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!

So do decimal points!

Watch what happens went we multiply by 10:

Eg ① ⇒ 6 x 10 = 60

Eg ② ⇒ 36 x 10 = 360

6.0 12.0
7.0 8.0

⇒ 6.0 ⇒ 60.0 (10, 1 zero)

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

The number of zero's tells you the number of places to jump.

eg2 3.24 x 10 ⇒ 32.4

notice how the decimal point has moved one place →

6 x 10 = 60

0.4 x 10 = 0.4

$\frac{1}{2} + \frac{1}{2} = \frac{2}{4} = \frac{1}{2}$

3.24 x 10 ① ①

3.24 x 10 = 32.4

32.4

WARNING

WE DO NOT JUST PUT A ZERO ON THE END! → Sigh!

Why???

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

0.4 x 10 ≠ 0.40

0.4

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

Examples:

23 × 100 → 23.00

so it can't be true so just add a zero on the end!

Examples:

23 × 100 → (2)

23.0'0. (4)

2300

8.6 × 1000

8.6 × 1000 → (3)

8.6'0'0'0.

8600

0.345 × 10000 → (4)

0.345

0.3450.

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 × 100 → (2) 800

b) 3.4 × 10 → (1) 34

c) 29 × 1000 → (3) 29000

d) 12.45 × 10 000 → (4) 124500

e) 0.512 × 100 → (2) 51.2

f) 0.0000469 × 1 000 000 → (6) 46.9

What about division?!

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

Yup! 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 ÷ 10 ← (1)

340.

34

0.4 ÷ 10

0.04

× 100 → (2)

÷ 100 ← (2)

320

28 ÷ 100 ← (2)

28.

0.28

0.34 ÷ 100 ← (2)

.00.34

0.0034

182 283 840 ÷ 10000 ← (4)

182 283 840.

18228.384

Some questions for you to do:

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

a) 2 ÷ 100 ← (2) 0.02

b) 4590 ÷ 1000 ← (3) 4.59

c) 0.014 ÷ 10 0.0014 0.0014

d) 70.80 ÷ 10 000 0.00708

e) 1367.512 ÷ 1000 1.367 512

f) 421 900 ÷ 100 000 000 0.004 219

00.70.80

0.00708

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 ...

← Finally

1 x 1 = 1

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 ...

Floaty numbers

Indices / Powers

3.6×100 → 10×10

3.6×10^2

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

$= 3.147 \times 10000$

$10^0 = 10$

$10^2 = 100 = 10 \times 10$

$10^3 = 1000 = 10 \times 10 \times 10$

$10^4 = 10000 = 10 \times 10 \times 10 \times 10$

$10^5 = 100000 = 10 \times 10 \times 10 \times 10 \times 10$

$10^6 = 1000000$

4' 5' 6'

$1 \times 1 = 1$
$2 \times 2 = 4$
$3 \times 3 = 9$
$4 \times 4 = 16$
$5 \times 5 = 25$

Square numbers

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

$2 \times 2 \times 2 = 2^3$
$3 \times 3 \times 3 = 3^3$
$4 \times 4 \times 4 = 4^3$

$6^4 = 6 \times 6 \times 6 \times 6$

Questions for you:

a) 31×10^2 → 3100

b) $2400 \div 10^5$ → 0.024

c) 0.0027×10^6 → 2700

d) 90.008×10^4 → 900 080

e) $3.45 \div 10^3$ → 0.00345

f) $2159951 \div 10^7$ → 0.2159951

31×10^2

31×100 → 3100

$7^2 = 7 \times 7 =$

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

a) 2830.3920×100	2 8 3 0 3 9•2 0	I	9 and 2
b) $23857 \div 1000$	2 3 8 5 7	N	
c) 0.4763892×10^5	0 4 7 6 3 8 9 2	A	
d) $382961 \div 10000$	3 8 2 9 6 2	O	
e) 19238.07×10^3	1 9 2 3 8 0 7	X	
f) 8.9236701×10000	8 9 2 3 6 7 0 1	T	
g) $20917983 \div 1000000$	2 0 9 1 7 9 8 3	R	
h) $83917 \div 10^5$	8 3 9 1 7	I	
i) $902873.021 \div 10^2$	9 0 2 8 7 3 2 0 1	D	
j) 0.08390×10^3	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