The Chalfonts Community College
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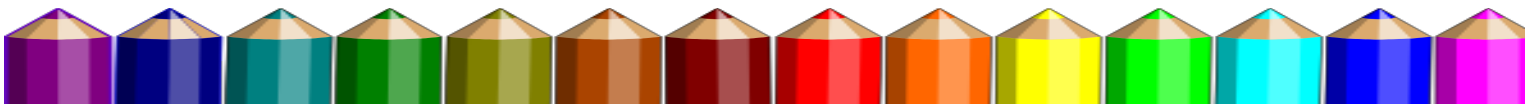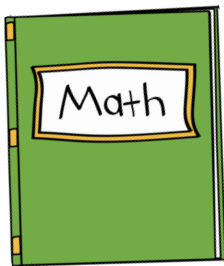
TRANSITION TO YEAR

7

MATHS

Welcome Year 7's ...

In this series of worksheets, you will be going over some of the maths facts and techniques you learned in Years 5 and 6, looking at rounding numbers, multiples and factors, fractions, ratio and proportion, data tables, 2D and 3D shapes, number sequences and probability.

Answers are provided, but remember to check your own work using the inverse operation; this is what you will be expected to do at secondary school. At the end of primary school, applying your maths skills means knowing how to find the important information in each question you tackle, using the correct mathematical symbols and being able to explain your conclusions using a clear method (always show your working out!). To get yourself into the habit of working as a maths student at Chalfonts, why not start marking your work with a green pen/green highlighter? You will be doing this from Year 7 to 11.
Have fun!

The language of mathematics!

Maths is an amazing international language that can be understood all over the world!

Think about the four 'operation' signs:

$$+ \quad - \quad \times \quad \div$$

Can you think of three more words to describe each one?

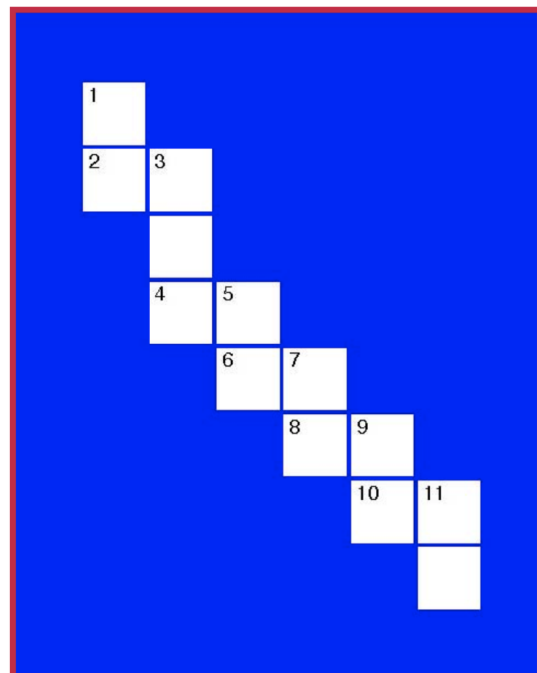| +	-	×	÷
add	subtract	multiple	divide

Now try answering these questions to fill in the number crossword below.

Across

2. The sum of 15 and 6

4. The product of 8 and 11.

6. 61 take away 9.

8. 112 divided by 2.

10. 7 less than 70.

Down

1. 88 sheets shared by 4 is...

3. 510 - 362 =

5. Twenty times four, add five.

7. 5^2

9. 264 divided by 4 =

11. Multiply 6 by itself.

Rounding numbers

If we don't need a number to be absolutely accurate we can 'round' it up or down. Rounding numbers is also an important skill enabling you to estimate answers.
When rounding numbers it's important to give the details of the number you are rounding to; for example, is it rounded to...

the nearest cm, nearest litre, nearest thousand

My brother's height is 156.7cm. What is this to the nearest cm?

I have 112 colouring pencils. How many is this to the nearest 10?

There are 624 children at my school. How many is this to the nearest hundred?

The population of Wales is 3,063,456. How many is this to the nearest million?

Estimate the total time, to the nearest minute, taken by all my friends to cycle to school this morning:

Name	Time	Estimate
Jamie	5 mins 47 sec	
Alice	8 mins 14 sec	
Ben	11 mins 8 sec	
Charlotte	9 mins 33 sec	
TOTAL		

Multiples and factors

When a number divides exactly into another number, the second number is a **multiple** of the first.

The **Lowest Common Multiple (LCM)** of two numbers is the lowest number which both the numbers go into without a remainder.

What is the LCM of 12 and 20?

Multiples of 12 = 12, 24, 36, 48, 60, 72
Multiples of 20 = 20, 40, 60, 80

The LCM is 60.

Factors are numbers which divide exactly into another number (with no remainder). We normally give the factors of numbers in pairs; for example the factors of 12 are 1 and 12, 2 and 6 and 3 and 4.

If you are asked to find the **Highest Common Factor** of two numbers, this is the highest number which goes into both.

What is the HCF of 12 and 20?

Factors of 12 = 1, 2, 3, 4, 6, 12
Factors of 20 = 1, 2, 4, 5, 10, 20

The HCF is 4.

What is the LCM of 8 and 14?

What is the HCF of 18 and 45?

What is the LCM of 7 and 9?

Find the HCF of 12 and 40.

Answers: Multiples of 8 are 8, 16, 24, 32, 40, 48, 56, 64 etc Multiples of 14 are 14, 28, 42, 56, 70. The LCM is 56.
Factors of 18 are 1, 3, 6, 9, 18. Factors of 45 are 1, 3, 5, 9, 15, 45. So the HCF is 9. Multiples of 7 are 7, 14, 21,
28, 35, 42, 49, 56, 63 etc. Multiples of 9 are 9, 18, 27, 36, 45, 54, 63, etc. The LCM is 63. Factors of 12 are 1, 2,
3, 4, 6, 12. Factors of 40 are 1, 2, 4, 5, 8, 10, 20, 40. The HCF is 4.

Prime numbers and square numbers

A **prime number** has only two factors, 1 and itself. This means that 1 is not a prime number. The number 2 is both the first prime number and also the only even prime number.
Using this information, can you determine the first 10 prime numbers?

A **square number** is a number multiplied by itself.

$$1^2 = 1 \times 1 = 1$$
$$2^2 = 2 \times 2 = 4$$
$$3^2 = 3 \times 3 = 9$$
$$4^2 = 4 \times 4 = 16$$

etc.

The inverse of a square number is its **square root**:

$$\sqrt{25} = 5 \ (5^2 = 25)$$

Can you work out 14^2 (14 x 14)? 15^2?

How many even prime numbers are there? What's the sum of all the prime numbers between 1 and 10?

Ordering fractions

Remember: when you compare fractions it's vital to adjust them so that all the denominators are the same (the bottom part of the fraction).

The children in class 5A have some coloured counters.
There are 60 in total.

Kate has one quarter of the counters.
Alfie has one third of the counters.
Sam has one tenth of the counters
Josie has one fifth of the counters.
Louis has all the rest.

Convert this information into fractions and write them in order from the smallest to the largest.
the smallest to the largest.

Smallest ──────────────▶ **Largest**

Can you match the pairs of equivalent fractions given below?

$\frac{2}{5}$ $\frac{1}{3}$ $\frac{3}{36}$ $\frac{17}{20}$ $\frac{14}{50}$ $\frac{40}{100}$ $\frac{1}{12}$ $\frac{85}{100}$ $\frac{7}{25}$ $\frac{5}{15}$

Powers of 10

When you are multiplying by a power of 10 you are essentially moving the decimal point a number of places to the right.

When you are dividing by a power of 10 you are moving the decimal point a number.

Try these questions:

5.3 x 10 =

670 ÷10 =

8.3 ÷10 =

0.385 x 1000 =

Now try to fill in the number which should replace the question mark.

? ÷10 = 2.2

5 ÷ 100 = **?**

? ÷ 100 = 0.045

? x 1000 = 72,000

Percentages shopping savvy

Knowledge of percentages is essential if you would like to get the best deal when you're out shopping!


Holly would like to buy a new gymnastics leotard. "Just Leotards" are selling a leotard for £30, with a 10% discount in the sale. "Leotards for You" have a 20% sale; the leotard in that shop is £33 before the sale. Which shop offers the best deal and why?

SALE!

George is looking at football boots. If he buys through his football club he saves a third on the retail price. If he buys through a website he can take advantage of a 30% discount this week. Which choice is the best deal and why?

Mrs Patel is booking cinema tickets for her family. If she books through a website the cost for the family is £38, but she has to pay a 10% booking fee on top of this price. If she books direct with the cinema she has a voucher which will give her a discount of 20% on the original price of £45.00. Which offer is the best deal and why?
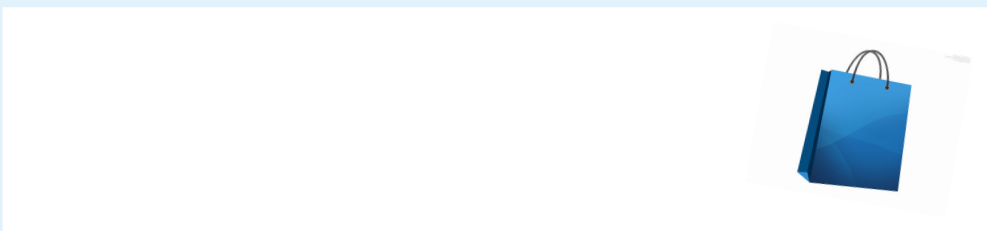
Ratio and proportion revision

Look at this pattern. How many pink lollies are there and how many yellow lollies are there?

There are 10 pink lollies in total and 5 yellow lollies.

If expressing this as a ratio for pink to yellow we say 10:5 which can be simplified by dividing each side by 5. **The final ratio is 2:1.** This means that for every two pink lollies there is one yellow lolly, or that there are twice as many pink lollies as there are yellow lollies.

Can you simplify the following ratios?

4:12   [:   ]

30:100   [:   ]

27:3   [:   ]

10:2   [:   ]

100:150   [:   ]

Divide £60.00 into the following ratios.

3:2   [:   ]

4:2   [:   ]

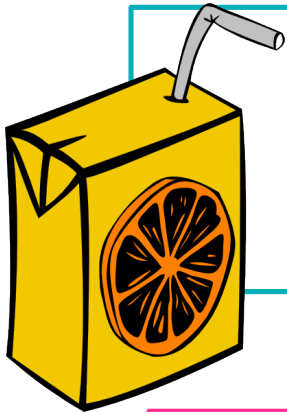2:28   [:   ]

6:24   [:   ]

Answers: 4:12 = 1:3, 30:100 = 3:10, 27:3 = 9:1, 10:2 = 5:1, 100:150 = 2:3 3:2 = £36:£24, 4:2 = £40:20, 2:28 = £4:£56, 6:24 = £12:£48

Ratio word problems

Use your knowledge of ratios to solve these real-life problems.

At the school disco, there are 24 cartons of orange juice and 54 cartons of apple juice. Write the ratio of orange juice to apple juice in its simplest form

Matthew buys a 500ml bottle of concentrated orange squash.
It can make 20 glasses of diluted orange squash.
It can make 20 glasses of diluted orange squash.
What volume would be needed to make 50 glasses of orange squash?
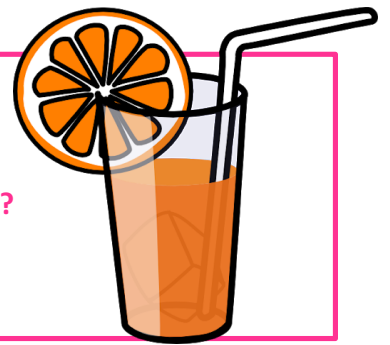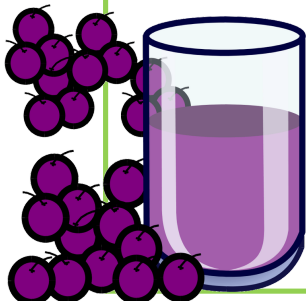
Joshua and Priya both have a drink of blackcurrant squash.
Joshua mixes the squash according to the instructions on the label with 1 part squash to parts of water.
Whose drink will taste stronger?
If Joshua uses 20ml of squash how much water will he need to add?
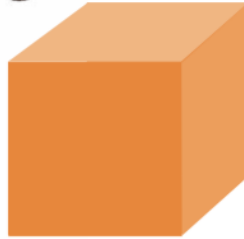If Priya uses 20ml of squash how much water will she have added?

Shape detective

Can you match the following descriptions to the 2D and 3D shapes? Join the description on the left to the correct shape on the right.

6 square faces

4 equal sides

1 side, no corners

1 curved face, 2 flat faces

1 square face, 4 triangular faces

5 equal sides

3 sides, 2 of equal length

circle

regular pentagon

cylinder

square-based pyramid

cube

isosceles triangle

square

Answers: 6 square faces = cube; 4 equal sides = square, 1 side no corners = circle; 1 curved face, 2 flat faces = cylinder; 1 square face, 4 triangular faces = square-based pyramid; 5 equal sides = regular pentagon; 3 sides, 2 of equal length = isosceles triangle

Numbers and sequences

A number sequence is a list of numbers that follows a particular rule which differs for each sequence.

To work out what the rule for the sequence is you need to look at the first few numbers given. For example:

3,7,11,15,19,23...   Rule = add 4 each time

Now fill in the missing numbers and decide the rule for each sequence:

4,9,14, ☐ , ☐ , ☐   Rule = ☐

27,21,15, ☐ , ☐ , ☐   Rule = ☐

48,39, ☐ , ☐ , ☐   Rule = subtract 9 each time

9, ☐ , ☐ , ☐ , ☐ , 44   Rule = add 7 each time

31, ☐ , ☐ , ☐ , ☐ , ☐   Rule = add 11 each time

9, ☐ , ☐ , ☐ ,61,74   Rule = ☐

0.6, 1.1, ☐ , ☐ ,2.6   Rule = ☐

Uniform shopping addition

The time has come to organise your school uniform for the new school year! Why not help your parents out and decide on the best shop to get value for money? Use a calculator to check your answers.

	SHOP A	SHOP B	SHOP C
Blazer	£39.99	£31.50	£32.99
Trousers x 3	£36.00	£44.85	£33.50
School tie	£11.95	£14.99	£8.50
Skirts x 3	£17.97	£13.50	£19.50
Shirts x 4	£10.00	£13.00	£11.98
V-neck jumper	£12.50	£16.25	£17.99
Black shoes	£34.99	£49.50	£19.95
School coat	£19.00	£24.99	£35.00
Trainers	£17.99	£24.99	£29.99
PE T-shirt	£7.99	£4.50	£5.35
PE shorts	£4.50	£6.99	£10.00
Tracksuit top	£19.99	£14.99	£18.99
Tracksuit trousers	£17.95	£12.50	£18.99
TOTAL			

Answers: Shop A Total = £250.82   Shop B Total = £272.55   Shop C Total = £262.73

Probability investigation

Ever wondered how likely it is to roll a 'double six' in a board game? Would you like to find out?

When you roll dice you assume that each option is equally likely. If you rolled a dice 60 times how many times would you expect to get a '6' or a '2'? Try rolling a die and complete the tally chart below to show the results.

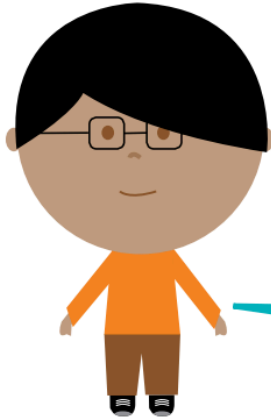| Outcome	Estimate	Tally	Total
1			
2			
3			
4			
5			
6			
Total			60

What would happen if you rolled the die another 60 times?

Why not give it a go! Were the results the same?

In theory, you should roll each number one sixth of the total times. How do your results vary?

Calculating equivalent fractions

Look at these pairs of fractions. Are they equivalent to each other? Remember, in a pair of equivalent fractions the numerator and denominator of one fraction are multiplied by the same number to make the other fraction. There is a trick question to watch out for, too!

$$\frac{2}{3} \xrightarrow[\text{x3}]{\text{x3}} \frac{6}{9} \qquad \frac{6}{10} \xrightarrow[\text{x10}]{\text{x10}} \frac{60}{100}$$

1) $\frac{4}{5}$ and $\frac{8}{10}$ ☐

2) $\frac{1}{3}$ and $\frac{2}{4}$ ☐

3) $\frac{5}{8}$ and $\frac{30}{48}$ ☐

4) $\frac{3}{6}$ and $\frac{1}{2}$ ☐

5) $\frac{8}{9}$ and $\frac{7}{8}$ ☐

6) $\frac{1}{3}$ and $\frac{2}{6}$ ☐

7) $\frac{5}{10}$ and $\frac{10}{20}$ ☐

8) $\frac{3}{3}$ and $\frac{6}{6}$ ☐

9) $\frac{1}{8}$ and $\frac{2}{16}$ ☐

10) $\frac{7}{70}$ and $\frac{8}{80}$ ☐

11) $\frac{1}{2}$ and $\frac{3}{6}$ ☐

12) $\frac{4}{5}$ and $\frac{8}{10}$ ☐

13) $\frac{16}{20}$ and $\frac{4}{5}$ ☐

14) $\frac{3}{8}$ and $\frac{9}{24}$ ☐

15) $\frac{1}{5}$ and $\frac{3}{15}$ ☐

16) $\frac{4}{5}$ and $\frac{2}{3}$ ☐

17) $\frac{23}{46}$ and $\frac{7}{14}$ ☐

18) $\frac{3}{8}$ and $\frac{15}{40}$ ☐

19) $\frac{7}{10}$ and $\frac{70}{100}$ ☐

20) $\frac{8}{9}$ and $\frac{16}{18}$ ☐

Answers: 1) Yes 2) No 3) Yes 4) Yes 5) No 6) Yes 7) Yes 8) Yes 9) Yes 10) Yes 11) Yes 12) Yes 13) Yes 14) Yes 15) Yes 16) No 17) Yes, though this is a bit of a trick question. Can you see that 23/46 and 7/14 are both equivalent to 1/2? 18) Yes 19) Yes 20) Yes

Box it up: long multiplication

A quick way to multiply a three-digit or four-digit number by a two-digit number is by using the long multiplication method.

```
        3   9   1
    x       3   9
  ─────────────────
    3   5   1   9
    □   8   □

1   1   7   3   0
    2   □   □
  ─────────────────
1   5   2   4   9
  ─────────────────
```

First we multiply each of the digits 391 by 9.

9 x 1 = 9

9 x 9 = 81 (put the 1 down; carry the 8)

9 x 3 = 27

27 + (carried) 8 = 35

Now we multiply each of the digits 391 by 3. Because it is actually 30, not 3, we put a zero down first.

3 x 1 = 3

3 x 9 = 27 (put the 7 down and carry the 2)

3 x 3 = 9 (plus the 2 which makes 11)

Last of all, we add the results of our calculations to get the answer.

3519 + 11730 = 15249

Use this method to complete these multiplications. Use the boxes as we have done above to help you set out your numbers correctly!

1. 3918 x 48 =

2. 7261 x 34 =

3. 7182 x 54 =

4. 3869 x 65 =

5. 2816 x 35 =

6. 8517 x 39 =

Dividing by 10, 100 and 1000

Ali the alien has been given some division homework – and she's just thrilled at the prospect.

Can you help her solve the calculations below so she can get back to some stargazing?

| 0.7 |
| 0.37 |
| 9.681 |

÷ 10 →

| |
| |
| |

| 1.8 |
| 0.481 |
| 0.3 |

÷ 100 →

| |
| |
| |

| 4 |
| 1.8 |
| 0.3 |

÷ 1000 →

| |
| |
| |

A fizzy problem

Mr Smith has bought a pack of 15 lemonade cans. Each can contains 300ml of lemonade.

He has to pour out these cans into empty jugs.
Each jug can hold a litre of liquid.

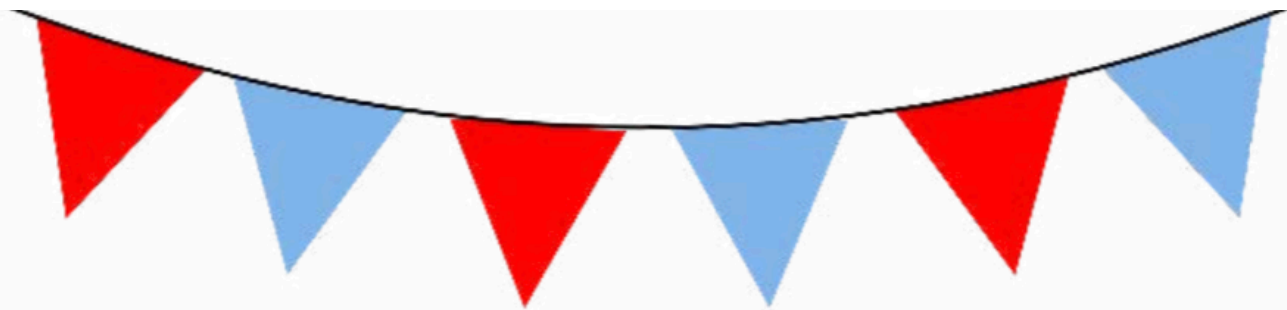How many jugs will he need to pour out the 15 cans?

Show your working out!

**Answer:** Mr Smith has 4½ litres of lemonade, so he would need 5 jugs.

Triangular treats

The three interior (inside) angles of a triangle always add up to 180°. This means that if you know the measurements of two of the angles of a triangle you can always work out the third one.

An isosceles triangle is a very special triangle. It has two sides which are the same, which in turn means that two angles are the same. For this reason you only need to know one angle in an isosceles triangle in order to work out the other two angles, providing that you know which of the sides are the same length.

Find the missing angles in these triangles:

27°

27°
a
b
90°
38°
16°
c
86°
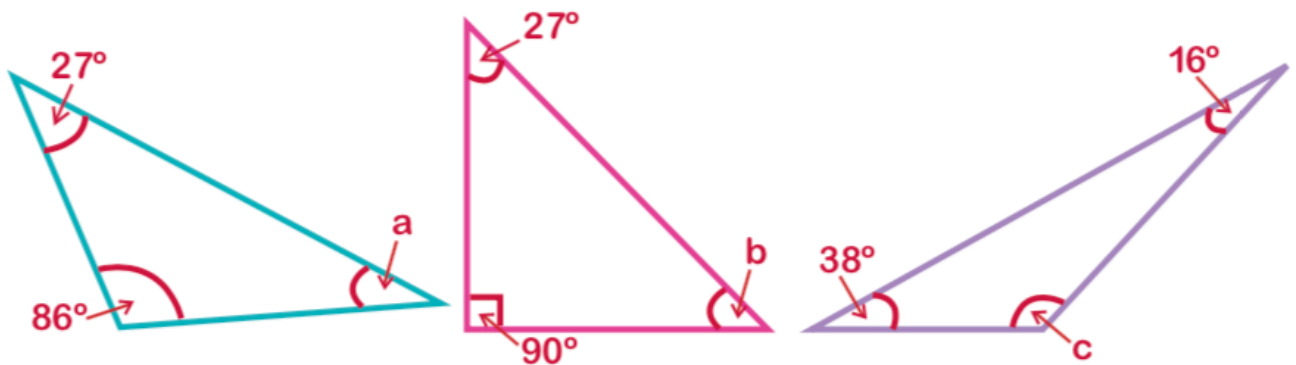
Now find the missing angles in these isosceles triangles:

Remember, don't try to measure these triangles with a protractor as they are not drawn to scale!

d
35°
e

f
23°
g

47°
h
i
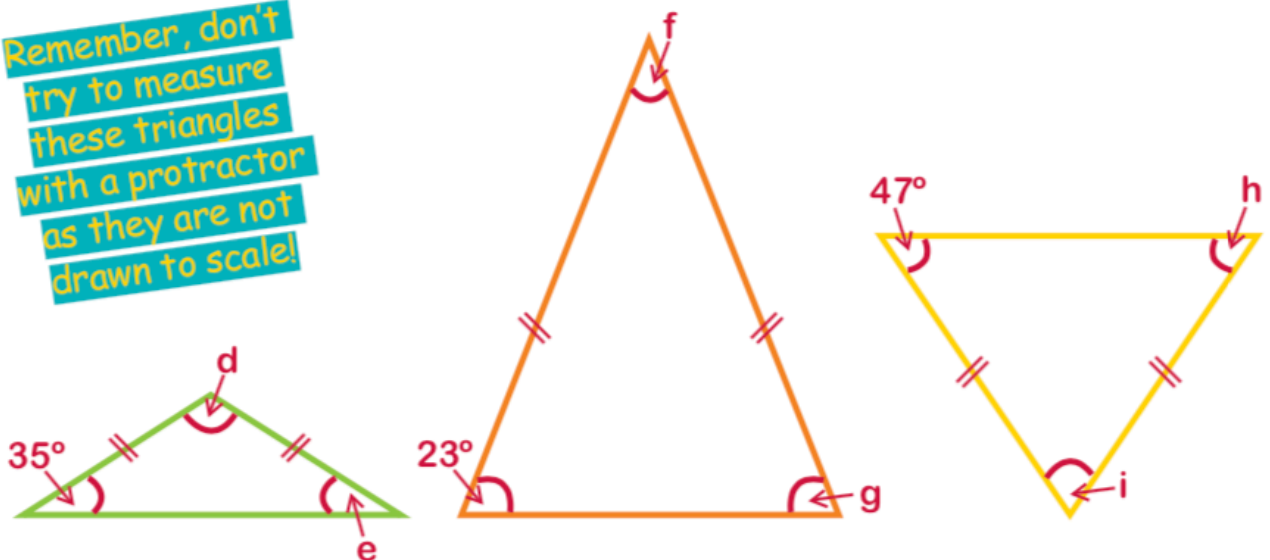
Calculating averages

Do you know the difference between the ways of considering the 'average' of a set of data?

Mode this is the value which occurs the most frequently.

Median this is the 'middle' value when all the data is arranged in order from lowest to highest.

Mean this is what most people think of when referring to an average. The mean of a group of numbers is the total (the sum of the numbers) divided by the number of pieces of data.

The 29 children in Year 6 have timed how long it took them to walk home from school last Monday (to the nearest minute) and have brought their results in to school. Can you help them to work out the mean, median and mode?

14	2	7	8	22	7	9	9
7	11	10	16	7	10	17	10
7	5	13	5	7	16	27	13
2	11	17	7	23			

Mean = [   ] minutes

Median = [   ] minutes

Mode = [   ] minutes

Answers: Mean = add all the numbers together and divide by the total (29) = 319 ÷ 29 = 11 minutes
Median = Arrange the data in numerical order and pick the middle the 15th value (in this case the 15th value), also 11 minutes.
Mode = This is the piece of data which occurs the most frequently, 7 minutes, the time taken to walk home for 7 of the children.

Fractions problem

Rendham Village have held their annual dance. By the end of the day, they have made £500.
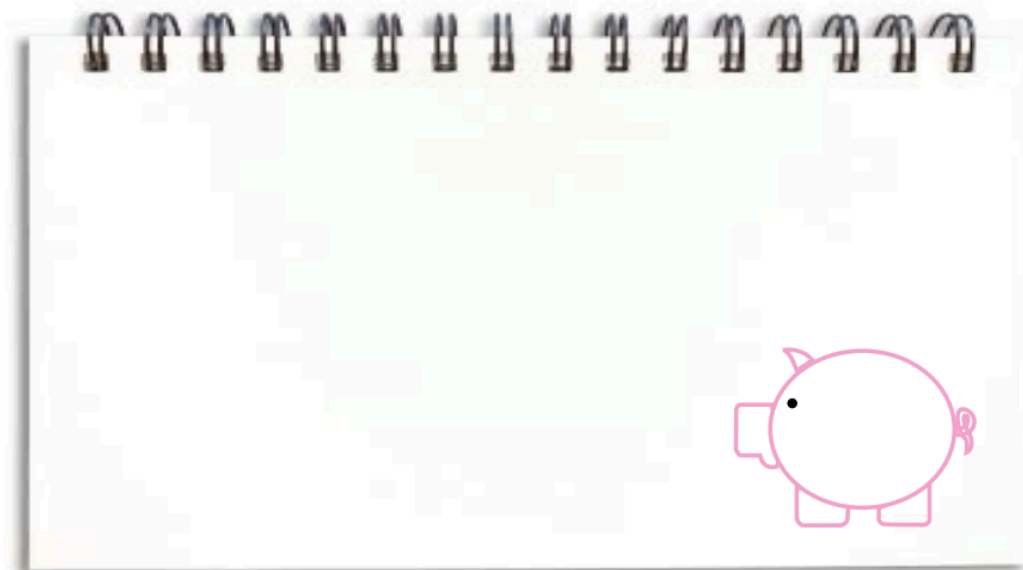
The money needs to be split up as follows:

$\frac{2}{10}$ of it needs to go to the church.

$\frac{1}{5}$ needs to go to the old people's home.

$\frac{4}{20}$ of it is needed to pay for the marquee.

$\frac{2}{5}$ of it is needed to pay for the sound equipment.

What is the largest amount of money spent on?
Show your working out.

The Chalfonts Community College

Success is an Attitude!

C	S	B	R	A	C	K	E	T	S	E	E	E	I
D	S	U	A	V	O	L	U	M	E	S	T	S	T
N	R	T	C	U	A	A	R	I	C	A	P	E	T
A	L	A	I	C	R	I	O	N	N	M	R	G	E
P	C	T	T	I	E	L	M	D	E	D	O	A	Q
X	M	H	A	I	A	S	L	I	U	O	B	T	U
E	N	S	B	D	O	V	S	C	Q	B	A	N	I
L	I	N	E	A	R	L	N	E	E	E	B	E	V
L	E	L	L	A	R	A	P	S	S	M	I	C	A
U	U	X	B	D	E	C	I	M	A	L	L	R	L
T	D	E	A	T	T	I	T	U	D	E	I	E	E
E	S	P	E	R	I	M	E	T	E	R	T	P	N
S	T	N	O	F	L	A	H	C	S	U	Y	P	T
T	U	S	U	B	S	T	I	T	U	T	E	E	A

ATTITUDE
EQUIVALENT
SEQUENCE
PERIMETER
SUBSTITUTE
DECIMAL
LCM
PROBABILITY
PERCENTAGES
SUCCESS
CHALFONTS
BRACKETS
INDICES
PARALLEL
AREA
BODMAS
LINEAR
EXPAND
RATIO