Multiply and divide by 10 and 100

Introduction

You often need to multiply and divide numbers by 10 and 100, particularly when you are converting between units of measure (such as millimetres and centimetres, or centimetres and metres) or when you are changing pounds to pence and vice versa.

This activity looks at multiplying and dividing numbers by 10 and 100.

You will learn:

- how to multiply whole numbers and decimals by 10 and 100
- how to divide whole numbers and decimals by 10 and 100.

Multiply and divide by 10 and 100

Multiplying by 10

Many people think that when you multiply by 10, you 'just put **0** at the end of the number'.

9 x 10 = 9**0**	20 x 10 = 20**0**	147 x 10 = 147**0**

This appears to work when you are multiplying a whole number, but what about decimals?

If you follow this 'rule' then 23.5 × 10 = 23.50, but **23.50** is **not** ten times bigger than **23.5** – it's the same number.

So how do you multiply by 10?

Place value

Numbers are made up of digits. Each digit has a value depending on it's place in the number. For example, in the number 23.5, 2 means 2 **tens**, 3 is 3 **units**, and 5 is 5 **tenths.**

When you multiply a number by **10,** the value of each digit becomes ten times bigger, so each digit moves **one place to the left**.

Example: 23.5 × 10 = 235

H	T	U		tenths
	2	3	.	5
2	3	5		

Multiplying by 100

To multiply a number by **100**, move each digit **two places to the left**.

Example: 23.5 x 100 = 2350

Th	H	T	U		tenths
		2	3	.	5
2	3	5	**0**		

⊙ If moving digits to the left leaves the **tens** or **units** column empty, put in **0** to hold the place.

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Practice 1

a. 25 × 10 = ... b. 250 × 10 = ... c. 2.5 × 10 = ...

d. 0.25 × 10 = ... e. 36 × 100 = ... f. 3.6 × 100 = ... g. 0.36 × 100 = ...

Practice 2

a. The distance from Edinburgh to London is 407 miles. A sales rep does this journey 10 times. How many miles is this in total?

b. A company pays travelling expenses of £0.41 per mile. How much will an employee receive for travelling 100 miles?

c. The rate for working overtime is £7. 50 per hour. How much will a worker get paid for working 10 hours overtime?

d. Carpet costs £12.95 per square metre. How much does it cost for 10 square metres?

e. How many centimetres in 3.25 metres? (1 m = 100 cm).

f. A desk is 125 cm wide. How many millimetres is this? (1 cm = 10 mm).

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Dividing by 10

Many people think that when you divide by 10, you 'just drop the **0** off the end of the number'.

70 ÷ 10 = 7	250 ÷ 10 = 25	2190 ÷ 10 = 219

But this 'rule' breaks down if the number doesn't end in 0, and what about decimals? If you follow this 'rule', then £21.50 ÷ 10 = £21.5, but the answer isn't ten times smaller – it's the same number.

So what really happens when you divide by 10?

Place value

Division is the inverse of multiplication. When you divide a number by **10,** each digit moves **one place to the right** to make it 10 times smaller.

Example: 71 ÷ 10 = 7.1

T	U		tenths
7	1		
	7	.	1

Dividing by 100

When you divide a number by **100**, move each digit **two places to the right**.

Example: 71 ÷ 100 = 0.71

T	U		tenths	hundredths
7	1			
	0	.	7	1

⊙ If moving digits to the right leaves the **units** or **tenths** column empty, put in **0** to hold the place.

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Practice 3

a. 250 ÷ 10 = ... b. 2500 ÷ 10 = ... c. 25 ÷ 10 = ... d. 2.5 ÷ 10 = ...

e. 3600 ÷ 100 = ... f. 360 ÷ 100 = ... g. 36 ÷ 100 = ...

Practice 4

a. A bag of rice holds 2500 g. How many 100 g servings will it make?

b. 10 litres of paint costs £12.50. What is the cost per litre?

c. 100 CDs cost £32. What is the cost of one CD?

d. A jar holds 357 ten pence coins. How much money is in the jar?

e. What is 90 centimetres in metres? (1 m = 100 cm)

f. A cooker is 550 mm wide. How many centimetres is this? (1 cm = 10 mm)

Practice 5

Now try these mixed multiplication and division.

1 Multiply and divide by 10:

a. 9 × 10 = ... b. 90 × 10 = ... c. 0.9 × 10 = ... d. 0.09 × 10 = ...

e. 90 ÷ 10 = ... f. 900 ÷ 10 = ... g. 9 ÷ 10 = ... h. 0.9 ÷ 10 = ...

2 Multiply and divide by 100:

a. 54 × 100 = ... b. 5.4 × 100 = ... c. 0.54 × 100 = ...

d. 5400 ÷ 100 = ... e. 540 ÷ 100 = ... f. 54 ÷ 100 = ...

Multiply and divide by 10 and 100

Check your skills

1 4.5 × 10 is:
A. 4.50
B. 40.5
C. 4.5
D. 45

2 16.5 ÷ 10 is:
A. 1.65
B. 16.05
C. 1.065
D. 10.65

3 7.35 × 100 is:
A. 73.5
B. 735
C. 7.3500
D. 700.35

4 650 ÷ 100 is:
A. 65
B. 6.05
C. 6.5
D. 60.5

5 Repayments on a loan are £35.62 per week for 100 weeks. How much is the total repayment on the loan?
A. £3500.62
B. £356.20
C. £3562
D. £35.6200

Turn to page 7 to check your answers.

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Answers

Practice 1

a. 250 b. 2500 c. 25 d. 2.5

e. 3600 f. 360 g. 36

Practice 2

a. 4070 miles b. £41 c. £75 d. £129.50

e. 325 cm f. 1250 mm

Practice 3

a. 25 b. 250 c. 2.5 d. 0.25

e. 36 f. 3.6 g. 0.36

Practice 4

a. 25 servings b. £1.25 c. £0.32 = 32p d. £35.70

e. 0.9 m f. 55 cm

Practice 5

1a. 90 1b. 900 1c. 9 1d. 0.9

1e. 9 1f. 90 1g. 0.9 1h. 0.09

2a. 5400 2b 540 2c. 54 2d. 54

2e. 5.4 2f. 0.54

Check your skills

1 D

2 A

3 B

4 C

5 C

