



The Heys School

# Maths

**Example 15**

Find an approximate answer to  $674 + 827 + 350$ .  
Round each number to the nearest 100 then add.

$$\begin{array}{r} 674 \text{ rounds up to } 700 \\ 827 \text{ rounds down to } 800 \\ 350 \text{ rounds up to } 400 \\ \hline 1900 \end{array}$$

So  $674 + 827 + 350$  is about 1900.

**Example 16**

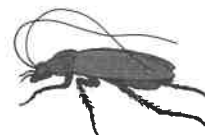
Find an approximate answer to  $5823 + 7504 - 6087$   
Round each number to the nearest 1000 then add.  
Split the calculation into two stages:

$$\begin{array}{r} 5823 \text{ rounds up to } 6000 \\ 7504 \text{ rounds up to } 8000 \\ \hline 14000 \end{array} \quad \begin{array}{l} \text{Answer to first stage} \\ 6087 \text{ rounds down to } 6000 \\ \hline 8000 \end{array}$$

So  $5823 + 7504 - 6087$  is about 8000.

**Example 17**

There are 3700 different species of cockroaches in the world, rounded to the nearest 100. How many different species might there actually be?



The smallest number that rounds to 3700 is 3650

The largest number that rounds to 3700 is 3749



So there are between 3650 and 3749 species of cockroach in the world.

**Exercise 2S**

1 Round each of these numbers to the nearest 100.

- |          |          |          |          |
|----------|----------|----------|----------|
| (a) 463  | (b) 381  | (c) 648  | (d) 752  |
| (e) 87   | (f) 709  | (g) 1437 | (h) 2374 |
| (i) 3482 | (j) 2974 | (k) 4952 | (l) 9983 |

- 2 Round each number to the nearest 100, then add or subtract to find an approximate answer to the calculation.

(a)  $572 + 137$       (b)  $258 + 396$       (c)  $847 - 583$   
 (d)  $750 - 254$       (e)  $748 + 862$       (f)  $983 - 314$   
 (g)  $817 - 582$       (h)  $809 - 294$       (i)  $793 - 243$   
 (j)  $1928 - 493$       (k)  $3251 - 905$       (l)  $2963 - 572$

- 3 Write each of these numbers to the nearest 1000.

(a) 4832      (b) 8643      (c) 7378      (d) 8052  
 (e) 3541      (f) 13 640      (g) 41 502      (h) 202 814  
 (i) 9724      (j) 842      (k) 489      (l) 99 630

- 4 Round each number to the nearest 1000, then add or subtract to find an approximate answer to these calculations.

(a)  $7178 - 2813$       (b)  $8921 - 3295$   
 (c)  $7510 + 2043$       (d)  $9388 + 2501$   
 (e)  $8279 + 4520$       (f)  $8734 + 916 - 2534$   
 (g)  $5068 + 8514 - 6813$       (h)  $9365 + 2544 - 4187$   
 (i)  $15\,396 - 2911$       (j)  $17\,289 + 7512$   
 (k)  $36\,813 - 13\,486$       (l)  $29\,723 + 6142$

- 5 Alan, Concie and Bill have been collecting signatures on a petition. They each rounded their numbers to the nearest 100. How many signatures might each have collected?



- 6 The table shows the number of species in some different families of birds. Write each number rounded to the nearest 100.

Family	Species
Cuckoo	128
Thrush	305
Warblers	350
Kingfishers	87

- 7 The table shows the distance from London to some foreign cities rounded to the nearest 1000.
- (a) What is the least distance each city might be from London?
- (b) What is the greatest distance each city might be from London?
- 8 The table shows the areas in  $\text{km}^2$  of some American states.
- (a) Write the area of each state rounded to the nearest  $100 \text{ km}^2$ .
- (b) Write the area of each state rounded to the nearest  $1000 \text{ km}^2$ .

City	Distance from London in miles
Cairo	2000
Mexico City	6000
Nairobi	4000
Sidney	11 000

State	Area in $\text{km}^2$
Massachusetts	8284
New Hampshire	9279
New Jersey	7787
Hawaii	6471
Vermont	9614

## 2.19 Checking answers by estimating

Omar used his calculator to add  $853 + 627 + 2350$   
Has he got the right answer?

Round each number to the nearest hundred.

$$\begin{array}{r}
 853 \text{ rounds up to } \quad 900 \\
 627 \text{ rounds down to } \quad 600 \\
 2350 \text{ rounds up to } \quad 2400 + \\
 \hline
 3900
 \end{array}$$

The answer is about 3900 so Omar has got the answer wrong.

- You can check to see if a calculator answer is correct by rounding to get an approximate answer.

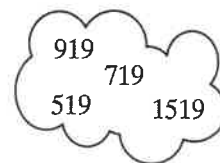
Rounding to get an approximate answer is called **estimating**.



### Example 18

Which number in the cloud is the correct answer to  $672 + 247$

$$\begin{array}{r}
 672 \text{ rounds to } \quad 700 \\
 247 \text{ rounds to } \quad 200 + \\
 \hline
 900
 \end{array}$$

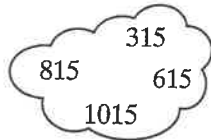


So 919 must be the correct answer.

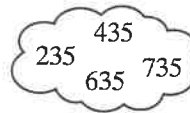
**Exercise 2T**

1 Which number in the cloud is the correct answer?

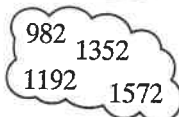
(a)  $578 + 237$



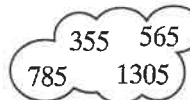
(b)  $917 - 482$



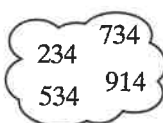
(c)  $918 + 654$



(d)  $874 - 519$



(e)  $891 - 357$

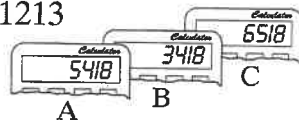


(f)  $376 + 248$

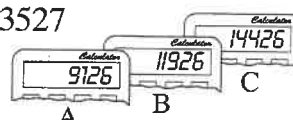


2 Use rounding to help you see which calculator shows the correct answer.

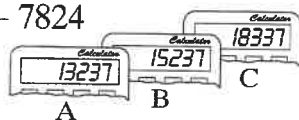
(a)  $7731 - 1213$



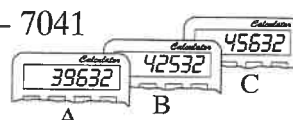
(b)  $8399 + 3527$



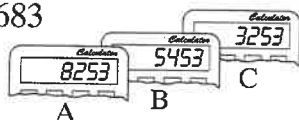
(c)  $10513 + 7824$



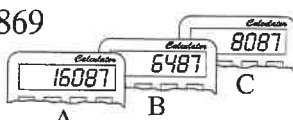
(d)  $32591 + 7041$



(e)  $8936 - 683$



(f)  $7218 + 869$



**Summary of key points**

1 The value of a digit depends on its place in a number. You can see this in a place value diagram:

The digit 4 means ...

	Hundreds	Tens	Units	
4 hundreds	4	7	9	Four hundred and seventy nine
4 tens	2	4	3	Two hundred and forty three
4 units	7	0	4	Seven hundred and four

## 2.12 Using mental maths to solve problems

You can use mental maths to solve everyday problems.

First decide whether to add or subtract to solve the problem.

These words usually mean you **add**:

**total, sum, altogether, plus**

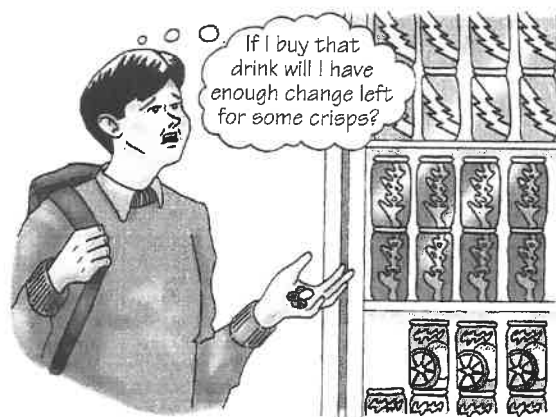
These words and phrases usually mean you **subtract**:

**minus, take away, less**

**How many more?**

**How much change?**

**What is the difference between...?**



**Example 4**

Paul bought a bar of chocolate for 38p and a packet of chewing gum for 45p.

How much change did he get from a £1 coin?

The total cost was  $38 + 45 = 83\text{p}$

The change was  $\text{£}1 - 83\text{p} = 100\text{p} - 83\text{p} = 17\text{p}$ .

**Exercise 2L****Class 7B**

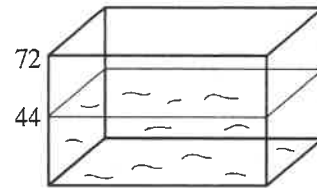
Girls 17

Boys 15

Total ...

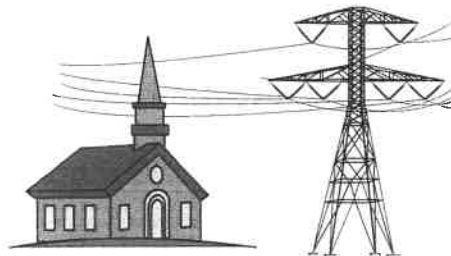
- In a class of children there are 17 girls and 15 boys.  
What is the total number of children in the class?
- Two classes of children went on a trip together.  
There were 34 children from one class and 29 children from the other class.  
How many children went on the trip?
- 98 children from a school went on a half day visit.  
47 children went in the morning.  
How many went in the afternoon?

- A water tank holds 72 litres when full.  
There are 44 litres of water in the tank.  
How many more litres of water can be put into the tank?



- Zoe buys a drink for 48p and a bar of chocolate for 36p.
  - What is the total cost?
  - What change should she get if she pays with a £1 coin?

- An electricity pylon is 33 metres tall.  
A church tower is 25 metres tall.  
How much taller is the pylon than the tower?



- 7 In a pond there are 28 mirror carp and 65 koi carp.  
 (a) What is the total number of carp in the pond?  
 (b) How many more koi carp than mirror carp are there?

- 8 In a class of 32 children, 18 have school dinner and the rest bring packed lunches.  
 How many children bring packed lunches?

**Class 8C**

School dinner	18
Packed lunches ...	
Total	32

- 9 In a darts match Morag scored 54 and 18 with her first two darts. After her third dart she had scored a total of 96.  
 What did she score with her third dart?



- 10 A computer shop had software for sale at these prices.  
 Marco bought three items of software for a total cost of £90.  
 Find all the possible costs of the three items Marco bought.



- 11 Jerry bought a coat for £247 and a pair of trousers for £56.  
 How much did she pay in total?
- 12 Gerard drove 83 miles from Exeter to Bristol and 232 miles from Bristol to Hull.  
 How far did he drive altogether?
- 13 Jerry bought a pair of shoes for £76 and a jacket.  
 The total cost was £154.  
 How much did the jacket cost?
- 14 Gerard drove 93 miles from Hull to Nottingham.  
 He then drove from Nottingham to Glasgow.  
 If the total journey was 379 miles, how far is it from Nottingham to Glasgow?



**Example 8**

A shop ordered 7 boxes of pencils.  
Each box contained 144 pencils.  
How many pencils did the shop order?

$$144 \times 7 = 1008 \text{ pencils}$$

$$\begin{array}{r} 144 \\ \times \quad 7 \\ \hline 1008 \\ 32 \end{array}$$

**Example 9**

A fruit grower is packing apples.  
Each pack holds 4 apples and he has 650 apples.  
How many packs can he fill? \_\_\_\_\_

$$650 \div 4 = 162 \text{ remainder } 2$$

He can fill 162 packs.

$$\begin{array}{r} 162 \\ 4 \overline{)650} \\ \underline{-4} \phantom{0} \\ 25 \\ \underline{-24} \\ 10 \\ \underline{-8} \\ 2 \text{ (remainder)} \end{array}$$

**Exercise 5J**

- Ofra gets £7 pocket money a week. \_\_\_\_\_ 1 year is 52 weeks and 1 day  
How much does she get in a year?
- A violinist practises for 4 hours every day.  
How many hours does he practise in a year?
- Eight people shared a lottery win of £376.  
How much did they each get?
- 160 people are invited to a wedding reception.  
They are each given a glass of champagne for a toast.  
Each bottle of champagne filled 6 glasses.  
How many bottles of champagne were needed?
- Vasbert ran 7 laps of a running track.  
Each lap of the track was 440 metres.  
How many metres did he run in total?
- A racing cyclist does 300 miles of training a week.  
He does the same number of miles each day.  
How many miles does he cycle each day?
- Gayle made 9 photocopies of a 24 page booklet.  
Each photocopy cost 4p to make.  
What was the total cost?



8 In a tombola the tickets which are multiples of 6 win a prize.

Which of the tickets shown would win prizes?

94 504 364 824 744 924

9 **Investigation** Choose any three different digits. Arrange them as a 2 digit number multiplied by a 1 digit number and do the multiplication. Try other arrangements of the same digits.

7, 4, 6

(a) How many different arrangements are there?

$$67 \times 4 = 268$$

(b) Which arrangement gives the largest answer?

$$76 \times 4 = \quad 46 \times 7 =$$

(c) Which arrangement gives the smallest answer?

(d) Try other sets of digits.

(e) Can you spot any rules to help you answer parts

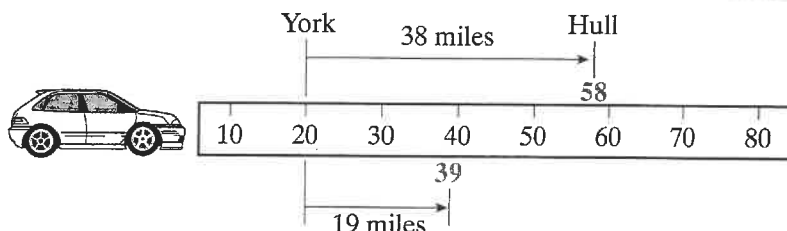
(b) and (c)?

### 5.11 Half way between

Ray wants to stop halfway between York and Hull. How far is that?



Think of a number line:



From York to Hull is  $58 - 20 = 38$  miles

Half of 38 is  $38 \div 2 = 19$  miles

It is 20 miles to York so Ray will stop after:

$$20 + 19 = 39 \text{ miles.}$$

There is an easier way to find the number half way between 20 and 58:

Add 20 and 58:  $20 + 58 = 78$

Find half of the total:  $78 \div 2 = 39$

To find half of a number you divide by 2

■ To find the number half way between two others add the two numbers together and divide by 2.

**Example 10**

Find the number half way between 27 and 54

$$27 + 54 = 81$$

$$81 \div 2 = 40\frac{1}{2}$$

so  $40\frac{1}{2}$  is half way between 27 and 54.

$$\begin{array}{r} 40 \text{ remainder } 1 \\ 2 \overline{)81} \end{array}$$

$$1 \div 2 = \frac{1}{2}$$

$$\text{so } 81 \div 2 = 40\frac{1}{2}$$

**Exercise 5K**

1 Find the number half way between:

- (a) 24 and 42      (b) 57 and 31      (c) 16 and 48      (d) 65 and 17  
 (e) 352 and 126      (f) 613 and 345      (g) 748 and 24      (h) 635 and 257

2 Find the number half way between:

- (a) 43 and 26      (b) 33 and 54      (c) 49 and 36      (d) 19 and 66  
 (e) 427 and 252      (f) 644 and 315      (g) 249 and 726      (h) 938 and 855

**5.12 Multiplying a 3-digit number by a 2-digit number**This section shows you how to do multiplications such as  $473 \times 64$ Think of 64 as  $60 + 4$ 

$$\begin{array}{l}
 473 \times 4 = 1892 \\
 473 \times 60 = 28380 \\
 473 \times 64 = 30272
 \end{array}
 \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{add}$$

$$\begin{array}{r}
 473 \\
 \times 4 \\
 \hline
 1892 \\
 1 \ 2 \ 1
 \end{array}$$

$$\begin{array}{r}
 473 \\
 \times 6 \\
 \hline
 2838 \\
 2 \ 4 \ 1
 \end{array}$$

$$\begin{array}{r}
 473 \times 6 = 2838 \\
 \text{so } 473 \times 60 = 28380
 \end{array}$$

$$\begin{array}{r}
 473 \\
 \times 64 \\
 \hline
 30272 \\
 1 \ 1 \ 1
 \end{array}$$

You can set out  $473 \times 64$  like this:

$$\begin{array}{r}
 473 \\
 \times 64 \\
 \hline
 1892 \\
 28380 \\
 \hline
 30272 \\
 1 \ 1 \ 1
 \end{array}$$

$473 \times 4$   
 Put a 0 in the units column then multiply  $473 \times 6$ .  
 This is the same as  $473 \times 60$ .  
 Add 1892 and 28380 to get  $374 \times 64$ .



**Exercise 5L**

- 1 (a)  $212 \times 31$       (b)  $123 \times 23$       (c)  $234 \times 32$   
 (d)  $436 \times 26$       (e)  $364 \times 43$       (f)  $275 \times 34$   
 (g)  $107 \times 27$       (h)  $461 \times 42$       (i)  $418 \times 64$   
 (j)  $602 \times 58$       (k)  $540 \times 76$       (l)  $183 \times 92$

- 2 Choose any five digits, for example 2, 3, 6, 8, 9.  
 Write them as a 3 digit  $\times$  2 digit multiplication  
 and work out the answer.  
 Try other arrangements of your five digits.  
 Which arrangement gives the largest answer?  
 Which arrangement gives the smallest answer?

$$\begin{array}{r} 628 \\ \times 39 \\ \hline 5652 \\ 18840 \\ \hline 24492 \\ 11 \end{array}$$

**5.13 Dividing a 3-digit number by a 2-digit number**

This section shows you how to do divisions such as  $875 \div 24$ .

First, here is a simpler example:  $947 \div 4$

Divide the 9 hundreds by 4       $\frac{2}{4)9\ 4\ 7}$   
 $9 \div 4 = 2$  remainder 1 \_\_\_\_\_

Divide the 14 tens by 4       $\frac{2\ 3}{4)9\ 4\ 7}$   
 $14 \div 4 = 3$  remainder 2 \_\_\_\_\_

Divide the 27 units by 4       $\frac{2\ 3\ 6\ \text{rem. } 3}{4)9\ 4\ 7}$   
 $27 \div 4 = 6$  remainder 3 \_\_\_\_\_

You are dividing by 4 and the remainder is 3 so you can write the answer as  $236\frac{3}{4}$  or 236.75.

You could also set it out like this:

Divide the 9 hundreds by 4       $\frac{2}{4)9\ 4\ 7}$   
 $9 \div 4 = 2$  remainder 1 \_\_\_\_\_  $\frac{-8}{1}$

Divide the 14 tens by 4       $\frac{2\ 3}{4)9\ 4\ 7}$   
 $14 \div 4 = 3$  remainder 2 \_\_\_\_\_  $\frac{-8}{1\ 4}$

Divide the 27 units by 4       $\frac{2\ 3\ 6\ \text{rem. } 3}{4)9\ 4\ 7}$   
 $27 \div 4 = 6$  remainder 3 \_\_\_\_\_  $\frac{-1\ 2}{2}$

$$\begin{array}{r} 236\ \text{rem. } 3 \\ 4)9\ 4\ 7 \\ -8 \\ \hline 1\ 4 \\ -1\ 2 \\ \hline 2\ 7 \\ -2\ 4 \\ \hline 3 \end{array}$$

The second method looks complicated but it is a good way to set out a division such as  $875 \div 24$

You can set out  $875 \div 24$  like this:

You cannot divide the 8 hundreds by 24. ———  
 Divide the 87 tens by 24.  
 $87 \div 24 = 3$  remainder 15

$$\begin{array}{r} 3 \\ 24 \overline{) 875} \\ \underline{-72} \phantom{0} \\ 15 \phantom{0} \end{array} \quad \begin{array}{r} 24 \\ \times 3 \\ \hline 72 \end{array}$$

Divide the 155 units by 24. ———  
 $155 \div 24 = 6$  remainder 11

$$\begin{array}{r} 36 \text{ rem. } 11 \\ 24 \overline{) 875} \\ \underline{-72} \phantom{0} \\ 155 \phantom{0} \\ \underline{-144} \\ 11 \phantom{0} \end{array} \quad \begin{array}{r} 24 \\ \times 6 \\ \hline 144 \end{array}$$

### Exercise 5M

- |                     |                   |                   |
|---------------------|-------------------|-------------------|
| 1 (a) $346 \div 13$ | (b) $367 \div 17$ | (c) $294 \div 15$ |
| (d) $691 \div 14$   | (e) $719 \div 19$ | (f) $849 \div 18$ |
| (g) $699 \div 13$   | (h) $842 \div 16$ |                   |
| 2 (a) $879 \div 23$ | (b) $963 \div 34$ | (c) $854 \div 26$ |
| (d) $987 \div 42$   | (e) $992 \div 47$ | (f) $763 \div 21$ |
| (g) $792 \div 39$   | (h) $948 \div 45$ |                   |
| 3 (a) $847 \div 76$ | (b) $993 \div 82$ | (c) $974 \div 91$ |
| (d) $895 \div 63$   | (e) $764 \div 58$ | (f) $947 \div 71$ |
| (g) $863 \div 85$   | (h) $683 \div 52$ |                   |

### Exercise 5N

In these questions you will need to either multiply or divide a 3-digit number by a 2-digit number. If you divide and there is a remainder you will need to decide what is a sensible answer.

- Jack works in a supermarket. He earns £186 a week. How much does he earn in a 52 week year?
- A group of 36 children went on a school journey for a week to the Isle of Wight. Each child paid £213. What was the total cost of the trip?

- 3 A garage charges £24 an hour for labour. The garage charges Nigel £336 labour to replace the engine in his car. For how many hours of labour was he charged?
- 4 A department store ordered 34 television sets at a cost of £357 each. What was the total cost of the television sets?
- 5 Every year on sports day a school gives a can of cola to each pupil. There are 950 pupils in the school and the cola comes in packs of 24. How many packs does the school need to order?
- 6 A car uses a gallon of petrol for every 58 miles it travels. How many gallons of petrol will the car use for a journey of 860 miles?

