

TARGET To add and subtract whole numbers using written methods.

Examples

$$\begin{array}{r} 84\ 759 \\ + 25\ 963 \\ \hline 110\ 722 \\ \small{1\ 1\ 1\ 1} \end{array}$$

$$\begin{array}{r} \small{8\ 11\ 1410\ 1} \\ 92\ 513 \\ - 17\ 548 \\ \hline 74\ 965 \end{array}$$

A

Copy and complete.

- | | |
|-------------------------|--------------------------|
| 1 2748
+ 1875 | 7 3453
- 1947 |
| 2 4583
+ 1679 | 8 5215
- 2340 |
| 3 5469
+ 3537 | 9 9491
- 6626 |
| 4 3795
+ 1648 | 10 4106
- 1893 |
| 5 6857
+ 2379 | 11 7342
- 3587 |
| 6 4674
+ 2956 | 12 6530
- 1745 |

- 13** North Yorkshire has an area of 8309 km². South Yorkshire's area is 1560 km². How much larger is the more northerly county?



B

Copy and complete.

- | | |
|-----------------------------|------------------------------|
| 1 29 756
+ 26 245 | 7 85 144
- 32 375 |
| 2 56 945
+ 27 382 | 8 32 317
- 28 698 |
| 3 37 567
+ 21 964 | 9 64 523
- 48 549 |
| 4 48 378
+ 39 776 | 10 71 431
- 52 485 |
| 5 25 693
+ 15 858 | 11 93 250
- 34 593 |
| 6 63 859
+ 16 432 | 12 46 365
- 36 398 |

- 13** During the year 32 786 fiction and 18 259 non-fiction books are bought from a shop. How many books are bought altogether?
- 14** A warehouse has 63 170 sacks of potatoes in stock. 29 485 sacks are dispatched. How many sacks are left?

C

Set out as in the example.

- | |
|--|
| 1 166 594 + 93 889 |
| 2 305 737 + 299 390 |
| 3 578 479 + 412 791 |
| 4 243 685 + 188 556 |
| 5 459 368 + 249 767 |
| 6 387 846 + 316 858 |
| 7 424 512 - 236 678 |
| 8 343 354 - 156 759 |
| 9 602 635 - 236 797 |
| 10 833 128 - 548 199 |
| 11 590 243 - 496 475 |
| 12 911 570 - 256 992 |
| 13 A store has takings of £639 827 in a week. During the next week takings rise by £275 984. What are the store's takings in the second week? |
| 14 The population of Longport is 726 540. The population of Bridgeford is 559 856. How many more people live in Longport than Bridgeford? |

Mastery

Fill in the missing numbers:

$$+ \begin{array}{r} 9\ 1\ 7\ 6\ 9 \\ \hline 1\ 4\ 7\ 3\ 9\ 5 \end{array}$$

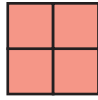
$$- \begin{array}{r} 6\ 5\ 2\ 3\ 9 \\ \hline 4\ 0\ 0\ 9\ 4 \end{array}$$

TARGET To recognise and use square numbers.

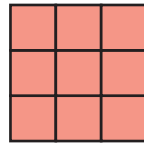
When a number is multiplied by itself you get a square number. They are called square numbers because they make square patterns.



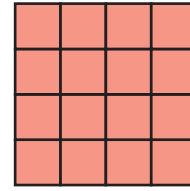
$$1^2 = 1 \times 1 = 1$$



$$2^2 = 2 \times 2 = 4$$



$$3^2 = 3 \times 3 = 9$$



$$4^2 = 4 \times 4 = 16$$

A

1 Complete this table up to 12^2 .

$$1^2 = 1 \times 1 = 1$$

$$2^2 = 2 \times 2 = 4$$

$$3^2 = 3 \times 3 = 9$$

Work out the area of each square.

2



7



3



8



4



9



5



10



6



11



B

Work out

1 $5^2 + 2^2$

7 $10^2 + 6^2$

2 $11^2 + 4^2$

8 $7^2 + 3^2$

3 $6^2 + 3^2$

9 $12^2 + 1^2$

4 $7^2 - 4^2$

10 $10^2 - 5^2$

5 $9^2 - 5^2$

11 $11^2 - 9^2$

6 $8^2 - 2^2$

12 $8^2 - 4^2$

Work out

13 10^2

19 70^2

14 20^2

20 50^2

15 60^2

21 40^2

16 80^2

22 90^2

17 30^2

23 120^2

18 110^2

24 100^2

Find a pair of square numbers which give a total of:

25 20

31 2000

26 85

32 6500

27 37

33 9000

28 89

34 14 900

29 153

35 6100

30 170

36 7200

C

Work out

1 100^2

7 $100^2 - 70^2$

2 200^2

8 $40^2 + 20^2$

3 500^2

9 $70^2 - 30^2$

4 800^2

10 $60^2 + 50^2$

5 600^2

11 $90^2 - 30^2$

6 1000^2

12 $80^2 + 40^2$

Lagrange's Theorem

Every whole number can be written as the sum of four or fewer square numbers.

Examples

$$19 = 16 + 1 + 1 + 1$$

$$35 = 25 + 9 + 1$$

Make the following numbers from four or fewer square numbers.

13 23

19 123

14 31

20 142

15 48

21 483

16 63

22 933

17 79

23 3485

18 96

24 8058

Mastery

Which three square numbers could complete this sum?

$$\underline{\quad} - \underline{\quad} = \underline{\quad}$$

Is there more than one solution?

TARGET To round decimals to the nearest whole number or tenth.

Always look at the column to the right of that to which you are rounding.
5 or more, round up. Less than 5, round down.

Examples

Round to the nearest whole number. $5.\underline{1}8 \rightarrow 5$ $7.\underline{5}3 \rightarrow 8$
Round to the nearest tenth. $5.\underline{1}8 \rightarrow 5.2$ $7.\underline{5}3 \rightarrow 7.5$

A

Round to the nearest whole number.

- | | |
|--------|----------|
| 1 0.6 | 7 15.84 |
| 2 3.28 | 8 2.9 |
| 3 6.5 | 9 16.3 |
| 4 12.7 | 10 0.52 |
| 5 1.05 | 11 10.17 |
| 6 18.4 | 12 21.63 |

Round to the nearest pound.

- | | |
|-----------|-----------|
| 13 £4.25 | 19 £2.62 |
| 14 £11.73 | 20 £8.07 |
| 15 £5.48 | 21 £10.83 |
| 16 £9.52 | 22 £7.28 |
| 17 £16.90 | 23 £1.54 |
| 18 £3.17 | 24 £15.39 |

Approximate by rounding to the nearest pound.

- 25 $£15.81 + £7.38$
26 $£32.47 + £6.72$
27 $£10.53 + £4.94$
28 $£8.26 + £2.06$
29 $£21.64 - £5.80$
30 $£16.18 - £3.93$
31 $£43.45 - £9.29$
32 $£39.09 - £1.51$

B

Round to the nearest:

- a) whole number
b) tenth.

- | | |
|----------|---------|
| 1 2.39 | 6 3.263 |
| 2 7.138 | 7 8.947 |
| 3 1.85 | 8 15.63 |
| 4 16.074 | 9 4.453 |
| 5 9.52 | 10 0.78 |

Round to the nearest:

- a) pound
b) 10p.

- | | |
|-----------|-----------|
| 11 £3.93 | 16 £2.09 |
| 12 £5.28 | 17 £6.54 |
| 13 £9.46 | 18 £3.37 |
| 14 £14.73 | 19 £8.82 |
| 15 £0.61 | 20 £11.15 |

Approximate by rounding to the nearest whole number.

- 21 $57.53 + 18.35$
22 $32.92 + 24.74$
23 $75.29 - 16.08$
24 $51.16 - 9.81$
25 14.62×8
26 6.49×12
27 $44.7 \div 5$
28 $68.51 \div 3$

C

Round to the nearest:

- a) hundredth
b) tenth.

- | | |
|---------|----------|
| 1 0.263 | 6 2.397 |
| 2 3.745 | 7 0.036 |
| 3 1.452 | 8 4.981 |
| 4 0.179 | 9 8.505 |
| 5 7.824 | 10 5.658 |

Round to the nearest:

- a) 10 grams
b) 100 grams.

- | | |
|-------------|-------------|
| 11 6.738 kg | 16 0.472 kg |
| 12 2.351 kg | 17 3.066 kg |
| 13 0.915 kg | 18 7.643 kg |
| 14 5.287 kg | 19 0.959 kg |
| 15 1.594 kg | 20 4.125 kg |

Approximate by rounding to the nearest tenth.

- 21 $6.548 + 3.97$
22 $4.39 + 2.751$
23 $9.605 - 1.82$
24 $7.48 - 3.236$
25 8.06×7
26 4.71×9
27 $6.35 \div 4$
28 $7.825 \div 6$

Mastery: True or False?

A number with five tenths will always round up to the nearest whole number.

Write sentences to prove or disprove this statement.

TARGET To find percentages of amounts and quantities.

Examples

10% of 40

$$\frac{1}{10} \text{ of } 40$$

$$40 \div 10$$

4

30% of 40

$$(10\% \text{ of } 40) \times 3$$

$$4 \times 3$$

12

25% of 40

$$\frac{1}{4} \text{ of } 40$$

$$40 \div 4$$

10

5% of 40

$$(10\% \text{ of } 40) \div 2$$

$$4 \div 2$$

2

A

Find 10% of:

1 20 6 300

2 70 7 240

3 500 8 900

4 140 9 650

5 800 10 410

Find 10% of:

11 80p 16 £1.70

12 30p 17 £17.00

13 £2.00 18 £0.20

14 £7.50 19 £5.60

15 £4.90 20 £8.10.

Find 10% of:

21 60 mm 26 700 g

22 90 kg 27 350 ml

23 400 ml 28 280 km

24 110 cm 29 490 m

25 830 m 30 120 kg.

31 A bag of flour weighs 850 g. 10% is used. How much flour is left?

B

Find

a) 10% of: b) 20% of:

1 300 3 £4.80

2 90 4 620 m

Find

a) 10% of: b) 30% of:

5 140 7 700 ml

6 2100 8 £12.50

Find

a) 25% of: b) 75% of:

9 32 11 £4.80

10 600 12 10 m

Find

13 20% of 160

14 30% of 30

15 50% of 2800

16 25% of 64

17 1% of 200

18 40% of 450 g

19 90% of £4.00

20 75% of 36p

21 60% of 1200 ml

22 5% of £10.00

C

Find the new price if the price shown is reduced by:

a) 10% b) 5% c) 15%.

1 £25.00 3 £70.00

2 £3.20 4 £9.80

How much interest is paid into a savings account for each amount if the interest rate is:

a) 10% b) 1% c) 3%.

5 £540 7 £10 000

6 £1900 8 £216

Find

9 1% of 5800

10 5% of 4

11 99% of 7000

12 15% of 12

13 2% of £79

14 11% of £35

15 95% of 600 g

16 7% of 1 litre

17 9% of 500 ml

18 3% of 2 kg

19 45% of 240 m

20 21% of £30 000

Mastery

Which is larger:

50% of 80

or

80% of 50 ?

B

For each of the following shapes write down:

- a) the volume of the shape
- b) the number of 1 cm^3 blocks needed to turn the shapes into a cube or cuboid
- c) the volume of the cube or cuboid.

C

For each of the following shapes write down:

- a) the number of 1 cm^3 needed to cover the base of the cuboid
- b) the number of layers of 1 cm^3 needed to fill the cuboid
- c) the volume of the cuboid.

- 9) The formula for the volume of a cuboid is:
 $\text{VOLUME} = \text{LENGTH} \times \text{WIDTH} \times \text{HEIGHT}$
 Use this formula to copy and complete the table.

LENGTH	WIDTH	HEIGHT	VOLUME
7 cm	2 cm	3 cm	42 cm^3
25 cm	10 cm		3000 cm^3
6 cm	4 cm	5 cm	
8 cm		4 cm	96 cm^3
	8 cm	5 cm	480 cm^3
9 cm	5 cm	6 cm	
15 cm	6 cm		360 cm^3
10 cm	7.5 cm		450 cm^3

- 10) What is the volume of a cube with 20 cm edges?

Mastery

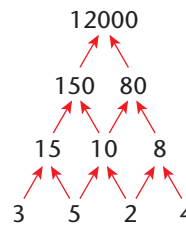
Calculate the volume of a cube when one side = 3 cm.
 If this is tricky, build the shape first.

TARGET To solve number puzzles involving multiplication and division.

Example

In a multiplication pyramid pairs of numbers are multiplied together to make the number above them.

Copy and complete the multiplication pyramids.



A

- $$\begin{array}{c} \square \\ \square \quad \square \\ 6 \quad 2 \quad 3 \end{array}$$
- $$\begin{array}{c} \square \\ \square \quad 16 \\ 4 \quad \square \quad 8 \end{array}$$
- $$\begin{array}{c} 700 \\ 35 \quad \square \\ \square \quad \square \quad 4 \end{array}$$
- $$\begin{array}{c} \square \\ 30 \quad \square \\ 3 \quad \square \quad 9 \end{array}$$
- $$\begin{array}{c} 108 \\ \square \quad 9 \\ 4 \quad \square \quad \square \end{array}$$
- $$\begin{array}{c} 640 \\ 32 \quad \square \\ \square \quad \square \quad 5 \end{array}$$

B

- $$\begin{array}{c} \square \\ \square \quad \square \\ \square \quad \square \quad \square \\ 5 \quad 2 \quad 3 \quad 5 \end{array}$$
- $$\begin{array}{c} \square \\ \square \quad \square \\ 8 \quad \square \quad 10 \\ 4 \quad \square \quad \square \quad 2 \end{array}$$
- $$\begin{array}{c} \square \\ 14 \quad 16 \\ 7 \quad \square \quad \square \\ \square \quad \square \quad 2 \quad \square \end{array}$$
- $$\begin{array}{c} 216 \\ \square \quad 12 \\ \square \quad \square \quad 6 \\ \square \quad \square \quad \square \quad 3 \end{array}$$
- $$\begin{array}{c} \square \\ 24 \quad \square \\ \square \quad 4 \quad \square \\ \square \quad 2 \quad \square \quad 5 \end{array}$$

C

- $$\begin{array}{c} \square \\ \square \quad \square \\ 25 \quad \square \quad 6 \\ 5 \quad \square \quad \square \quad 3 \end{array}$$
- $$\begin{array}{c} \square \\ 54 \quad \square \\ 6 \quad \square \quad 12 \\ \square \quad \square \quad \square \quad 4 \end{array}$$
- $$\begin{array}{c} \square \\ 240 \quad \square \\ \square \quad \square \quad 30 \\ \square \quad 4 \quad \square \quad 6 \end{array}$$
- 1 2 4 5

Using the above numbers only for the bottom layer, make 4 different multiplication pyramids each with a top layer of 1000.
- Make up some multiplication pyramids of your own.

Mastery

Can you create a multiplication pyramid where:
The bottom row is all one-digit numbers,
The second row is both two-digit numbers,
and the top number has three digits?