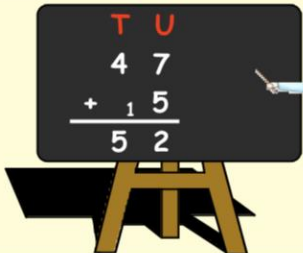


Numeracy S1/S2

Addition and subtraction

<https://youtu.be/h8wjXaecKM4> - video notes

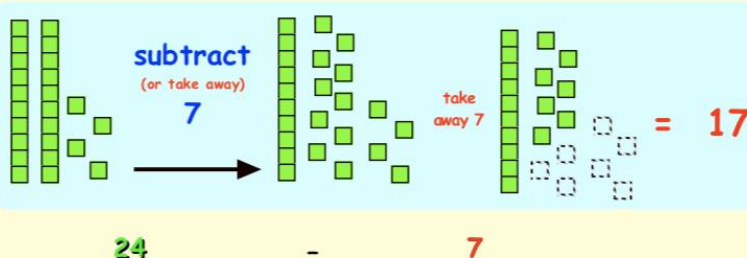
<https://youtu.be/6UCV8919-ZQ>



It is **VERY** important to line the numbers up properly.

Remember to add the number you have **carried**.

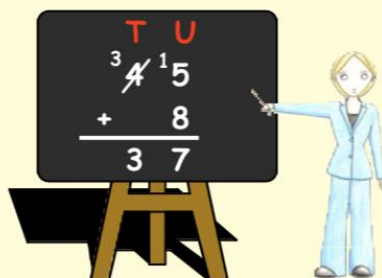
Example What is 24 **subtract** 7?



This can be written as :-

T	U
2 ¹	4 ¹
-	7
1 7	

Example What is 45 **subtract** 8?



We **cannot** take 8 away from 5.

We need to **carry** (or borrow) a ten and add this to the units.

This means the 5 becomes 15, and the 4 tens becomes 3 tens. Now we can do the subtraction.

Copy the following and find the answers :-

a 352
 + 168
 ——

b 469
 + 357
 ——

c 386
 + 566
 ——

d 978
 + 213
 ——

e 626
 - 386
 ——

f 5003
 + 3087
 ——

g 3456
 + 5678
 ——

h 7374
 - 5895
 ——

i 3000
 - 893
 ——

j 7777
 + 1999
 ——

k 6052
 - 3463
 ——

l 10000
 - 8409
 ——

m 5389 + 364

n 2345 + 6666

o 8527 - 5521

p 8000 - 374

q 5802 + 4299

r 7006 - 2967

s 8429 + 368

t 10000 - 7391.

Mental methods are about trying to get the **correct answer** in the **quickest** and **easiest** way. We will look at addition and subtraction first.

Example 1 :-

Addition

$$26 + 39$$

(Treat as $26 + 40$ and take 1)

$$\begin{aligned} &= 26 + 40 - 1 \\ &= 66 - 1 \\ &= 65 \end{aligned}$$

Example 2 :-

Subtraction

$$83 - 49$$

(Treat as $83 - 50$ and add 1)

$$\begin{aligned} &= 83 - 50 + 1 \\ &= 33 + 1 \\ &= 34 \end{aligned}$$

methods to carry
out mental
calculations



Example 3 :-

Addition

$$57 + 24$$

(Do $50 + 20$ add $7 + 4$)

$$\begin{aligned} &= 70 + 11 \\ &= 81 \end{aligned}$$

Example 4 :-

Subtraction

$$85 - 42$$

(Do $80 - 40$ add $5 - 2$)

$$\begin{aligned} &= 45 - 2 \\ &= 43 \end{aligned}$$

YOU have to choose the quickest and easiest method.

Discuss various methods in class.

Write down the easiest, quickest way to calculate **mentally** :-

- | | |
|---|---|
| a $39 + 46$ "add + 46, then take" | b $90 - 68$ "90 -, then take" |
| c $390 + 240$ "add + 240, then take" | d $87 - 34$ "80 -, then add 7 -" |
| e $2300 + 4500$ "add, then add" | f $520 - 280$ "520 -, then add" |

Choose your own mental method to find the answers to these :- (You might like to time yourself).

- | | | | |
|------------------------|------------------------|------------------------|------------------------|
| a $39 + 58$ | b $53 + 66$ | c $19 + 85$ | d $38 + 88$ |
| e $70 - 25$ | f $69 - 53$ | g $100 - 72$ | h $70 - 39$ |
| i $350 + 190$ | j $690 + 220$ | k $160 + 420$ | l $320 + 990$ |
| m $750 - 330$ | n $790 - 460$ | o $700 - 140$ | p $1000 - 280$ |
| q $410 - 390$ | r $820 - 380$ | s $460 - 190$ | t $810 - 670$ |
| u $2300 + 4500$ | v $2900 + 5800$ | w $6800 - 2300$ | x $9000 - 6900$ |

Do these problems **mentally** :-

- a** There were 69 people in a queue outside a night club.
As the doors were about to open, 24 more people arrived.
How many were now in the queue?



- b**  Of the 670 pupils in a primary school, 360 are girls.
How many boys are in the school?

- c** Dave has exactly £1000 in his bank.
If he buys a laptop, priced £399 with this money,
how much will be left in the bank?



<https://corbettmaths.com/wp-content/uploads/2013/02/addition-pdf4.pdf>

<https://corbettmaths.com/wp-content/uploads/2018/09/Subtraction-pdf.pdf>

- additional practice

Addition and subtraction with decimals

<https://youtu.be/jPdETHICW8M> - video notes

<https://youtu.be/yYPozC6etq4>

Example 1 :-

$$17.65 + 6.97$$

$$\begin{array}{r} \Rightarrow 17.65 \\ + 6.97 \\ \hline = 24.62 \\ \uparrow \\ \text{line up} \end{array}$$

Example 2 :-

$$34.16 - 16.53$$

$$\begin{array}{r} \Rightarrow 34.16 \\ - 16.53 \\ \hline = 17.63 \\ \uparrow \\ \text{line up} \end{array}$$

Make sure the decimal points are always beneath each other.

Set these down and find the answers :-

a
$$\begin{array}{r} 16.72 \\ + 5.97 \\ \hline \\ \hline \end{array}$$

b
$$\begin{array}{r} 28.68 \\ + 18.27 \\ \hline \\ \hline \end{array}$$

c
$$\begin{array}{r} 53.19 \\ + 9.77 \\ \hline \\ \hline \end{array}$$

d
$$21.65 + 7.99$$

e
$$56.57 + 29.37$$

f
$$67.64 + 17.37$$

g
$$\begin{array}{r} 17.62 \\ - 5.48 \\ \hline \\ \hline \end{array}$$

h
$$\begin{array}{r} 42.57 \\ - 15.92 \\ \hline \\ \hline \end{array}$$

i
$$\begin{array}{r} 74.83 \\ - 37.46 \\ \hline \\ \hline \end{array}$$

j
$$19.27 - 6.58$$

k
$$73.01 - 48.02$$

l
$$92.52 - 62.3.$$

To find
$$\begin{array}{r} 45.8 \\ - 24.73 \\ \hline \\ \hline \end{array}$$

rewrite it as

$$\begin{array}{r} 45.80 \\ - 24.73 \\ \hline = 21.07 \end{array}$$

note
(Adding 0's often helps).

Find the following :-

a
$$\begin{array}{r} 17.7 \\ - 9.18 \\ \hline \\ \hline \end{array}$$

b
$$\begin{array}{r} 53.7 \\ - 12.25 \\ \hline \\ \hline \end{array}$$

c
$$\begin{array}{r} 24.2 \\ - 8.79 \\ \hline \\ \hline \end{array}$$

d
$$35.1 - 6.27$$

e
$$62.4 - 32.93$$

f
$$100.5 - 87.78.$$

To find
$$\begin{array}{r} 47 \\ - 13.45 \\ \hline \\ \hline \end{array}$$

rewrite it as

$$\begin{array}{r} 47.00 \\ - 13.45 \\ \hline = 33.55 \end{array}$$

note
(Adding 0's often helps).

Find the following :-

a
$$18 - 8.43$$

b
$$9 - 5.97$$

c
$$12 - 1.01$$

d
$$25 - 16.25$$

e
$$72 - 38.48$$

f
$$80 - 0.92.$$

<https://corbettmaths.com/wp-content/uploads/2018/09/Adding-Decimals-pdf.pdf>

<https://corbettmaths.com/wp-content/uploads/2018/09/Subtracting-Decimals-pdf.pdf>

Additional practice

Multiplication

<https://youtu.be/8c69laMRWJo> - video notes

Learn your tables **now** - they are a must !!.

$$\begin{array}{l} 2 \times 2 = 4 \\ 2 \times 3 = 6 \\ 2 \times 4 = 8 \\ 2 \times 5 = 10 \\ 2 \times 6 = 12 \\ 2 \times 7 = 14 \\ 2 \times 8 = 16 \\ 2 \times 9 = 18 \end{array}$$

$$\begin{array}{l} 3 \times 2 = 6 \\ 3 \times 3 = 9 \\ 3 \times 4 = 12 \\ 3 \times 5 = 15 \\ 3 \times 6 = 18 \\ 3 \times 7 = 21 \\ 3 \times 8 = 24 \\ 3 \times 9 = 27 \end{array}$$

$$\begin{array}{l} 4 \times 2 = 8 \\ 4 \times 3 = 12 \\ 4 \times 4 = 16 \\ 4 \times 5 = 20 \\ 4 \times 6 = 24 \\ 4 \times 7 = 28 \\ 4 \times 8 = 32 \\ 4 \times 9 = 36 \end{array}$$

$$\begin{array}{l} 5 \times 2 = 10 \\ 5 \times 3 = 15 \\ 5 \times 4 = 20 \\ 5 \times 5 = 25 \\ 5 \times 6 = 30 \\ 5 \times 7 = 35 \\ 5 \times 8 = 40 \\ 5 \times 9 = 45 \end{array}$$

$$\begin{array}{l} 6 \times 2 = 12 \\ 6 \times 3 = 18 \\ 6 \times 4 = 24 \\ 6 \times 5 = 30 \\ 6 \times 6 = 36 \\ 6 \times 7 = 42 \\ 6 \times 8 = 48 \\ 6 \times 9 = 54 \end{array}$$

$$\begin{array}{l} 7 \times 2 = 14 \\ 7 \times 3 = 21 \\ 7 \times 4 = 28 \\ 7 \times 5 = 35 \\ 7 \times 6 = 42 \\ 7 \times 7 = 49 \\ 7 \times 8 = 56 \\ 7 \times 9 = 63 \end{array}$$

$$\begin{array}{l} 8 \times 2 = 16 \\ 8 \times 3 = 24 \\ 8 \times 4 = 32 \\ 8 \times 5 = 40 \\ 8 \times 6 = 48 \\ 8 \times 7 = 56 \\ 8 \times 8 = 64 \\ 8 \times 9 = 72 \end{array}$$

$$\begin{array}{l} 9 \times 2 = 18 \\ 9 \times 3 = 27 \\ 9 \times 4 = 36 \\ 9 \times 5 = 45 \\ 9 \times 6 = 54 \\ 9 \times 7 = 63 \\ 9 \times 8 = 72 \\ 9 \times 9 = 81 \end{array}$$

<https://youtu.be/8c69laMRWJo> - additional practice

Multiplication by a single digit

Copy the following and complete the calculation :-

a
$$\begin{array}{r} 748 \\ \times 3 \\ \hline \\ \hline \end{array}$$

b
$$\begin{array}{r} 296 \\ \times 5 \\ \hline \\ \hline \end{array}$$

c
$$\begin{array}{r} 407 \\ \times 9 \\ \hline \\ \hline \end{array}$$

d
$$\begin{array}{r} 1243 \\ \times 4 \\ \hline \\ \hline \end{array}$$

e
$$\begin{array}{r} 3026 \\ \times 7 \\ \hline \\ \hline \end{array}$$

f
$$\begin{array}{r} 5217 \\ \times 8 \\ \hline \\ \hline \end{array}$$

g
$$\begin{array}{r} 9070 \\ \times 6 \\ \hline \\ \hline \end{array}$$

h
$$\begin{array}{r} 9876 \\ \times 9 \\ \hline \\ \hline \end{array}$$

Rewrite each of these in the above form and complete the calculation :-

a 509×8

b 817×7

c 954×4

d 1804×6

e 7×6254

f 5×2037

g 2076×9

h 3×9987

Long multiplication

<https://youtu.be/wayoCIgl08I> - video notes

<https://youtu.be/4PcsEtlqei8>

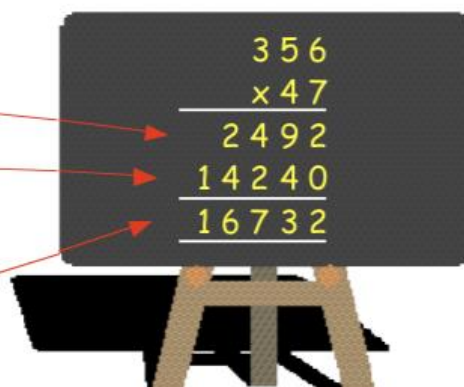
Example:- Find 356×47

Step 1 :- multiply the **356** by the **7** (= 2492).

Step 2 :- now multiply by **40**, not 4. (= 14240)

(it's easier to put a 0 (zero) below the 2 and then multiply by the 4).

Step 3 :- now simply **add your 2 answers**.



Set down and do the following :-

a

$$\begin{array}{r} 153 \\ \times 72 \\ \hline \end{array}$$

.....
.....0
.....

b

$$\begin{array}{r} 436 \\ \times 48 \\ \hline \end{array}$$

.....
.....0
.....

c

$$\begin{array}{r} 804 \\ \times 92 \\ \hline \end{array}$$

.....
.....
.....

d

$$\begin{array}{r} 556 \\ \times 55 \\ \hline \end{array}$$

.....
.....
.....

e

$$\begin{array}{r} 1264 \\ \times 32 \\ \hline \end{array}$$

.....
.....
.....

f

$$\begin{array}{r} 2598 \\ \times 63 \\ \hline \end{array}$$

.....
.....
.....

g

$$\begin{array}{r} 4107 \\ \times 85 \\ \hline \end{array}$$

.....
.....
.....

h

$$\begin{array}{r} 7612 \\ \times 48 \\ \hline \end{array}$$

.....
.....
.....

Set the following down in the manner shown above and find :-

a 236×17

b 805×26

c 37×549

d 73×1023

e 8204×29

f 7777×54

g 4706×83

h 57×9217

<https://corbettmaths.com/wp-content/uploads/2018/01/multiplication-1-grid.pdf> - additional practice

Multiplying Decimals

<https://youtu.be/XLRJ8y5duc0> - video notes

To find 7.38×9

$$\begin{array}{r} 7.38 \\ \times 9 \\ \hline \end{array}$$

$$\begin{array}{r} 66.42 \\ \hline \end{array}$$

remember the point

It helps to copy
the decimal point
straight down
from where it is.

Copy these and find the answers :-

a $\begin{array}{r} 4.48 \\ \times 5 \\ \hline \\ \hline \end{array}$

b $\begin{array}{r} 3.76 \\ \times 6 \\ \hline \\ \hline \end{array}$

c $\begin{array}{r} 6.07 \\ \times 8 \\ \hline \\ \hline \end{array}$

d $\begin{array}{r} 9.89 \\ \times 3 \\ \hline \\ \hline \end{array}$

e $\begin{array}{r} 13.14 \\ \times 7 \\ \hline \\ \hline \end{array}$

f $\begin{array}{r} 0.97 \\ \times 9 \\ \hline \\ \hline \end{array}$

g $\begin{array}{r} 47.88 \\ \times 2 \\ \hline \\ \hline \end{array}$

h $\begin{array}{r} 24.36 \\ \times 8 \\ \hline \\ \hline \end{array}$

i $\begin{array}{r} 7.45 \\ \times 9 \\ \hline \\ \hline \end{array}$

j 19.74×5

k 12.57×6

l 8×11.25

a



A packet of Rolchies weighs 32.74 grams.
What is the weight of 5 packets ?

b

The driver of this taxi charges £2.49 per mile.

My house is 7 miles from my office.

How much will I be charged for a taxi journey home from work ?



c



Joe bought 8 metres of fencing at
£7.85 per metre.

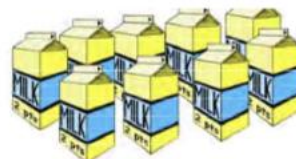
How much did it cost him ?

d

I bought 9 two pint cartons of milk.

2 pints is the same as 1.14 litres.

How many litres of milk have I got ?



<https://corbettmaths.com/wp-content/uploads/2018/01/multiplying-decimals-textbook-pdf.pdf> - additional practice

Whole number x 10, 100, 1000

<https://youtu.be/1-q-31464D8> - video notes

Learn these rules

Example :-

$$117 \times 10 = 1170$$

Simple Rule for Whole Numbers :-

If you multiply by 10, simply add a 0 at the end.

If you multiply by 100, simply add two 0's at the end.

If you multiply by 1000, simply add three 0's at the end.

Write down the answers to the following :-

- | | | | |
|--------------------|--------------------|---------------------|---------------------|
| a 19×10 | b 12×10 | c 37×10 | d 10×93 |
| e 10×117 | f 205×10 | g 10×346 | h 10×1850 |
| i 2060×10 | j 2875×10 | k 10×54321 | l 23050×10 |

Write down the answers to the following :-

- | | | | |
|---------------------|---------------------|---------------------|----------------------|
| a 26×100 | b 58×100 | c 100×122 | d 100×300 |
| e 4050×100 | f 100×1006 | g 100×9500 | h 80600×100 |

Write down the answers to these :-

- | | | | |
|---------------------|----------------------|----------------------|-----------------------|
| a 17×1000 | b 213×1000 | c 360×1000 | d 1000×930 |
| e 1000×400 | f 1240×1000 | g 1000×3800 | h 1000×52020 |

A jar contain 100 lollipops. How many lollies are there in :-

- | | | |
|-----------|-----------|--------------|
| a 13 jars | b 27 jars | c 214 jars ? |
|-----------|-----------|--------------|

There are 1000 metres in 1 kilometre. How many metres are there in :-

- | | | | |
|--------|---------|----------|-------------|
| a 7 km | b 23 km | c 320 km | d 3005 km ? |
|--------|---------|----------|-------------|

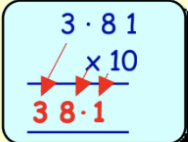
Decimals x 10, 100, 1000

Can you remember when you multiplied a whole number by 10 you simply added a 0 on to the end ?

$$36 \times 10 = 360$$

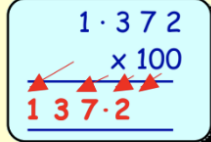
This rule does **not** work for decimals.

To find 3.81×10

=> 

move all the figures **1 place left**

To find 1.372×100

=> 

move all the figures **2 places left**

Simple Rules :-

To multiply by 10 => move the **figures 1 place to the left.**
=> (or move **the point 1 place to the right.**)
To multiply by 100 => move the **figures 2 places to the left.**
=> (or move **the point 2 places to the right.**)

Write down the answers to the following by using the 1st rule above :-

- | | | | |
|---------------------|--------------------|--------------------|--------------------|
| a 10×7.61 | b 10×1.82 | c 10×0.69 | d 10×6.32 |
| e 16.18×10 | f 47.5×10 | g 0.03×10 | h 10×1.08 |

Write down the answers to the following by using the 2nd rule above :-

- | | | | |
|----------------------|----------------------|----------------------|----------------------|
| a 9.32×100 | b 100×3.57 | c 1.264×100 | d 0.873×100 |
| e 100×12.18 | f 1.049×100 | g 0.001×100 | h 100×7.5 |

A carpet tack weighs 0.19 grams.

Calculate the weight of :-



- a 10 tacks b 100 tacks.

A bottle holds 1.15 litres of champagne.

How many litres are there in :-

- a 10 bottles b 100 bottles ?

Extend the above rules to help find the answers to the following :-

- | | | |
|-------------------------|-----------------------|------------------------|
| a 1.225×1000 | b 0.467×1000 | c 13.18×1000 |
| d 0.00426×1000 | e 1000×0.003 | f 0.0505×1000 |

<https://corbettmaths.com/wp-content/uploads/2018/09/Multiplication-by-10-100-1000-pdf.pdf> - additional practice

To multiply 84×20

Step 1 Find $84 \times 10 = 840$

Step 2 Now find $\begin{array}{r} 840 \\ \times 2 \\ \hline 1680 \end{array}$

To multiply 124×300

Step 1 Find $124 \times 100 = 12\,400$

Step 2 Now find $\begin{array}{r} 12\,400 \\ \times 3 \\ \hline 37\,200 \end{array}$

Try to do the following **mentally** :- (use the 2-step approach)

a 23×30

b 31×40

c 12×80

d 52×60

e 20×112

f 50×403

g 41×900

h 600×62

i 115×700

j 300×423

k 2000×43

l 120×4000



Calculate each of the following (not necessarily mentally) :-

a 215×30

[Find 10×215 first = 2150 and then find 2150×3]

b 519×50

c 406×40

d 2145×80

e 810×90

f 3156×70

g 2708×60

Work out each of the following using the 2 steps shown :-

a 304×300

[Find 304×100 first = 30 400 and then find $30\,400 \times 3$]

b 241×200

c 123×600

d 134×800

e 412×500

f 203×700

g 431×400

h 900×205

i 600×711

j 2000×621

k 402×5000

l 341×3000

m 623×4000

n 9000×117

o 6000×2015

p 7000×3120

There is a quick way of doing the following multiplications **mentally** :-

Example :- $70\,000 \times 4000$

=> simply find $7 \times 4 (= 28)$ and add on **7** zeros => $280\,000\,000$

Do the following **mentally** :-

a 40×30

b 60×40

c 900×80

d 500×60

e 20×3000

f 50×400

g 800×900

h 600×700

i 4000×600

j 300×8000

k 2000×4000

l 8000×9000



Division

Division by a Single digit

<https://youtu.be/q3Jk6W4oDgw> - video notes

$$\begin{array}{r} 732 \\ 8 \overline{) 5856} \end{array}$$

Copy the following and complete the calculation :-

a $7 \overline{) 3808}$

b $5 \overline{) 9265}$

c $6 \overline{) 7434}$

d $8 \overline{) 5216}$

e $4 \overline{) 6384}$

f $3 \overline{) 7008}$

g $7 \overline{) 8764}$

h $9 \overline{) 8865}$

Set the following down in the same way as above and complete the calculation :-

a $5915 \div 7$

b $4752 \div 2$

c $9465 \div 5$

d $8703 \div 9$

e $7728 \div 8$

f $6316 \div 4$

g $8706 \div 6$

h $6561 \div 3$

i $6858 \div 9$

j $\frac{5033}{7}$

k $\frac{1936}{4}$

l $4536 \div 8$

m $\frac{9072}{6}$

n $6735 \div 5$

o $\frac{7533}{9}$

p $\frac{6083}{7}$

Show how you obtain your answers to the following :-

- a A week consists of 7 days.
How many weeks are there in 805 days ?

- b Eggs are packed into boxes of 6.
How many boxes are needed to pack 4086 eggs ?

- c Nine people won a total of £5283. If it is shared **equally** amongst them, how much will each receive ?

d



Chocolate biscuits are packed into jars of 8.
One day, the factory produces 7552 biscuits.
How many jars are needed to pack them all ?

Division by Decimals

<https://youtu.be/6FHL3J3FYaE> - video notes

Remember to copy the decimal point up to the line above.

To find :- $25.76 \div 7$

=>

$$\begin{array}{r} 3.68 \\ 7 \overline{) 25.76} \end{array}$$

remember the point

copy up

Copy and do the following :-

a $2 \overline{) 14.86}$

b $3 \overline{) 17.01}$

c $4 \overline{) 27.56}$

d $5 \overline{) 27.75}$

e $6 \overline{) 46.08}$

f $7 \overline{) 39.34}$

g $8 \overline{) 53.76}$

h $9 \overline{) 31.77}$

i $6 \overline{) 2.52}$


j $42.15 \div 5$

k $20.32 \div 8$

l $12.18 \div 7$

- a Share £62.16 equally amongst 4 men.
How much will each receive?



- b  Cut a piece of tape 43.62 centimetres long into 6 equal pieces.
What length is each piece?

- c Five farmers equally split 78.55 acres of land among themselves.
How much land will each farmer get?



<https://corbettmaths.com/wp-content/uploads/2018/11/Dividing-Decimals-by-whole-numbers-pdf.pdf> - additional practice

Whole numbers \div 10, 100, 1000

<https://youtu.be/IN2347MFlps> - video notes

Learn these rules

Example :-

$$8200 \div 10 = 820$$

Simple Rule for Whole Numbers :-

If you divide by 10, simply remove the last 0.

If you divide by 100, simply remove the last **two** 0's.

If you divide by 1000, simply remove the last **three** 0's.

Write down the answers to the following :-

a $180 \div 10$

b $260 \div 10$

c $480 \div 10$

d $1230 \div 10$

e $7600 \div 10$

f $40\,200 \div 10$

g $69\,300 \div 10$

h $51\,000 \div 10$

i $10\,000 \div 10$

j $143\,000 \div 10$

k $200\,000 \div 10$

l $5\,050\,500 \div 10$



Write down the answers to the following :-

a $900 \div 100 = \dots\dots$

b $1700 \div 100$

c $5200 \div 100$

d $16\,000 \div 100$

e $8000 \div 100$

f $105\,000 \div 100$

g $20\,000 \div 100$

h $1\,400\,000 \div 100$

Write down the answers to the following :-

a $7000 \div 1000$

b $29\,000 \div 1000$

c $78\,000 \div 1000$

d $30\,000 \div 1000$

e $265\,000 \div 1000$

f $370\,000 \div 1000$

g $900\,000 \div 1000$

h $3\,100\,000 \div 1000$

A hospital box holds 100 samples. How many boxes are needed to hold :-

a 1300 samples

b 37 000 samples

c 120 000 samples ?

There are 1000 grams in 1 kilogram. How many kilograms are there in :-

a 15 000 grams

b 56 000 grams

c 160 000 grams

d 1 000 000 grams ?

There are 10 millimetres in 1 centimetre, 100 centimetres in 1 metre and 1000 metres in 1 kilometres. How many kilometres are equivalent to :-

a 7000 m

b 600 000 cm

c 5 000 000 mm ?

Decimals $\div 10, 100, 1000$

We have just given a rule that said :-

To Multiply by 10

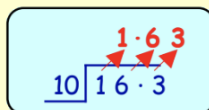
Move all the figures
1 place to the left

=> Now =>

To Divide by 10

Move all the figures
1 place to the right

$$16 \cdot 3 \div 10 \Rightarrow$$



The new rule for dividing by 100 is similar :-

To Multiply by 100

Move all the figures
2 places to the left

=> Now =>

To Divide by 100

Move all the figures
2 places to the right

Find the following :-

a $\underline{1000} \overline{)247 \cdot 1}$

b $\underline{1000} \overline{)1649}$

c $\underline{1000} \overline{)23 \cdot 5}$

d $365 \cdot 2 \div 1000$

e $69 \div 1000$

f $6750 \div 1000$

g $\frac{650}{1000}$

h $\frac{3275}{1000}$

i $\frac{25 \cdot 8}{1000}$

a If 10 packets of chews cost £5.40, what will one packet cost ?

b If a box of 100 doughnuts costs £4, what will one doughnut cost ?

c 1000 screws weigh 6.14 kg. What will one screw weigh ?

d 10 metal strips together measure 87 cm. What is the width of one strip ?

e 100 tins of beans weigh 15 000 grams. What will one tin weigh ?



To change from millimetres to centimetres, you "divide by 10".

Change each of the following to centimetres :-

a 12 mm

b 42 mm

c 5.8 mm

d 3.0 mm

e 0.7 mm.

To change from centimetres to metres, you "divide by 100".

Change each of the following to metres :-

a 422 cm

b 805 cm

c 99 cm

d 46.7 cm

e 5.8 cm.

To find $2160 \div 40$, do it in **TWO** steps as follows :-

Step 1 :-

find $2160 \div 10$ first ($= 216$)

Step 2 :-

then find $216 \div 4 \Rightarrow$

$$\begin{array}{r} 54 \\ 4 \overline{) 216} \end{array}$$

Example :- $120\,000 \div 4000$

\Rightarrow simply cancel out **equal numbers** of zeros $120\cancel{000} \div 4\cancel{000}$

\Rightarrow then do the simpler division $120 \div 4 = 30$

Do the following **mentally** :-

a $1500 \div 30$

b $2400 \div 40$

c $64\,000 \div 80$

d $12\,000 \div 600$

e $120\,000 \div 3000$

f $800\,000 \div 400$

g $7\,200\,000 \div 900$

h $56\,700\,000 \div 700$

i $4\,800\,000 \div 800$

j $3\,360\,000 \div 8000$

k $20\,000\,000 \div 4000$

l $8\,280\,000 \div 9000$



Do the following divisions, using the same method as shown above :-

a $390 \div 30$ (Find $390 \div 10 = 39$ and then find $3 \overline{) 39}$).

b $180 \div 20$

c $2250 \div 50$

d $3200 \div 80$

e $13\,200 \div 40$

f $40\,800 \div 60$

g $46\,000 \div 50$.

Divide the following :-

a $18\,200 \div 200$ (Find $18\,200 \div 100 = 182$ and then find $2 \overline{) 182}$).

b $21\,900 \div 300$

c $16\,400 \div 400$

d $32\,500 \div 500$

e $17\,600 \div 200$

f $24\,800 \div 800$

g $819\,000 \div 900$.

Solving problems using addition, subtraction, multiplication & division

Addition, Subtraction, Multiplication & Division

In the following exercise you will have to carefully read each problem and decide whether to use $+$, $-$, \times or \div 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.

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

Combined pay is **£44 731**.

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

This is a $-$ problem.



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

Jan earns **£3 605** more than Jason.

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

This is a \times problem.

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

Jason would earn **£61 689**.

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

This is a \div problem.

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

Jan earns **£6 042** every 3 months.

$\div 4$, as there are 4 lots of 3 months in a year.

Be able to solve problems using mathematical operations



1. As a bus arrived at a stop, there were 38 people on board. At the stop, a further 17 passengers got on. How many were there now on the bus ?



2.  On January 1st 2011, I noted that my car had done 28 312 miles. On January 1st 2012, the reading on the odometer was 41 187. How many miles had my car covered over the year ?

3. A palette holds 1275 pots of noodles. How many pots are there altogether in 6 palettes ?



4.  A week consists of 7 days. How many weeks are there in 805 days ?

5. Find the answer to $5 \times 568 \div 8$.


6. 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 ?



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


8. 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 ?



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

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





11.  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 ?

12. 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 (2 adults + 2 kids)		£25.75


You may use a calculator from Question 12 onwards

13.  The total bill for 8 ladies who went on a golfing weekend including accommodation and two rounds of golf, came to £2158.
How much did each lady pay if the bill was shared evenly ?

14. It costs £7.95 for an adult and £4.80 for a child to go to the cinema in London.
How much did it cost for a party consisting of 4 adults and 5 children to go watch a film while they were in London ?



15. Alfredo's sell boxes of mini pizzas.
A box of 6 costs £16.50 and a box of 4 costs £11.40.
Which is the better deal ? Explain your answer with working.



Powers & Roots

<https://youtu.be/63qQOYbZS0g> video notes

<https://youtu.be/YgxUCo94-xk>

Squares, Cubes and Powers (Indices)

- To **square** a number means to **multiply it by itself**.

e.g. the "square" of 4 is .. $4 \times 4 = 16$ (not 4×2).

This is shortened to "4 squared = $4 \times 4 = 16$ ",

or better still $4^2 = 4 \times 4 = 16$. (4^2 is read as **four squared**).

$$4^2$$

Be able to square & cube numbers and also raise them to a power

- To **cube** a number means to **multiply it by itself, then itself again**.

e.g. the "cube" of 2 is $2 \times 2 \times 2 = 8$ (not 2×3).

This is shortened to "2 cubed = $2 \times 2 \times 2 = 8$ ", or better still $2^3 = 2 \times 2 \times 2 = 8$.

(2^3 is read as "two cubed")

$$2^3$$

The smaller number on the right shoulder is known as an **index** (plural "indices") or a **power**.

Example :-

$$3^5 \text{ (read as 3 to the power of 5) } = 3 \times 3 \times 3 \times 3 \times 3 = 243.$$

1. Do **not** use a calculator in this question. Copy and complete the following. :-

a $3^2 = 3 \times 3 = \dots$

b $5^2 = 5 \times 5 = \dots$

c $6^2 = 6 \times \dots = \dots$

d $8^2 = \dots \times \dots = \dots$

e $7^2 =$

f $9^2 =$

g $10^2 =$

h $1^2 =$

i $20^2 =$

j $(-1)^2 =$

k $(-8)^2 =$

l $(\frac{1}{2})^2 =$

m $4^3 = 4 \times 4 \times 4 = \dots$

n $3^3 = 3 \times 3 \times \dots = \dots$

o $5^3 = \dots \times \dots \times \dots = \dots$

p $6^3 = \dots \times \dots = \dots$

q $1^3 =$

r $10^3 =$

s $(-1)^3 =$

t $(-2)^2 =$

u $(\frac{1}{2})^3 =$

v $2^4 =$

w $3^6 =$

x $4^5 =$

2. You **can** use a calculator this time. Find the value of :-

a 13^2

b 17^2

c 21^2

d 26^2

e 37^2

f 100^2

g 19^2

h 300^2

i 29^2

j 51^2

k 43^2

l 58^2

m 8^3

n 12^3

o 19^3

p 25^3

q $(-9)^3$

r $(\frac{1}{7})^3$

s 6^4

t 7^7

u 2^8

v 3^{10}

w 10^6

x 20^5

<https://corbettmaths.com/wp-content/uploads/2018/09/Squaring-Numbers-pdf.pdf> -

additional practice square numbers

<https://corbettmaths.com/wp-content/uploads/2018/11/Cube-numbers-pdf.pdf> -

additional practice cube numbers

Square Roots and Cube Roots

Square Root

You already know how to find "six squared" $6^2 = 6 \times 6 = 36$.

We can reverse this process by asking "what number, times itself, gives 36"?

From above, you can see that the answer must be 6.

We say that "the square root of 36 is 6", which shortens to

$$\sqrt{36} = 6$$

Be able to find the square root of any number and some simple cube roots



<https://youtu.be/oSfs9mGOIU> - video notes

Copy each line and complete :-

a since $3^2 = 9 \Rightarrow \sqrt{9} = 3$

b since $5^2 = 25 \Rightarrow \sqrt{25} = \dots$

c since $7^2 = 49 \Rightarrow \sqrt{49} = \dots$

d since $8^2 = 64 \Rightarrow \sqrt{64} = \dots$

e since $9^2 = ? \Rightarrow \sqrt{?} = \dots$

f since $10^2 = ? \Rightarrow \sqrt{?} = \dots$



Write down the answer to each of the following :-

a $\sqrt{16}$

b $\sqrt{1}$

c $\sqrt{400}$

d $\sqrt{900}$

You can now use the " $\sqrt{\quad}$ " button on your calculator to find :-

a $\sqrt{400}$

b $\sqrt{900}$

c $\sqrt{121}$

d $\sqrt{361}$

e $\sqrt{225}$

f $\sqrt{256}$

g $\sqrt{169}$

h $\sqrt{289}$

i $\sqrt{1.44}$

j $\sqrt{20.25}$



Most square roots are **not exact** :- $\sqrt{19} = 4.358898944 = 4.36$ (to 2 decimal places)

Use your calculator to find the following to **two decimal places** :-

a $\sqrt{17}$

b $\sqrt{26}$

c $\sqrt{34}$

d $\sqrt{71}$

e $\sqrt{95}$

f $\sqrt{109}$

g $\sqrt{186}$

h $\sqrt{600}$

i $\sqrt{750}$

j $\sqrt{1000}$

<https://corbettmaths.com/wp-content/uploads/2018/09/Square-Root-pdf.pdf> - additional practice

https://youtu.be/2Xn_mYEoct4 - video notes

Cube Root

At this stage, we will look only at simple examples.

As "two cubed" $2^3 = 2 \times 2 \times 2 = 8$, then the "cube root" of 8 is 2.

i.e. "what number \times itself, \times itself again gives 8"?

$$\sqrt[3]{8} = 2$$

$$\sqrt[3]{8}$$

6. The answers to these questions are all whole numbers. Find :-

a $\sqrt[3]{27}$

b $\sqrt[3]{64}$

c $\sqrt[3]{125}$

d $\sqrt[3]{1000}$

e $\sqrt[3]{1000000}$

<https://corbettmaths.com/wp-content/uploads/2018/11/Cube-root-pdf.pdf> - additional practice

BODMAS

<https://youtu.be/if8ZsZXhQJE> - video notes

Many calculations have to be completed in a **specific order**.

(You will find out much later in Mathematics why!)

using the order
of operations

Example :- For $3 + 4 \times 2$ the answer is **NOT** .. $7 \times 2 = 14$. The answer **IS** $3 + 8 = 11$.

An easy way to remember which part of a calculation comes first is using the mnemonic **BODMAS**.

Example 1

$$5 + 3 \times 2$$

Multiply first

$$= 5 + 6$$

$$= 11$$

Example 2

one half of $30 \div 5$

Of first

$$= 15 \div 5$$

$$= 3$$

Example 3

$$(18 - 2) \div (2 \times 4)$$

Brackets first

$$= 16 \div 8$$

$$= 2$$

• **Multiply & Divide** rank equally
• **Add & Subtract** rank equally

1	2	3	4
B	O	M	A
		or	or
		D	S

After you have done any **B**(rackets) or **O**(f), then go from left to right doing any **M**(ultiplication) or **D**(ivision) as you find them. Then go from left to right doing any **A**(ddition) or **S**(ubtraction) as you find them.

Calculate :-

a $20 - 12 + 2 - 10$

b quarter of $20 \div 5$

c fifth of $50 - 10$

d $\frac{1}{2}$ of $16 \div 4$

e $10 + \frac{1}{3}$ of 15

f $13 - \frac{1}{4}$ of $12 + 2$

g $5 \times 3 - 12 \div 4 + 8$

h $5 \times 4 - 2 \times 3 + 16 \div 4$

i $13 - \frac{1}{4}$ of $(20 - 8)$.

Find, showing two more steps each time :-

a $5 + (12 \div 2)$

b $16 \div (10 - 2)$

c $5 \times (6 + 3)$

d $100 \div (6 + 4)$

e $6 \times (7 + 2) - 24$

f $(5 + 2) \times (6 - 2) + 5$.

a What is the answer to $3 + 2 \times 4$

(i) 20

or

(ii) 11 ?

b What is the answer to $5 + 3 \times 3$

(i) 24

or

(ii) 14 ?

c What is the answer to $12 - 2 \times 4$

(i) 4

or

(ii) 40 ?

d What is the answer to $4 \times (6 - 2)$

(i) 16

or

(ii) 22 ?

e $16 + 4 \times 3$

f $5 \times 7 - 1$

g $10 + 4 \div 2$

h $3 + 4 \times 2$

i $3 + (4 \times 2)$

j $(3 + 4) \times 2$

k $\frac{1}{2}$ of $6 + 4$

l $\frac{1}{2}$ of $(6 + 4)$.

Find :-

a $100 \div 4 + 5 \times 2$

b a quarter of $(16 + 4)$

c $6 \times (5 + 4)$

d $6 \times 5 + 4$

e $6 + 5 \times 4$

f $(6 + 5) \times 4$

g $100 - \frac{1}{2}$ of 10×10

h $\frac{1}{2}$ of $(\frac{1}{3}$ of 12)

i $((6 + 4) + 2) \times 3 - (20 + 2)$.

Copy each of the following and **insert brackets** to make each calculation correct :-

a $5 + 3 \times 2 = 16$

b $18 - 5 \times 2 = 8$

c $20 + 4 \div 6 = 4$

d $10 + 6 \div 2 \times 5 = 25$

e $10 + 20 \div 5 - 1 = 15$

f $5 + 2 \times 8 - 6 \div 2 = 7$.

<https://corbettmaths.com/wp-content/uploads/2018/11/Order-of-Operations-Exercise-211-pdf.pdf> - additional practice

Brackets
Of
Multiplication
Division
Addition
Subtraction

Rounding

<https://youtu.be/a33QG-6kgVc> - video notes

Round to any number of Decimal Places

Be able to
round a number
to any
decimal place

In book 2b, you learned how to round a number to the nearest 10, 100 or 1000 by deciding which multiple of 10, 100 or 1000 the number was closer to.

When rounding to :-

- | | | |
|-------------------------------|--|--------------------------|
| 1 Decimal Place | look at the 2nd decimal figure. | e.g. 5· 1 38 |
| 2 Decimal Places | look at the 3rd decimal figure. | e.g. 7·45 1 7 |
| 3 Decimal Places | look at the 4th decimal figure. | e.g. 11·513 2 9 |
| 4 Decimal Places | look at the 5th decimal figure. | e.g. 0·7617 9 81. |

if this figure is a 5, 6, 7, 8 or 9 => round the digit **before** that figure **UP** by 1.

if this figure is a 0, 1, 2, 3 or 4 => **leave** the digit before it as it is.

Example :- Examine the decimal number 4·2615937.

Rounded to 1 dec. pl.	4·2 6 15937 = 4·3	(a "6", so round the "2" UP)
Rounded to 2 dec. pl.	4·26 1 5937 = 4·26	(a "1", so leave the "6" as it is)
Rounded to 3 dec. pl.	4·261 5 937 = 4·262	(a "5", so round the "1" UP)
Rounded to 4 dec. pl.	4·2615 9 37 = 4·2616	(a "9", so round the "5" UP).

Round each of these numbers to **1 decimal place** :-

- | | | | |
|-----------------|------------------|------------------|--------------------|
| a 4·24 | b 3·48 | c 6·451 | d 7·2923 |
| e 9·351 | f 0·5199 | g 10·946 | h 8·9913 |
| i 10·555 | j 0·94999 | k 19·9512 | l 99·99111. |

Round each of these numbers to **2 decimal places** :-

- | | | | |
|-----------------|-----------------|------------------|-------------------|
| a 7·583 | b 9·627 | c 3·98512 | d 5·3991 |
| e 0·2451 | f 13·484 | g 9·0523 | h 4·9926 |
| i 9·951 | j 0·5199 | k 9·996 | l 99·9953. |

Round each of these numbers to **3 decimal places** :-

- | | | | |
|------------------|-------------------|-------------------|-------------------|
| a 8·7923 | b 11·5047 | c 0·2987 | d 215·4025 |
| e 2·45712 | f 10·08082 | g 34·99912 | h 2·99999. |

Round each of these numbers to the number of decimal places in the brackets :-

- | | | |
|----------------------|----------------------|----------------------|
| a 24.54 (1) | b 1.765 (2) | c 0.8156 (3) |
| d 8.7654 (2) | e 9.789 (2) | f 0.55555 (3) |
| g 10.1469 (2) | h 0.54321 (4) | i 11.631 (0) |
| j 1.99999 (3) | k 23.7684 (2) | l 99.99 (1). |

Use your calculator to carry out each of these calculations, then round to **2 decimal places** :-

- | | |
|----------------------------|------------------------------|
| a $3.157 + 7.998$ | b $26.954 - 17.895$ |
| c $14.795 + 5.2$ | d $134.37 - 72.478$ |
| e $14.795 \div 5$ | f 26.9×37.84 |
| g $14 \div 9$ | h $434.3 \div 72.4$ |
| i 3.17×7.8 | j 16.9×17.84 |
| k $114 \div 17.6$ | l $134.3 \div 42.4$. |



Do these calculations, then round each answer to the number of decimal places shown in the brackets :-

- | | | |
|----------------------------------|-----------------------------------|---|
| a 4.67×0.358 (3) | b 0.254×9.777 (2) | c 8.847×2.584 (3) |
| d $0.29 \div 4.145$ (4) | e $17.35 \div 19.887$ (1) | f $0.3 \times 0.24 \times 0.99$ (4). |

<https://corbettmaths.com/wp-content/uploads/2019/01/Rounding-decimal-places-pdf.pdf> - additional practice

Rounding using Significant Figures

In mathematics, a figure or digit in a number is "significant" if it gives some sense of **Quantity & Accuracy**.

"Zeros" can be complicated - when do we count them?
when do we ignore them?

If zeros are used only to show where the position of the decimal point is, then they are NOT significant.

Be able to round a number to any given significant figure.

Example 1 :-

503 has 3 significant figures 50.3 has 3 significant figures
5.03 has 3 significant figures 0.503 has 3 significant figures
0.05030 has 4 significant figures
(The front zero positions the decimal point, BUT trailing zeros shows accuracy).

Example 2 :-

8275 rounded to 1 significant figure \Rightarrow 8000
13 232 rounded to 3 significant figures \Rightarrow 13 200
1.5579 rounded to 3 significant figures \Rightarrow 1.56
0.007 762 rounded to 2 significant figures \Rightarrow 0.0078

Round each number to 1 significant figure :-

a 52	b 374	c 7229	d 67187
e 3199	f 2799	g 4.73	h 0.056
i 0.654	j 0.0067	k 0.000741	l 29.12.

Round each number to 2 significant figures :-

a 306	b 7149	c 20900	d 452135
e 36.57	f 46.64	g 8.183	h 0.321
i 0.496	j 0.005594	k 0.03433	l 39.112.

Round each number to 3 significant figures :-

a 4583	b 36076	c 99456	d 456399
e 9.321	f 22.817	g 0.451345	h 0.765198
i 0.004615	j 0.01093	k 0.03487	l 0.099999.

Using Rounding to find estimates

<https://youtu.be/l00tsmfk8oQ> - video notes

Estimating using Significant Figures

Significant Figures can be used to estimate an answer to any calculation.

Examples :-

Round each number to **1 significant figure** and estimate :-

1. $6587 + 2189$

$$\Rightarrow 7000 + 2000 \\ = 9000$$

2. 372×197

$$\Rightarrow 400 \times 200 \\ = 80000$$

3. $5381 \div 46$

$$\Rightarrow 5000 \div 50 \\ = 100$$

Be able to estimate an answer using significant figures

1. Round each number to **1 significant figure** to estimate each calculation :-

a $4531 + 1771$

b $87542 - 14876$

c $131871 + 72114$

d $33155 - 11517$

e 136×54

f 346×173

g 1175×457

h 542×777

i $419 \div 14$

j $1873 \div 223$

k $111554 \div 1881$

l $22761 \div 449$

2. Round each number to **2 significant figures** to estimate each calculation :-

a $7956 + 1453$

b $62275 - 11615$

c 1788×196

d 10123×119

e $89514 \div 297$

f $237123 \div 997$

3. Round each number to **1 significant figure** to estimate each calculation :-

a $395 + 115 \times 19$

b $315 \times 581 - 29745$

c $1960 \div 41 + 172$

d $1.23 + 1.9 \times 3.7$

e $19.4 - 2.95 \times 6.199$

f $23.3 \div 11.98 + 29.13$

4. Round each number to **1 significant figure** to estimate each calculation :-

a In an orchard, one hundred and ninety two apples are put into each barrel.
How many apples are there in 53 barrels ?

b There are 9156 pages in 327 identical magazines.
How many pages are in each magazine ?

5. Use a calculator to find the exact answers to questions 1-4.
Compare each answer to your estimate.



<https://corbettmaths.com/wp-content/uploads/2018/10/Estimation-pdf.pdf> - additional practice