4

S = ...
(1)
(Total 4 marks)

2. *d* is directly proportional to the square of *t*.
d = 80 when *t* = 4
(a) Express *d* in terms of *t*.

....
(3)

(b) Work out the value of *d* when *t* = 7

d = ...
(1)

(c) Work out the positive value of *t* when *d* = 45

t = ...
(2)
(Total 6 marks)

3. The distance, D, travelled by a particle is directly proportional to the square of the time, t, taken. When $t = 40$, $D = 30$

(a) Find a formula for D in terms of t.

$D =$ ....

(3)

(b) Calculate the value of D when $t = 64$

....

(1)

(c) Calculate the value of t when $D = 12$
Give your answer correct to 3 significant figures.

....

(2)

(Total 6 marks)

4. The time, T seconds, it takes a water heater to boil some water is directly proportional to the mass of water, m kg, in the water heater. When $m = 250$, $T = 600$

(a) Find T when $m = 400$

$T =$ ....

(3)

The time, T seconds, it takes a water heater to boil a constant mass of water is inversely proportional to the power, P watts, of the water heater.
When $P = 1400$, $T = 360$

(b) Find the value of T when $P = 900$

$T =$ ....

(3)

(Total 6 marks)

5. A ball falls vertically after being dropped.
The ball falls a distance *d* metres in a time of *t* seconds.
d is directly proportional to the square of *t*.
The ball falls 20 metres in a time of 2 seconds.
(a)   Find a formula for *d* in terms of *t*.

d = ...
(3)

(b)   Calculate the distance the ball falls in 3 seconds.

.... m
(1)

(c)   Calculate the time the ball takes to fall 605 m.

.... seconds
(3)
(Total 7 marks)

6.   In a spring, the tension (*T* newtons) is directly proportional to its extension (*x* cm). When the tension is 150 newtons, the extension is 6 cm.
(a)   Find a formula for *T* in terms of *x*.

T = ...
(3)

(b)   Calculate the tension, in newtons, when the extension is 15 cm.

....newtons
(1)

(c)   Calculate the extension, in cm, when the tension is 600 newtons.

....cm
(1)
(Total 5 marks)