

# Multiplying and dividing by 10, 100, 1000

Sunday, 18 March 2018 6:21 pm

★ The work to be completed by the end of the lesson is:

The questions are shown at the bottom of this OneNote.

## Recap

✦ Not only do we need to know our times tables ... we need to know how to use basic number facts to help us complete questions quicker.

One of the most important are being able to multiply and divide by ~~10~~, ~~100~~, ~~1000~~ etc.

## Bouncing Decimals

Which of the following is cute ... and which is a killer?

They do have the most amazing thing in common!!!



They both bounce!

The wonderful thing about Tiggers  
Is Tiggers are wonderful things  
Their tops are made out of rubber  
Their bottoms are made out of springs

**Tigger's Song.**

They're bouncy, bouncy, bouncy, pouncy.  
Fun, fun, fun, fun, FUN!  
But the most wonderful thing about Tiggers,  
Is I'm the only one.

The wonderful thing about Tiggers.  
Is Tiggers are wonderful chaps.  
They're loaded with vim and with vigour.  
They love to leap in your laps.

They're bouncy, bouncy, bouncy, pouncy.  
Fun, fun, fun, fun, FUN!  
But the most wonderful thing about Tiggers,  
Is I'm the only one.

Tiggers are wonderful feliaths.  
Tiggers are awfully sweet,  
Everyone else is jealous.  
And that's why I repeat.

The wonderful thing about Tiggers.  
Are Tiggers are wonderful things.  
Their tops are made out of rubber.  
Their bottoms are made out of springs.

They're bouncy, bouncy, bouncy, pouncy.  
Fun, fun, fun, fun, FUN!  
But the most wonderful thing about Tiggers,  
Is I'm the only one.

Yes, I'm the only one.

By Midpopen, Thanks to Google for Images.

## ✦ So do decimal points!

Watch what happens when we multiply by 10:

Eg ①  $\Rightarrow 6 \times 10 = 60$

Eg ②  $\Rightarrow 36 \times 10 = 360$

6.0 12.0  
7.0 8.0

$\Rightarrow 6.0 \times 10 = 60.0$

$\Rightarrow 3.24 \times 10 = 32.4$

When we multiply you move the decimal point to the right.

1 zero

The number of zeros tells you the number of places to jump.

notice how the decimal point has moved one place  $\rightarrow$

$6 \times 10 = 60$

$0.4 \times 10 = 0.4$

$\left(\frac{1}{2} + \frac{1}{2}\right) = \frac{2}{4} = \left(\frac{1}{2}\right)$

$3.24 \times 10 = 32.4$

$3.24 \times 10 = 32.4$

$32.4$



**WARNING**

WE DO NOT JUST PUT A ZERO ON THE END!

$\rightarrow$  Sigh!

Why???

Well ... what would happen if you did  $0.4 \times 10$  by putting a zero on the end?

$0.4 \times 10 \neq 0.40$

~~$0.400000$~~

These are the same number so it can't be true to just add a zero on the end!

Examples:

$23 \times 100$

$2300$

so it can't be true to just ...  
zero on the end!

Examples:

$23 \times 100$

②

$$\begin{array}{r} 23 \cdot 0 \cdot 0 \\ \times \phantom{00} \\ \hline 2300 \end{array}$$

$8.6 \times 1000$

$8.6 \times 1000 \rightarrow ③$

$$\begin{array}{r} 8 \cdot 6 \cdot 0 \cdot 0 \\ \times \phantom{00} \\ \hline 8600 \end{array}$$

$0.345 \times 10000$

④

$0.345$

$$\begin{array}{r} 0 \cdot 345 \cdot 0 \\ \times \phantom{00} \\ \hline 3450 \end{array}$$

$3450$

Remember: The decimal point is always at the end of a number (hidden) if you can't see it ☺

$0.4$

$0.4$

Questions for you to do:

Calculate these multiplications. Remember, multiply means move decimal point to the right:

a  $8 \times 100 \rightarrow ②$   
 $800$

b  $3.4 \times 10 \rightarrow ①$   
 $34$

c  $29 \times 1000 \rightarrow ③$   
 $29000$

d  $12.45 \times 10000 \rightarrow ④$   
 $124500$

e  $0.512 \times 100 \rightarrow ②$   
 $51.2$

f  $0.0000469 \times 1000000 \rightarrow ⑥$   
 $46.9$

What about division?

\* It's just a jump to the left ...

Yep! In the same way that we moved the decimal point to the right when we multiply, we move it to the left when we divide.

Here are some examples ...

$340 \div 10$

①

$$\begin{array}{r} 34 \cdot 0 \\ \div 10 \\ \hline 34 \end{array}$$



$\times 100 \rightarrow ③$

$\div 100 \rightarrow ②$

$$\begin{array}{r} 0.4 \\ \div 10 \\ \hline 0.04 \end{array}$$

$28 \div 100$

②

$$\begin{array}{r} 0 \cdot 28 \\ \div 100 \\ \hline 0.28 \end{array}$$

$320$

$0.34 \div 100$

②

$$\begin{array}{r} 0 \cdot 0 \cdot 34 \\ \div 100 \\ \hline 0.0034 \end{array}$$

$182\,283\,840 \div 10000$

④

$$\begin{array}{r} 182\,283\,840 \\ \div 10000 \\ \hline 18228.384 \end{array}$$

$18228.384$

Some questions for you to do:

Calculate these divisions. Remember, divide means move decimal point to the left:

a  $2 \div 100 \rightarrow ②$   
 $0.02$

b  $4590 \div 1000 \rightarrow ③$   
 $4.59$

c  $0.014 \div 10 \rightarrow ①$   
 $0.0014$

d  $70.80 \div 10000$   
 $0.00708$

e  $1367.512 \div 1000$   
 $1.367512$

f  $421900 \div 100000000$   
 $0.004219$

$$\begin{array}{r} 0 \cdot 0 \cdot 70 \cdot 80 \\ \div 10000 \\ \hline 0.00708 \end{array}$$

Index number (powers of ten)

We can write 10, 100, 1000, 10000, 100000, 1000000 ... in a different way!  
It's so cool ... but we can only tell clever people.

Watch and be amazed ...



Finish

$1 \times 1 = 1$

We can write 10, 100, 1000, 10000, 100000, 1000000 ... in a different way!  
It's so cool ... but we can only tell clever people.

Watch and be amazed ...



0.00708

← Floating

Floaty numbers

Indices / Powers

$\times 100$   $1000\ 000$

$$3.6 \times 100 \rightarrow 10 \times 10$$

$$3.6 \times 10^2$$

$$3.147 \times 10^4 = 3.147 \times 10 \times 10 \times 10 \times 10$$

$$= 3.147 \times 10000$$

$$\begin{array}{l} 10^0 \\ 10^1 \\ 10^2 \\ 10^3 \\ 10^4 \\ 10^5 \\ 10^6 \end{array} = \begin{array}{l} 10 \\ 100 \\ 1000 \\ 10000 \\ 100000 \\ 1000000 \end{array}$$

$$10^2 = 10 \times 10$$

$$10^3 = 10 \times 10 \times 10$$

$$10^4 = 10 \times 10 \times 10 \times 10$$

$$10^5 = 10 \times 10 \times 10 \times 10 \times 10$$

$$10^6 = 10 \times 10 \times 10 \times 10 \times 10 \times 10$$

$$\begin{array}{l} 1 \times 1 = 1 \\ 2 \times 2 = 4 \\ 3 \times 3 = 9 \\ 4 \times 4 = 16 \\ 5 \times 5 = 25 \end{array} \left. \begin{array}{l} \\ \\ \\ \\ \end{array} \right\} \text{Square numbers}$$

$$\begin{array}{l} 1 \times 1 = 1^2 \\ 2 \times 2 = 2^2 \\ 3 \times 3 = 3^2 \\ 4 \times 4 = 4^2 \end{array} \quad \begin{array}{l} 2 \times 2 \times 2 = 2^3 \\ 3 \times 3 \times 3 = 3^3 \\ 4 \times 4 \times 4 = 4^3 \end{array}$$

4' 5' 6'

$$(6^4) = 6 \times 6 \times 6 \times 6$$

Questions for you:

1  $31 \times 10^2$

$$3100$$

2  $2400 \div 10^3$

$$0.24$$

3  $0.0027 \times 10^6$

$$2700$$

$$31 \times 10^2$$

$$31 \times 100 \rightarrow 2$$

$$3100$$

4  $90.008 \times 10^4$

$$900\ 080$$

5  $3.45 \div 10^3$

$$0.00345$$

6  $2159951 \div 10^7$

$$0.2159951$$

$$7^2 = 7 \times 7$$

$$7 \times 7 =$$

More questions for you ...

For these calculations:

- (i) Show where our character needs to spray paint a new decimal point, and  
(ii) write down the two numbers the new decimal point is between to solve the puzzle



1  $2830.3920 \times 100$

$$2\ 8\ 3\ 0\ 3\ 9 \cdot 2\ 0$$

I 9 and 2

2  $23857 \div 1000$

$$2\ 3\ 8\ 5\ 7$$

N

3  $0.4763892 \times 10^5$

$$0\ 4\ 7\ 6\ 3\ 8\ 9\ 2$$

A

4  $382961 \div 10000$

$$3\ 8\ 2\ 9\ 6\ 2$$

O

5  $19238.07 \times 10^1$

$$1\ 9\ 2\ 3\ 8\ 0\ 7$$

X

6  $8.9236701 \times 10000$

$$8\ 9\ 2\ 3\ 6\ 7\ 0\ 1$$

T

7  $20917983 \div 100000$

$$2\ 0\ 9\ 1\ 7\ 9\ 8\ 3$$

R

8  $83917 \div 10^5$

$$8\ 3\ 9\ 1\ 7$$

I

9  $902873.021 \div 10^2$

$$9\ 0\ 2\ 8\ 7\ 3\ 2\ 0\ 1$$

D

10  $0.08390 \times 10^3$

$$0\ 0\ 8\ 3\ 9\ 0$$

P

This is another mathematical name for a decimal point:

□ □ □ I □ □ □ □ □ □

0 and 9 8 and 9 8 and 7 9 and 2 0 and 7 3 and 9 8 and 2 0 and 8 3 and 8 6 and 7