Subtraction: Example: 240 -162

Write down all of the column headings you will need, and put the sum beneath the columns by separating the number into (for example} hundreds, tens and units.

	H	T	U
	1	~~3~~ 1	~~4~~ 10
-	1	6	2
		7	8

240 - 162 = 78

Subtract from the right hand column (the units here) and move left one column at a time.

Be careful- you might need to borrow from the column 'next door' {to the left}. In our example, we would begin with 0-2,which is impossible so we borrow from the tens column {making the 4 go down to a 3) and use it to make our 0 into a 10 (ten). Now, it's 10-2,which is 8. Continue like that, always borrowing from the next column to the left.

Note: A question asking you to "find the difference of' two numbers just wants you to subtract them.

Division: Example: 9345 ÷ 15

Set up your bus stop so that the number you are dividing by is outside (trying to get in).

15) 9 3 4 5

At each stage, you're asking yourself, "How many of the number outside can fit into the next part of the number in the bus stop?“ In our example, 15 doesn't fit into 9 at all, so none of the 9 has been used yet. Because of this, we carry it across to turn the 3 into 93.

Next we ask ourselves, "How many 15's fit into 93?” Looking at the times table, 6x15=90 so 6 fits in. We had 93 though, so 3 has not yet been used and can be moved over to make the 4 become 34.

0 6

15) ~~9~~ ~~9~~ ~~3~~ 4 5

Continue like this until you have gone through all of the numbers in the bus stop. The number above the bus stop is your answer.

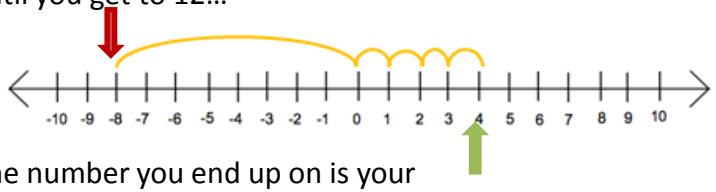
9345 ÷ 15 = 623

Negative Numbers - Addition and Subtraction

Example : - 8 + 12

Negative numbers are numbers that are **less than zero**. When adding and subtracting with negative numbers, you should use a number line. Start at the first number given in the sum (here, it’s -8).

Then, think about whether you are adding or subtracting your number. If you’re adding it needs to get bigger, so you move to the right. If you’re subtracting, it needs to be smaller, so you move left. We need to add 12 in our example, so add 8 to get back to zero, then add on in 1’s until you get to 12…



The number you end up on is your answer! **- 8 + 12 = 4**

Be aware of circumstances where there are two signs in the middle of the sum:-

Example 1: -5 + - 3

Where the signs in the middle are different, the resulting sum becomes a subtraction so the above example would be -5 – 3 which equals -8.

Example 2: -6 - - 3

Where the signs in the middle are the same, the resulting sum becomes an addition so the above example would be -6 + 3 which equals -3.

Key Words

Subtraction; Hundreds; Tens; Units; Column; Dividing; Bus Stop; Carry; Multiplication; Increase; Product.

Linked topics

Place Value; Adding and Subtracting with Decimals; Multiplication Tables; Division with Negative Numbers; Division with decimals; Factors

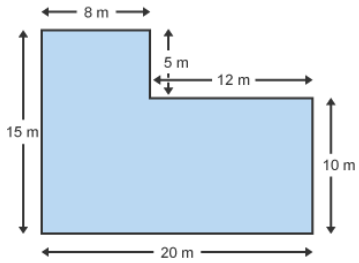
Perimeter

Is the total distance around the edge of a 2D shape.

Units of perimeter; **mm, cm, m …**

Example;

8 + 5 + 12 + 10 + 20 + 15 = 70m



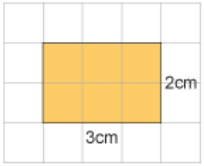
Area

Is the 2D space a shape covers

Units of area; **mm², cm², m², km² …**

Examples;

Counting squares = 6cm²

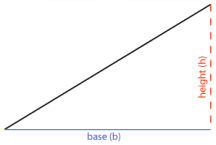


Square and Rectangle;

Area = **base** x **height**

Triangle;

Area = ½ x **base** x **height**



Calculations with Decimals

Putting extra zeroes means 'there's no value at this decimal place'. In a number like 2.50, there's 'no hundredths'. So it's ok to write 2.5 as 2.50 or 2.500, etc. But DO NOT take 2.5 and make it 20.5!

Adding and Subtracting Decimals:

1) Write down the numbers, one under the other, with the decimal points lined up.
2) Put in zeros so the numbers have the same length.
3) Then add using column addition or subtract using column subtraction, remembering to put the decimal point in the answer.

Example: 1.452 + 1.3

1.452
+ 1.300
2.752

Multiplying Decimals:

Multiply normally as you would with integers using column multiplication , ignoring the decimal points

Then, put the decimal point in the answer: count up how many numbers are after the decimal point in both numbers, then the answer should have that many numbers after its decimal point.

2.34 ← 2 decimal places
× 1.6 ← + 1 decimal place
1404
234
3.744 ← 3 decimal places

Rounding

10, 100 and 1000

Remember to keep the place value of each number by inserting zeros where applicable.

Look at the number which **represents the place value**, look to the **right**, if this digit is **5 or more** the number **rounds up by 1**. If the number is **4 or less** the number **stays the same.**

E.g. Round **17,839** to the nearest 10, 100 & 1000

(i) Nearest 10 = 17 840

(ii) Nearest 100 = 17 800

(iii) Nearest 1000 = 18 000

Decimal places (d.p.)

1) **Identify the position** of the decimal place to be rounded to, e.g. 2d.p. would be the 2nd digit after the decimal place.
2) Then look to the **right** of this digit, this number now decides whether the decimal place is rounded up or kept the same.
3) If the **decider** is **5 or more** then **round the digit up**. If the **decider** is **4 or less** then **leave the digit as it is**.

Significant figures (s.f.)

1) The **first significant number** is the first digit of a number which isn't zero.
2) The **2nd, 3rd, digits** follow immediately after the 1st , regardless of zeros 0.002309 2.03070

3) When rounding numbers the **place value** of each digit must be the same.

Key Words

Area; Perimeter; Dimension; Calculate; Addition; Decimal; Integer; Significant figures; Decimal places

Linked topics

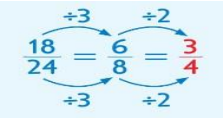
Naming 2D shapes; Units; Surface Area; Volume; Column addition/subtraction of integers; Estimating using calculations; Bounds; Rounding answers; Place value

Terminology

Numerator – Top number of a fraction.
Denominator – Bottom number of a fraction
Mixed Number – has an integer part and a fraction part. E.g. $3\frac{1}{3}$
Improper Fraction – the numerator is bigger than the denominator. E.g. $\frac{9}{5}$

Simplifying Fractions

Find a number that is a factor of the numerator and the denominator. Divide both numbers by that factor.
When the only common factor of the numerator and the denominator is 1, you know you have simplified far enough. If you find the highest common factor you can completely simplify in 1 step.



Equivalent Fractions

You need to work out what you have to multiply the one number by to get the other in the equivalent fraction.
In this example you need to multiply 4 by 4 to get 16 so you need to multiply 1 by 4 to get the missing numerator.

$$\frac{1}{4} = \frac{?}{16}$$

X 4

Multiplying Fractions

1) Cancel by finding common factors of one of the numerators and one of the denominators.
2) Multiply together the numerators.
3) Multiply together the denominators.
4) Simplify if you can.

Example;

$$\frac{2}{5} \times \frac{10}{11} = \frac{2 \times 10}{5 \times 11} = \frac{20}{55} = \frac{4}{11}$$

Dividing Fractions

1) Use KFC:
   Keep (the 1st fraction)
   Flip (the 2nd fraction)
   Change (the sign to x)
2) Now complete the problem as multiplication of fractions.

Example;

$$\frac{4}{7} \div \frac{2}{5}$$
$$= \frac{4}{7} \times \frac{5}{2} = \frac{4 \times 5}{7 \times 2} = \frac{20}{14} = \frac{10}{7} = 1\frac{3}{7}$$

Percentage

'Per cent' means 'out of 100'

Percentages of Amounts

To find **50%** of a number you **half it**
To find **25%** of a number you **half 50%**
To find **10%** of a number you **divide by 10**
To find **5%** of a number you **half 10%**
To find **1%** of a number you **divide by 100**
To find a **% increase** you **add on**
To find a **% decrease** you **subtract from**

To find **any % of a number**:
You break the percentage down into easier percentages, then add them together.

Example – 15% of £46

15% = 10% + 5%

10%→ $£46 \div 10 = £4.60$

5%→ $£4.60 \div 2 = £2.30$

15% = £4.60 + £2.30 = £6.90

Equivalent Fractions, Decimals, Percentages

$\frac{1}{2}$ = 50% = 0.5
$\frac{1}{4}$ = 25% = 0.25
$\frac{3}{4}$ = 75% = 0.75
$\frac{1}{10}$ = 10% = 0.1
$\frac{1}{100}$ = 1% = 0.01

Key Words

Highest common factor; Lowest common multiple; Denominator; Numerator; Improper fraction; mixed number; equivalent.

Linked topics

HCF/LCM; Calculate fractions of quantities; Recurring decimals to fractions; Percentage increase/decrease; Compound interest/depreciation.

Writing Ratios

- A **ratio** is a way of comparing the sizes of two or more quantities.
- The ratio of black circles to white circles can be written as 6 : 2 
- The above ratio would be read as 'in the ratio 6 to 2'. Please note that the order in which ratio is stated is important as 'in the ratio 2 to 6' would mean 2 black circles to 6 white circles.
- This would mean there are 6 + 2 = 8 parts in total. Hence the fraction of black circles would be $\frac{6}{8}$ and the fraction of white circles is $\frac{2}{8}$.

Simplifying Ratios

- When simplifying ratio we need to find the highest common factor (HCF) and then divide both parts by the HCF.

Example: 

The HCF of 6 : 2 is 2 so we need to divide both 6 and 2 by 2. The simplified ratio is 3 : 1.

- If we were simplifying the ratio 35:21:56 we would find the HCF first which is 7. Then divide each part by 7. The simplified ratio is 5 : 3 : 8.
- To express a ratio as a fraction we need to add the separate parts (5 + 3 + 8) which totals 16. Hence as a fraction it would be $\frac{5}{16}$, $\frac{3}{16}$ and $\frac{8}{16}$

Dividing in a given ratio

Divide £40 between Peter and Rebecca in the ratio 2 : 3

Step 1: Add the parts
(2 + 3 = 5)

Step 2: Express the ratio as a fraction
Peter gets 2 parts out of a total of 5 parts so he gets $\frac{2}{5}$ of £40
Rebecca gets 3 parts out of a total of 5 parts so she gets $\frac{3}{5}$ of £40

Step 3: Finding a fraction of an amount
To find $\frac{2}{5}$ of £40 we divide by the denominator and then multiply by the numerator. 40 divided by 5 is 8 and when we multiply by 2 the answer is 16.
To find $\frac{3}{5}$ of £40 we divide by the denominator and then multiply by the numerator. 40 divided by 5 is 8 and when we multiply by 3 the answer is 24.

Step 4: Express the answer clearly
Peter gets £16; Rebecca gets £24

Unitary Method

Unit – 1 of (or just 1)

The unitary method – Find 1 part and then multiply to get the number wanted

Example:

1) 3 pigs cost £18. What would 5 pigs cost?

÷3	3 pigs	=	£18	÷3
	1 pig	=	£6	
×5	5 pigs	=	£30	×5

2) It takes 30 litres of fruit drink to fill 50 cups. How many litres of fruit drink are needed to fill 70 cups?

÷ 50	50 cups	=	30 litres	÷ 50
	1 cup	=	0.6 litres	
× 70	70 cups	=	42 litres	× 70

Key Words
Ratio; Parts; Simplify; Highest common factor; Dividing or sharing in a given ratio; Numerator and denominator; Unitary method

Linked topics
HCF; Simplifying fractions; Division; Exchange rates and conversions; Scale drawing and similarity; Direct and Inverse Proportion; Fraction of an amount