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# Steps to Success and Top Tips– Year 6

## Key Learning Objectives

**1. To multiply and divide decimals mentally by 10 or 100 and explain the effect**

**2. To multiply and divide whole numbers by 1000 and explain the effect**

### Top Tips

#### *Multiply*

- To multiply by 10, move all the digits one place to the left
- To multiply by 100, move all the digits 2 places to the left
- To multiply by 1000 move all the digits 3 places to the left

#### *Divide*

- To divide by 10, move all the digits one place to the right
- To divide by 100, move all the digits 2 places to the right
- To divide by 1000 move all the digits 3 places to the right

#### Remember

- *Write the place value columns to help.*
- *The decimal point never moves*
- *When dividing the number is **Reduced** and the digits move to the **Right***
- *When multiplying the number gets **Larger** and the digits move to the **Left***
- *Number of zeros is the clue to the how many places to move.*
- *Remember to put zeros as place holders in any columns left empty.*
- *Remember each place value column is 10 times larger than the last when you move to the left and 10 times smaller as you move to the right*

### 3. To order a set of decimals with up to three decimal places.

#### Steps to success

1. Arrange all the numbers in a column with the decimal points underneath each other.
2. Make them all the same length by adding zeros as place holders.
3. Ignore the decimal points and the zeros at the beginning and treat the numbers as whole numbers.
4. Arrange in order of size.
5. Put the decimal points back in and any beginning zeros.
6. Rewrite the numbers in their original form.

Example order these number smallest first: 0.7 1.02 0.23 0.09

Step 1	Step 2	Step 3	Step 4	Step 5
0.7	0.70	70	9	0.09
1.02	1.02	102	23	0.23
0.23	0.23	23	70	0.70
0.09	0.09	9	102	1.02

### 4. To reduce a fraction to its simplest form by cancelling.

#### Steps to Success

1. Find the HIGHEST common factor of BOTH the numerator and the denominator. (*The highest possible number that divides exactly into BOTH the numerator and the denominator*)
2. Divide BOTH the numerator and the denominator by the highest common factor.
3. Check that the fraction cannot be reduced further. (*How low can you go?*)

#### Top Tips

- To find the highest common factor look at the numerator and denominator. Are both in the 2x table? 3 x tables? 4 x tables? Etc.
- *'What you do to the top you do to the bottom!'*

**5. To find fractions of numbers (e.g.  $\frac{5}{8}$  of 32,  $\frac{7}{10}$  of 40,  $\frac{9}{100}$  of 400cm)**

**Steps to Success**

1. Divide the number by the denominator (bottom number)
2. Multiply the answer by the numerator ( top number)

**Top Tips**

- *Make it easy for yourself reduce the fraction to its lowest terms*

**6. To understand that percentages are the number of parts in every 100**

**Top Tips**

- *Percent means out of 100. Think 'per-century, in every 100 years!'*
- *Equivalent fractions, decimals and % to remember are:*

$$\frac{1}{2} = 0.5 = 50\%$$

$$\frac{1}{4} = 0.25 = 25\%$$

$$\frac{1}{8} = 0.125 = 12.5\%$$

$$\frac{1}{10} = 0.1 = 10\%$$

$$\frac{1}{5} = 0.2 = 20\%$$

$$\frac{1}{3} = 0.333 = 33.333\%$$

$$\frac{3}{4} = 0.75 = 75\%$$

- *Remember if you know easier fractions remember to halve them – if you know  $\frac{1}{4}$  you can halve it to get  $\frac{1}{8}$*

## 7. To find simple percentages of quantities

### Steps to Success

*Easiest Method for simple % e.g. 25%: Use Knowledge of Fractions*

1. Convert percentage to an equivalent fraction
2. Divide the number by the denominator (bottom number)
3. Multiply the answer by the numerator (top number)

*But for more complicated percentages e.g. 27%*

1. Divide the number by 100 to find 1%
2. Multiply the answer by the percentage required.

### Top Tips

- *To find 10% just divide by 10 (BUT be careful you don't divide by 20 to find 20%!) 10 % is a special percentage.*
- *If using a calculator remember to press the equals button (=) after each step*
- *Look for quick build-ups e.g. 27% = 25% and 2%*

### Steps to Success - VAT

To find VAT 17.5% think of it as 10% + 5% + 2.5%

1. Find 10% by dividing by 10.
2. Half the answer to find 5%
3. Half that answer to find 2.5%
4. Add them all together

## 8. To solve simple problems involving ratio and proportion

### Top Tips

- *Ratio compares a part to another part e.g. 2:1 (mixing paint, orange squash)*
- *Proportion compares a part to the whole group e.g.  $\frac{3}{4}$  (8 out of 10 cats prefer whiskers)*

## 9. To carry out column addition and subtraction of decimals

### Steps to Success *Addition*

1. Write the numbers in the correct place value column.
2. Make sure that the decimal point is lined up.
3. Start with the column on the right and add up all the numbers in that column.
4. If one of the columns add up to an answer of 10 or more:
  - put the right digit of the answer in that column and
  - carry the left digit to the column on the left under the bottom line.
5. Repeat with all the columns

	Th	H	T	U
		3	0	2
		2	1	3
	4	6	8	5
+			1	4
-----				
	5	2	1	4
-----				
	1	1	1	

### Top Tips

- The vital thing when **adding decimals** is to keep everything including the decimal point in the right columns according to the law of place value. The rest is normal addition.

### Column Subtraction

1. Write the greatest number on top, line up the digits in the place value columns.
2. Make sure the decimal points are lined up.
3. Start by subtracting the column on the right, taking the bottom number away from the top.
4. If the top digit is less than the digit you are going to subtract, you need to exchange with a digit in the column to the left. *Make the left neighbour 1 less, write the 1 beside your digit on its left*

	H	T	U
		5	1
	3	6	1
-		3	4
-----			
	3	2	7
-----			

### Top Tips

- Keep everything in the correct columns.
- Exchange if necessary.
- When exchanging, cross out digit you are exchanging with and take away one from it. Write the new number above it.
- Remember you cannot take away from 0 so you need to exchange with the column to the left. **ALSO** remember you cannot exchange with 0 so you need to exchange with the next column.

### 10. To say the division facts corresponding to multiplication tables up to 10 x 10

### Top Tips

- To multiply by 4, just double it and double it.
- The 6 times table is double the 3 times table.
- The 8 times table is double the 4 times table etc.
- 5, 6, 7, 8 – reminds you that  $56 = 7 \times 8$
- The sum of the digits in the 9 times table digits add up to 9.
- Remember finger trick for the 9 times tables.
- Remember  $4 \times 5 = 5 \times 4$  etc. you only need to learn half as many facts!

## 11. To carry out short multiplication and division of decimals

### Steps to Success

#### Multiply

1. Ignore the decimal point
2. Multiply the single digit number by each digit of the big number in turn (starting with the units).
3. Each time you get an answer 10 or more, carry the left digit to the next column (like you do when you are adding)
4. Put the decimal point in the answer so it has one decimal place.

#### Divide

1. Put a decimal point on top of the 'bus stop' above the decimal point of the number you are dividing into.
2. Divide into the big number, one digit at a time, starting from the LEFT (It's the opposite side from when you are adding, subtracting and multiplying)
3. Put the result of each division directly above, on the top of the 'bus stop'
4. If the small number won't go into a digit exactly, carry the remainder across (to the next digit on the right). If it won't go at all put a 0 on top and carry the whole digit.

### Top Tips

- Extend bus stop analogy to numbers that are 'out in the rain' and sheltered numbers.
- Use you multiplication facts to help.

## 12. To carry out long multiplication (HTU x TU)

### Steps to Success

1. Set out the numbers according to **place value**.

Th	H	T	U
	3	7	2
x		1	8
-----			
-----			

2. Multiply each digit of the top number by the digit in the units column of the bottom number, starting with the units column, then the tens, then the hundreds.

Th	H	T	U
	3	7	2
x		1	8
-----			
		--	
2	9	7	6
	5	1	

3. Because you are now going to multiply by the tens column, put zero in the units column of your answer before you start.

Th	H	T	U
	3	7	2
x		1	8
-----			
2	9	7	6
			0

4. Multiply each digit of the top number by the digit in the tens column of the bottom number.

Th	H	T	U
	3	7	2
X		1	8
-----			
2	9	7	6
3	7	2	0

5. Add the two answers to obtain the final answer.

Th	H	T	U	
	3	7	2	
X		1	8	
-----				
2	9	7	6	This is 372 x 8 units.
3	7	2	0	This is 372 x 1 ten.
-----				
6	6	9	6	This is 372 x 18.

### Top Tips

- Highlight each stage using different colours.
- When you multiply by the tens column and you need to put a place holder zero. Turn the 0 into a smiley face for fun!
- Start writing your calculation three squares in from the margin because the answer will grow.

**13. To identify and use the appropriate operations (including combinations of operations) to solve word problems**

**Steps to Success**

1. Read and understand the problem.
2. Underline key information.
3. Decide what you need to work out (*which operation?*)
4. Estimate
5. Calculate
6. Answer in a sentence.
7. Take time to check your answer



**Top Tips**

- Record your working throughout. You can use jottings but write them down clearly so you can trace back your steps when you are checking your answer.
- Reality Check – is your answer sensible?

**14. To explain methods and reasoning**

**Top Tips**

- Break your method down into clear steps
- Use mathematical language to explain your method

## Steps to Success and Top Tips

### Shape, Space, Measures and Data Handling – Year 6

#### **Key Targets**

**15. To use a protractor to measure acute and obtuse angles to the nearest degree**

#### **Steps to Success**

1. Put the centre of the protractor on the vertex of the angle.
2. Line up the black line at the bottom of the protractor with the line of the angle.
3. Follow the black line of the protractor along the line of the angle towards the 'open mouth' of the angle until you find the zero.
4. Follow the scale around from the zero to the other line of the angle.
5. Read the scale carefully.
6. Using your knowledge of acute and obtuse angles, check your answer is sensible.

#### **Top Tips**

- The centre of the protractor must be exactly on the corner of the angle.
- The black line at the bottom of the angle must be perfectly on top of the line of the angle.
- Remember to read the right scale, start at the zero and follow the scale around.
- Remember if your angle is acute it will be less than  $90^\circ$ . If your angle is obtuse it will be greater than  $90^\circ$  and less than  $180^\circ$

**16. To calculate the perimeter of shapes that can be split into rectangles**

**Steps to Success**

*The Big Blob method*

1. Put a big blob at one vertex and then trace around the sides of the shape.
2. Write down the length of every side as you go along. If a side has no length given, then you just have to work it out.
3. Keep going until you get back to the big blob.
4. Now add up all the lengths and remember to state the units in your answer

**Top Tips**

**Perimeter – rim is the outside**

**17. To calculate the area of shapes that can be split into rectangles**

**Steps to Success**

1. Split the shape into rectangles (*no gaps and no overlaps*)
2. Calculate the area of each rectangle by multiplying length by width.
3. Add the areas of each rectangle together

**Top Tips**

**Area is the amount of surface covered by a flat shape.**

**$\text{cm}^2$  = a square that has each side measuring 1cm**

**$\text{m}^2$  = a square that has each side measuring 1m**

***Area of a rectangle = length x width***

***Area of right angle triangle =  $\frac{1}{2}$  of the rectangle it would fit perfectly in so  $\frac{1}{2}$  of length x width***

## 18. To read and plot co-ordinates in all four quadrants

### Steps to Success

#### Reading

1. Find the point
2. Imagine a line straight down to meet the x axis
3. Where the imaginary line crosses the x axis is the coordinate for the x axis. This is the first coordinate in the brackets
4. Go back to the point.
5. Imagine a line straight going across to meet the y axis
6. Where the imaginary line crosses the y axis is the coordinate for the y axis. This is the second coordinate in the brackets.
7. Write the co-ordinates in brackets with the x coordinate first and the y coordinate second. Separate the x and y coordinates with a comma (x, y)

#### Plotting

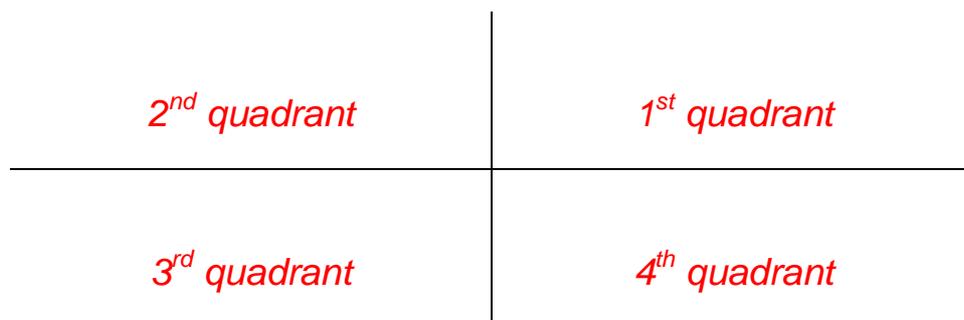
1. Start with the coordinate for the x axis.
2. Go along the x axis until you get to the coordinate you want.
3. Imagine a line going straight up from there, the point is somewhere on that line.
4. Go up/down the y axis until you get to the y co-ordinate.
5. Imagine a line going straight across from that point.
6. Precisely where the imaginary lines meet put a cross.

### Top Tips

The co-ordinates are always in alphabetical order – X then Y

X is a cross so the x axis is across.

You always go along the corridor and then up the stairs so it's along first and then up.



**19. To identify and use the appropriate operations (including combinations of operations) problems involving measures**

**Steps to Success**

1. Read and understand the problem.
2. Underline key information.
3. Decide what you need to work out.
4. Estimate
5. Calculate
6. Add any units
7. Take time to check your answer



**Top Tips**

- Answers to problems involving money always need to be written with 2 decimal places. If you are using a calculator and the answer is 1.5 you need to add a 0 on the end so it's £1.50
- am means morning – it runs from 12 midnight to 12 noon
- pm means afternoon and evening – it runs from 12 noon to 12 midnight
- 12 noon is pm and 12 midnight is am
- The 24 hour clock always has 4 digits and does NOT need a am or a pm. The 24 hour time is the same as the 12 hour clock in the morning except it has a 0 in front. You need to add 12 hours if it's the afternoon.
- Remember to calculate in 60's not 100's. Practice addition bonds to 60 and practice counting in intervals of 5.
- Many children will need apparatus to calculate time problems.

**20. To solve a problem by extracting and interpreting information presented in tables, graphs and charts**

**Steps to Success -Bar charts**

1. Draw the axes
2. Mark the axes (*think about a suitable scale*).
3. Label the y axis
4. Label the x axis
5. Draw bars & colour if necessary
6. Title your chart
7. Draw a key if necessary

**Top Tips**

1. Use a sharp pencil to draw your graphs
2. Use a ruler.
3. Think about a suitable scale for your axes

**Mean**

1. Add up all the values
2. Divide the total by the number of items.

**Remember – don't be mean SHARE your sweets**

**Median**

1. Put the values in order of size (smallest to largest)
2. Find the middle value
3. If there are two middle value the median is half way between the two (you could add them together and divide by 2)

**Remember – Small Medium Large median sounds like medium)**

**Mode**

1. The most common value

**Remember mode sounds like most**

**Mode is French for fashion**

**A la mode = something trendy**

## 21. To convert metric measures

### **Top Tips**

There are three types of metric measures length, mass and volume.

Each one has a base unit:

Length = metre

Mass = grams

Volume = litres

Each type of metric unit has smaller and larger units which are either 10, 100, 100- times smaller or larger. The size of the unit compared to the base unit is shown by adding a prefix.

Deci =  $1/10$  of the base unit (10 times smaller)

*Centi =  $1/100$  of the base unit (100 times smaller)*

*Milli =  $1/1000$  of the base unit (1000 times smaller)*

*Kilo = 1000 time larger than the base unit*