Did you know?

The word *fraction* comes from the Latin *fractus* which means "to break".

If you multiply by 1s the answer will ALWAYS be a **palindrome.** A palindrome is a number which is the same forwards as backwards.
e.g $11111 \times 11 = 122221$

1. Start with any four digit number (that has at least two different digits).
2. Arrange the digits of the four digit number to make the largest and smallest numbers possible.
3. Subtract the smaller number from the larger one.
4. Take the answer and repeat the process.

Eventually you'll end up at 6174 or 'Kaprekar's Constant'. Interestingly, it will never take more than 7 steps to get to 6174!

Did you know? If you shuffle a pack of cards really well, there is a greater chance that this sequence of cards has NEVER been seen before in history than that it has been seen before!
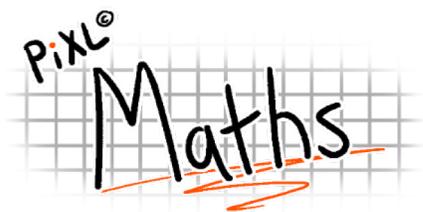
"Multiply by 10 you just add a zero"
Incorrect because….

What about decimals?
$$4.35 \times 10 = 43.5$$
We don't "*add a zero*", instead each place holder is ten times bigger.

H	T	.	$\frac{1}{10}$
	6	.	3
6	3		

Here we have 6.3×10
We can see that the **6** has now become **60** and the **0.3** has become **3**

KS3 Spine
NUMBER

"Whatever you do to the top you do to the bottom, so add the top add the bottom"

$\frac{1}{2} + \frac{1}{2} = \frac{2}{4}$?!?! This doesn't makes sense

Think about the example above in real terms, if you have half of something and add another half you only have two quarters at the end??

When adding fractions we need a **common denominator .** In the example above we would have $\frac{2}{2}$ which is 1.

"When you multiply by a number the answer will always be bigger"

This is **sometimes true!**
$3 \times 12 = 36$ which clearly is getting bigger…
We could think about this in the context- " there are 12 eggs in a dozen and I want 3 boxes, so I want 3 of the 12 egg boxes"
What about $\frac{1}{2} \times 12$? If this was a sentence we are wanting "half of 12 which is 6"
If the temperature is -3° and it gets twice as cold we need to do $-3 \times 2 = -6$ again the answer is smaller.

"The longer the number the bigger it is"
This is sometimes true because…

What do we mean by "longer"? More digits?
3456 is certainly bigger than 23 **BUT**
1.23432 is smaller than **2** even though it has more digits.
We need to look at the PLACE VALUE of those digits to decide which is bigger.

"Two minuses makes a plus"

This is true **SOMETIMES!** $-4 \times -5 = 20$
We have two minus numbers multiplied together and we get a positive answer. GREAT! … **BUT…….**
If the temperature is -5° and it **drops** by another 3 degrees it is now -8°, we did the calculation $-5 - 3 = -8$
We have two minus numbers but get a negative answer.
BUT… $3 - -5 = 8$
Make sure you try the questions and ask for help if you are still confused!

Test Me!

Each question matches the checklist of basic skill.
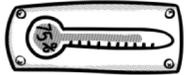
1. Write the following numbers in ascending order

3.4   3.04   3.404   3.044

2. Round the following to 1dp and 2dp
a) 3.567   b) 0.0564   c)1.9999

3. The temperature is -5° in Berlin. The temperature in Edinburgh is 4° what is the difference in temperature?

4. Use whatever written method you like to calculate the exact solution to the following
$a) \ 216 \div 18$ $b) \ 1728 \div 36$ $c) \ 16 \times 213$

5. If each box contains 16 books, how many books in 12 boxes?

6. Write an estimation for the following calculation
$$1236 \div 12$$

7. Is 12 a prime number? Explain.

8. Calculate $\frac{2}{3} + \frac{1}{4}$

9. Write the decimal equivalent for $\frac{1}{2}, \frac{3}{4}, 10\%, 80\%$

10. Calculate a) 23.45×10 $b) \ 0.4563 \times 100$

11. Cancel down as far as possible

$a) \ \frac{9}{12}$ $b) \ \frac{16}{6}$ $c) \ \frac{-3}{6}$

Challenge

These questions test your understanding of the misconceptions people have.

1. Multiply the following numbers by 10 and 100
a)0.00043   b) 23.4596

2. If I carry out the calculation 6×0.5 will my answer be bigger or smaller than 6? **Explain** why

3. Put these numbers in order, smallest first and **explain** why

4. Match the solution to the question

-6×4 -4×-6 $-24 \div 4$ $-24 \div -6$

24   4   -6   -24

5. Jan writes down the following calculation, has she got the answer right? How do you know?

$$\frac{1}{5} + \frac{2}{3} =$$

$$\frac{3}{15} + \frac{10}{15} =$$

$$\frac{13}{30}$$

Extend

Each question looks similar **BUT** you will have to do a different calculation using the skills you have. When you are answering the questions try and think or write down what is the **same** and what is **different** about each question.

A can of lemonade costs 67p

a) If you buy one can how much change will you get from £5?
b) If you only have 33p, how much more do you need to buy 1 can?
c) How many cans can I buy with £5?
d) You buy 3 cans and pay with £5 how much change will you get?

The number 24

a) What is $\frac{2}{3} \ of \ 24$?
b) Calculate $24 \times \frac{3}{8}$
c) $\frac{2}{3}$ of a number is 24, what is the original number?
d) Find $24 \div \frac{2}{3}$

Maths KS3 **NUMBER**