

## 3A3 Home Learning

### Problem Solving

#### Addition, Subtraction, Multiplication & Division

In the following exercise you will have to carefully read each problem and decide whether to use +, -, × or ÷ to solve it.

Examples :-

Jason earns £20 563 per year. Jan gets an annual salary of £24 168.

1. What is their combined pay ?

This is a + problem.

$$\begin{array}{r} £20\,563 \\ + £24\,168 \\ \hline £44\,731 \end{array}$$

Combined pay is £44 731.

2. How much **more** than Jason does Jan earn ?

This is a - problem.



$$\begin{array}{r} £24\,168 \\ - £20\,563 \\ \hline £\,3\,605 \end{array}$$

Jan earns £3 605 more than Jason.

3. What would Jason earn over 3 years at this rate of pay ?

This is a × problem.

$$\begin{array}{r} £20\,563 \\ \times 3 \\ \hline £61\,689 \end{array}$$

Jason would earn £61 689.

4. What did Jan earn in the first three months ?

This is a ÷ problem.

$$\begin{array}{r} £\,6\,042 \\ 4 \overline{) £24\,168} \end{array}$$

Jan earns £6 042 every 3 months.

÷4, as there are 4 lots of 3 months in a year.

Be able to solve problems using mathematical operations



- A pack has 500 sheets of A4 paper. A box contains 5 packs.  
How many sheets are in (a) 1 box (b) 6 boxes ?
- I owe £85 to my mother, £14 to my sister and £139 to my brother.  
How much do I owe altogether ?
- Jane has won £652.  
She shares it equally among herself, her mother, her father and her sister.  
How much does each person receive ?
- Kate has £800. She owes Peter £530 and Susan £180. However, Jan owes Kate £100.  
How much will Kate have when everyone settles their debts ?
- A car can travel 48 miles on 1 gallon of petrol.  
How far can it travel on a full tank of 9 gallons ?
- I have exactly enough money to buy 8 C.D.'s, all costing the same amount. I have £148.  
How much does each C.D. cost ?

7. I buy a games console for £127.  
After 2 years, I sell it for 3 times the price which I paid for it.  
How much did I sell it for ?
8. Jenny saved £1284 in the year 1999. This is £468 more than she saved in 1998 and £233 less than she saved in 1997.  
How much did she save in 1997 and 1998 ?
9. Six people share a lottery win of £8760. How much will each receive ?
10. A carton of beans hold 128 tins.  
How many tins are there in 5 cartons ?

Arthur bought a brand new car for £8998.  
One year later, it was valued at only £7005.  
How much had the value of his car dropped over the year ?



A train travelled for 6 hours at an average speed of 235 km/hr.  
How many kilometres had the train travelled ?

Sultana shortcakes are packed into jars of 8.  
Every day, the biscuit factory hopes to make 6840 sultana shortcakes.  
How many jars will be needed each day ?



During a storm, a plane dropped in height from 35280 feet to 29690 feet.  
By how many feet had it dropped ?

An hour consists of  $(60 \times 60) = 3600$  seconds.  
How many seconds are there in 3 hours ?



Jessie works in a hat shop for 4 hours per day.  
She worked a total of 592 hours over the past year.  
How many days did she turn up for work ?

Mr & Mrs Greig took their two children to Playdome for a day out.

- a How much was it for 2 adult and 2 children's tickets ?
- b They bought the Family Ticket.  
How much did they save ?



PLAYDOME		
(daily ticket)		
(unlimited rides)		
Adult		£9.75
Child		£5.99
Family		£25.75
(2 adults + 2 kids)		



You may use a calculator from Question 12 onwards

## Comparing Products

<https://youtu.be/CMMAKOgWg54> video notes

When running a home, most people have to work to a budget.  
(A specific amount they can afford to spend).

When shopping, lots of money can be saved by finding the **best buys** for individual items.

**Example :-**

Lorne Dog Food comes in two sizes.

- The small one costs £2.65.
- The large one costs £3.64.



By calculating the cost of **100 grams** of food for each size of tin, decide which is the **better deal**.



Cost of small tin per 100 g :-

$$£2.65 \div 5 = £0.53.$$

Cost of large tin per 100 g :-

$$£3.64 \div 7 = £0.52.$$

**Better Deal is large tin.**  
**A saving of 1p per 100 g.**

"Zad Soap Powder" is offered in two different sizes.

- The small box costs £15 for 600 grams.
- The large box costs £19.20 for 800 grams.



Which one is the better deal ? Explain.

Two bottles of the same wine are priced £7.70 for the 700 ml bottle and £10 for the one litre bottle. Which is the better deal ? Explain.



"Belgique Chocolates" costs £4.16 for a 400 gram box or £5.25 for a 500 gram box.

Which is the better deal ? Explain.



"Puss Puss" cat treats come in two sizes of tin.

- The small tin costs £3.50 for 350 grams.
- The large tin costs £4.40 for 550 grams.

Which is the better deal ? Explain.

(Hint :- find the cost per 50 g or the cost per gram)



"Ryanjet Holidays" offers special deals at the Constantino Hotel in Torremolinos.

Which of the two deals is better value for money ? *Explain.*



Ken is comparing two holiday companies' offers.

Which of the two should he choose ? *Explain.*



Fence paint can be bought in two tin sizes - 750 ml and 2.5 litres.

The larger tin costs £20. The smaller tin costs £7.50.

Which of the two tins offers the better value ?

Three cartons of rice are on offer.

- The small 800 gram carton costs £1.60.
- The 2 kilogram carton costs £3.60.
- The large 5 kilogram trade carton costs £7.50.

Which of the boxes offers :-

**a** the best value

**b** the poorest value ?



Golf balls are sold in boxes of 3, 6 and 10.

- A box of three costs £5.40.
- A box of six costs £10.20.
- A box of ten costs £17.50.

Which would you choose ? *Explain.*



## Fractions, Decimals, Percentages

### Percentages to decimals/fractions

<https://youtu.be/pmHwZ7WYRXE> video notes

[https://youtu.be/Alod\\_I-STl8](https://youtu.be/Alod_I-STl8)

**Remember :-**

$$15\% \text{ means } \frac{15}{100} = 0.15$$

also

$$4\% \text{ means } \frac{4}{100} = 0.04$$

note

Write each of the following as a fraction **AND** as a decimal :-

- |              |              |              |                |                |
|--------------|--------------|--------------|----------------|----------------|
| <b>a</b> 17% | <b>b</b> 26% | <b>c</b> 48% | <b>d</b> 12%   | <b>e</b> 75%   |
| <b>f</b> 6%  | <b>g</b> 2%  | <b>h</b> 8%  | <b>i</b> 10.5% | <b>j</b> 1.2%. |

*(Knowing your multiplication tables will help here).*

Write these percentages as fractions and simplify where possible :-

- |  |  |              |              |               |
|--|--|--------------|--------------|---------------|
| <b>a</b> $45\% = \frac{45 \div 5}{100 \div 5} = \frac{\boxed{\phantom{00}}}{\phantom{00}}$ | <b>b</b> $30\% = \frac{30 \div 10}{100 \div 10} = \frac{\boxed{\phantom{00}}}{\phantom{00}}$ |              |              |               |
| <b>c</b> 35%   | <b>d</b> 60%   | <b>e</b> 50% | <b>f</b> 25% | <b>g</b> 75%  |
| <b>h</b> 10%   | <b>i</b> 5%  | <b>j</b> 12% | <b>k</b> 36% | <b>l</b> 72%  |
| <b>m</b> 4%  | <b>n</b> 80%   | <b>o</b> 65% | <b>p</b> 28% | <b>q</b> 90%. |

<https://corbettmaths.com/wp-content/uploads/2018/09/Percentages-to-Fractions-pdf.pdf>

<https://corbettmaths.com/wp-content/uploads/2013/02/percentages-to-decimals-pdf2.pdf>

Additional practice

## Fraction to Percentage

[https://youtu.be/5fq\\_tcX9Vq4](https://youtu.be/5fq_tcX9Vq4) video notes

To change a fraction  
(like  $\frac{3}{5}$ ) to a percentage :-

$$\frac{3}{5} \text{ means } 3 \div 5 = 0.6 \Rightarrow (0.6 \times 100\%) = \mathbf{60\%}$$

(calculator)

$$\frac{6}{8} \text{ means } 6 \div 8 = 0.75 \Rightarrow (0.75 \times 100\%) = \mathbf{75\%}$$

(calculator)

Copy the following and use your calculator to change each fraction to a percentage :-

a  $\frac{9}{50} = 9 \div 50 = 0.\dots\dots \Rightarrow (0.\dots\dots \times 100\%) = \boxed{\phantom{000}} \%$



b  $\frac{1}{4} = 1 \div 4 = 0.\dots\dots \Rightarrow (0.\dots\dots \times 100\%) = \boxed{\phantom{000}} \%$

c  $\frac{3}{25}$

d  $\frac{2}{5}$

e  $\frac{3}{10}$

f  $\frac{11}{20}$

g  $\frac{1}{2}$

h  $\frac{1}{20}$

i  $\frac{7}{20}$

j  $\frac{7}{25}$

k  $\frac{1}{8}$

l  $\frac{5}{8}$

m  $\frac{7}{10}$

n  $\frac{3}{100}$

Mary scored  $\frac{19}{25}$  in a science test. To write this as a percentage :-

$$\text{Score} = \frac{19}{25} = 19 \div 25 = 0.76 \Rightarrow (0.76 \times 100\%) = \mathbf{76\%}$$

Change each of these test scores to percentages in the same way :-

a Percy scored 21 out of 30 ( $= \frac{21}{30} = 21 \div 30 = 0.\dots\dots \Rightarrow \dots\dots \%$ )

b Roddy scored 35 out of 50

c Pat scored 28 out of 40

d Charlie scored 3 out of 10

e Val scored 24 out of 25

f Cindy scored 54 out of 60

g Kath scored 70 out of 80

h Trevor scored 28 out of 56.



Rick sat 4 separate tests. Listed below are his marks.

French - 12 out of 60

Art - 18 out of 20

Geography - 9 out of 30

Music - 13 out of 25



By changing each score to a **percentage**, write his subjects in order, starting with his best subject.

<https://corbettmaths.com/wp-content/uploads/2018/11/Fractions-to-Percentages-pdf.pdf>  
additional practice

## Percentage of an amount

<https://youtu.be/5e9SoWxDGtQ> video notes

To find 13% of £500 =>

$$\begin{aligned} 13\% \text{ of } £500 &= \frac{13}{100} \times 500 \\ &= (13 \div 100) \times 500 = \text{£}65 \end{aligned}$$

To find 8% of £70 =

$$\begin{aligned} 8\% \text{ of } £70 &= \frac{8}{100} \times 70 \\ &= (8 \div 100) \times 70 = \text{£}5.60 \end{aligned} \quad \text{note*}$$

e 55% of £200

f 12% of £60

g 72% of £5400

h 75% of £7.80

i 2% of £5

j 1% of £110

k 32% of £9.50

l 25% of 44p

m 22% of £2.50

n 4% of £12

o  $17\frac{1}{2}\%$  of £50  
(17.5)%

p  $2\frac{1}{2}\%$  of £200.  
(2.5)%

a Of the 180 pupils in 4th Year, 65% are girls.

(i) How many girls are there ?

(ii) How many boys are there ?



b



The petrol tank in my car holds 80 litres.

When 95% of a full tank is used up, a warning light shines on the dashboard.

How many litres from a full tank will I have to use for the light to just come on ?

c A packet of cereal weighs 650 grams.

24% of it is sugar  
48% of it is starch  
16% of it is protein  
7% of it is fibre  
5% of it is fat



Calculate how many grams of sugar, starch, protein, fibre and fat are in the packet.

d 90% of the human body is made up of water.

If Joe weighs 60 kilograms, how much of him is water ?



e



The value of my games console dropped by 45% in 1 year.

I paid £280 for it a year ago.

What's it worth now ?



## Percentage Increase/Decrease

<https://youtu.be/tUtgC7ZrsRc> video notes

My new fridge should have cost me £400 but the price **rose** by 3%. =>



Old Price	£400
Rise (3% of 400) =	$\frac{£12}{\leftarrow (3 \div 100) \times 400}$
New Price =	£412

(For each question in this exercise, show the 3 lines of working neatly).

1. A weekend in Paris was priced at £400. It has risen by 10%.  
What is the new cost for the break ?



2. Last year, a freezer cost £320.  
This year it has risen by 25%.  
What is the new price ?



3. The pressure in a boiler was 70 poundals.  
The pressure rose by 5%.  
What was the new pressure ?

4. A military jet rose from a height of 3500 feet by 40%.  
What was its new height ?



5. The depth of water in a harbour at low tide was 2.5 metres.  
At high tide, the depth of the water rose by 50%.  
What was the depth of the water at high tide ?



6. Jessie weighed 50 kg, but because of her love for fry-up breakfasts, her weight has risen by 6%.  
Calculate Jessie's new weight.





Sometimes prices fall.  
For example, in a **SALE**.

This camera should cost £65,  
but it is **REDUCED** by  
20% in the Autumn sale.

### PHOTO STORE

**SALE**  
**20% OFF**  
**ALL PRICES**



**£65**

3 lines each time =>

Old Price =	£65.00
=> <b>Fall</b> = $\frac{20}{100} \times 65 = (20 \div 100 \times 65)$	<u>£ 13.00</u> (calculator)
=> <b>New Price</b> = (£65 - £13) =	<b>£52.00</b>

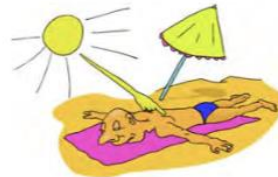
The normal price for this tyre is £80.  
It has now been reduced by 40% in a sale.  
What is its new price ?



This pair of trainers usually costs £65.  
The price dropped by 15% in a sale.  
What was their new price ?



The cost of a week's holiday to Portugal is  
advertised in a travel agent's window at £450.  
If you book online you can save 8%.  
What is the online price of the holiday ?



A plane was flying at 25 000 feet.  
Due to turbulence, the plane's height  
dropped by 35%.  
What was the new height of the plane ?



Last December, the Green family used 725 units of electricity.  
This December, due to the milder weather, they have cut this by 12%.  
How many units will they pay for now ?



A racing car was doing 210 mph along  
the straight during a practice lap.  
The driver slowed by 30% at a tight bend.  
What was the car's speed around the bend ?



In February, 120 millimetres of rain fell in Aberdeen.  
In March, there was a drop in rainfall of 15%.  
How much rain fell in March in Aberdeen ?



## Fractions, Decimals and Percentages Summary

- Write 31% as :-  
a a fraction      b a decimal.
- Write each of the following as a fraction and simplify as much as possible :-  
a 60%      b 85%      c 22%.
- Use your calculator to change each of the following fractions to a :-  
(i) decimal      (ii) percentage :-  
a  $\frac{9}{20}$       b  $\frac{17}{25}$       c  $\frac{25}{40}$ .
- Kendra scored 76 out of 80 in a Science Test. Write her score as a percentage.
- Work out the following :-  
a 21% of £320      b 7% of £45  
c 68% of £20      d  $12\frac{1}{2}\%$  of £5600.
- Games consoles normally cost £425 at "EasyGame".  
a How much could be saved in the spring sale ?  
b How much will a console cost in the sale ?
- A watering can had 4.8 litres of water in it.  
When a tap was opened, the volume of water in the can increased by 15%.  
a By how many litres did the volume rise ?  
b How much water was then in the can ?
- Last winter, the caterers in a golf club took in a total of £2500.  
This winter, their takings have fallen by 8%.  
How much have they made this winter ?
- Scotia Bank is offering interest at  $\frac{1}{2}\%$  per year. Anglo Bank's rate is 0.75%.  
Tom puts £500 in the Scotia Bank and Jerry puts £500 in the Anglo Bank.  
How much more than Tom will Jerry have made when they close their accounts at the end of the year ?

## Fraction of an Amount

<https://youtu.be/TXJOls7vXMs> video notes

**(Harder)** To find  $\frac{2}{3}$  of a number (like 15), you do it in **2 steps**.

**Step 1 :-** Find  $\frac{1}{3}$  of 15 ( $\div 3$ ) first  $\Rightarrow \frac{1}{3}$  of 15 =  $15 \div 3 = 5$

**Step 2 :-** Now find  $\frac{2}{3}$  of 15 by ( $\times 2$ ).  $\Rightarrow \frac{2}{3}$  of 15 =  $5 \times 2 = 10$ .

Here's how you should set down the working :-

$$\frac{2}{3} \text{ of } 15 \Rightarrow (15 \div 3) \text{ then } 5 \times 2 = 10$$

$$\frac{3}{4} \text{ of } 24 \Rightarrow (24 \div 4) \text{ then } 6 \times 3 = 18$$

$$\frac{5}{6} \text{ of } 18 \Rightarrow (18 \div 6) \text{ then } 3 \times 5 = 15$$

**Rule :-**

To multiply by a fraction like  $\frac{5}{6}$

$\Rightarrow$  "divide by the denominator" (6)

$\Rightarrow$  then "multiply by the numerator" (5)

Do the following :- (You may use a calculator).

**a**  $\frac{3}{5}$  of 180  $\Rightarrow (180 \div 5)$  then  $36 \times 3 = \dots$

**b**  $\frac{7}{8}$  of 120  $\Rightarrow (120 \div \dots)$  then  $\dots \times 7 = \dots$

**c**  $\frac{2}{3}$  of 150

**d**  $\frac{3}{4}$  of 680

**e**  $\frac{7}{10}$  of 1400

**f**  $\frac{3}{5}$  of 95

**g**  $\frac{5}{9}$  of 360

**h**  $\frac{3}{7}$  of 371

**i**  $\frac{7}{8}$  of 656

**j**  $\frac{5}{6}$  of 198

**k**  $\frac{4}{5}$  of 925.

**a** A school has 1050 pupils.  $\frac{3}{5}$  of them are boys.

(i) How many boys are there ?

(ii) How many girls ?



**b** Lena spends £152 per week on food.  $\frac{5}{8}$  of that is spent in Tresco Supermarket.

(i) How much does she spend in Tresco ?

(ii) How much is spent elsewhere ?

**c** Of the 84 words Aaron was asked to spell, he got  $\frac{6}{7}$  of them correct.

(i) How many words did he spell correctly ?

(ii) How many did he get wrong ?

<https://corbettmaths.com/wp-content/uploads/2013/02/fraction-of-an-amount-pdf2.pdf>  
additional worksheet

## Exchange rate

<https://youtu.be/3ZopQfmTISw> video notes

Many countries use different currencies, although Britain still uses the **GBP**, the Great British Pound.

**Euros (€)** are widely used throughout Europe.

Initially we will look at how to change from our currency to the currencies of other countries.

You will have to do this if you ever holiday abroad.

### Exchange Rates

£1 = €1.25 (All Europe)

£1 = \$1.53 (America)

£1 = 1.82 (Australian Dollars)

**Example 1 :-** To change £200 to Euros you simply **MULTIPLY** :-

$$£200 = 200 \times €1.25 = €250$$

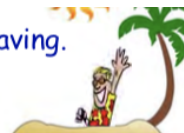
**Example 2 :-** To change £120 to American Dollars, again, you simply **MULTIPLY** :-

$$£120 = 120 \times \$1.53 = \$183.60$$

**Rule :-** When changing from British money to foreign money, always **MULTIPLY**.

Alan went to Santa Ponsa in Majorca. He changed £500 to Euros before leaving.

How many Euros did he receive ?



Taylor went to Berlin at Easter and changed £280 to Euros.

How many Euros did Taylor get ?

The Hendrys flew to Las Vegas (in America) and changed £1200 to dollars.

How many dollars did they get ?



Winnie and Tom went to Australia for a month's holiday.

They changed £2100 to Australian dollars.

How many dollars did they receive ?

Change the following :-

**a** £250 to Euros

**b** £8 to Euros

**c** £340 to American dollars

**d** £750 to Australian dollars.



Shown are some of the **world exchange rates** :-

6. a If I changed £200 to Hong Kong Dollars how many would I receive ?
- b Joe changed £500 to Yen before flying to Japan.  
How many did he get ?
- c The Frasers changed £750 to Rupees for a stopover in Mumbai.  
How many Rupees did they receive ?
- d During our two week stay in Norway, we spent £925 which we had changed to Kroner.  
How much was this in Kroner ?

**British Pound (January 20...)**

	£1 =
American Dollar (\$)	1.53
Australian Dollar	1.82
Chinese Yuan Renminbi	9.30
Danish Kroner	9.20
Euro	1.25
Hong Kong Dollar	11.85
Indian Rupee	90
Japanese Yen	185
Mexican Peso	21
New Zealand Dollar	1.95
Norwegian Kroner	10
South African Rand	17.2
Swiss Franc	1.50

7.



Jenny went camping around Denmark for 3 months.  
Before she went, she changed £1500 to Danish Kroner.  
How many did Jenny receive ?

If you want to change foreign currency back to pounds => you simply **DIVIDE**.

When you bring Euros, dollars etc. home from your holiday you will have to divide by the present rate to get your £'s.

**Example :-** To change 800 Euros back to pounds you have to **DIVIDE** :-

$$€800 = 800 \div 1.25 = \text{£}640$$

**Exchange Rates**

£1 = €1.25 (All Europe)  
£1 = \$1.53 (America)  
£1 = 1.82 (Australian Dollars)

**Rule :-** When changing foreign money back into British money, always **DIVIDE**.

- a If I changed 711 Hong Kong Dollars to £'s how many would I receive ?
- b Chesney changed 3700 Yen to £'s before flying home from Japan.  
How many £'s did he get ?
- c The Johnsons spent 27 300 Pesos while on holiday in Mexico.  
What was that in £'s ?
- d When Sadie returned from Denmark she exchanged 414 Kroner for pounds.  
How many did she get ?

**British Pound (January 2015)**

	£1 =
American Dollar (\$)	1.53
Australian Dollar	1.82
Chinese Yuan Renminbi	9.30
Danish Kroner	9.20
Euro	1.25
Hong Kong Dollar	11.85
Indian Rupee	90
Japanese Yen	185
Mexican Peso	21
New Zealand Dollar	1.95
Norwegian Kroner	10
South African Rand	17.2
Swiss Franc	1.50

Hazel returned from Paris with 50 Euros.

How much would she get by changing them back to £'s ?



Walter spent a week in Italy, staying in Pisa.

He brought €93.75 back and changed them back to £'s.

How much did he receive ?

Troy returned from America with \$229.50.

How many £'s will he get when he exchanges his dollars ?



I brought 236.60 Australian dollars back from holiday.

How many £'s will I get for them ?

How much would be given when the following amounts were exchanged for £'s :-

a 10 Euros

b 18.75 Euros

c \$1530

d \$3.06

e 1911 Australian dollars

f 2500 Euros ?



I changed £500 to Euros before travelling to Rome.

a How many Euros did I receive ?

b I spent €600 when I was in Italy and changed the rest back to £s when I got home.

How many £'s did I have when I returned home ?



Charlie returned from China with 465 Yuan.

How much will he get when he changes his money back to £'s ?

Anne paid 1.75 Euros for a notepad at a market in Strasbourg.

She wondered what that had cost her in British money.

Work out the price for Anne.



Edwina bought her laptop in Hamburg, Germany for €425.

Kendra bought the same laptop in New York, America for \$459.

Lotti had paid £320 in Dundee for an identical laptop.

Who got the best deal ? Explain.

<https://corbettmaths.com/wp-content/uploads/2013/02/exchange-rates-pdf.pdf> additional practice