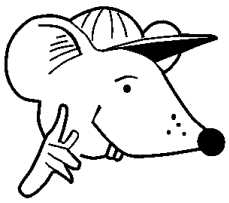
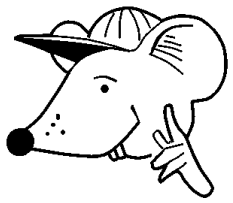


MATHEMATICS



Y5 Multiplication and Division
5315
Revise multiplying and dividing by 10 and 100

Equipment

Paper, pencil, calculator

MathSphere

Concepts

Multiplying by 10, 100 and 1000 are fundamental ideas in arithmetic. These ideas will eventually be used in work involving negative numbers, positive numbers, decimals and percentages, so it is very important to master them early on.

Never say 'to multiply by ten we *add a nought'*. This idea certainly works for whole numbers, but is totally false for decimals.

Eg. 3.98 x 10 is definitely not 3.980!

If children are taught to ***add a nought*** there will be a great deal of un-learning needed later on. Bad habits are very difficult to break.

The ideas to get across are as follows:

Multiplying.
When multiplying by 10 the number moves one place to the left.
When multiplying by 100 the number moves two places to the left.
Etc.

Dividing.
When dividing by 10 the number moves one place to the right.
When dividing by 100 the number moves two places to the right.
Etc.

These rules work for both whole numbers and decimals:

e.g.

Th	H	T	U			Th	H	T	U
	4	5	8	x 10	=	4	5	8	0

This zero is inserted to fill the space created when the number is moved to the left one place.

e.g.

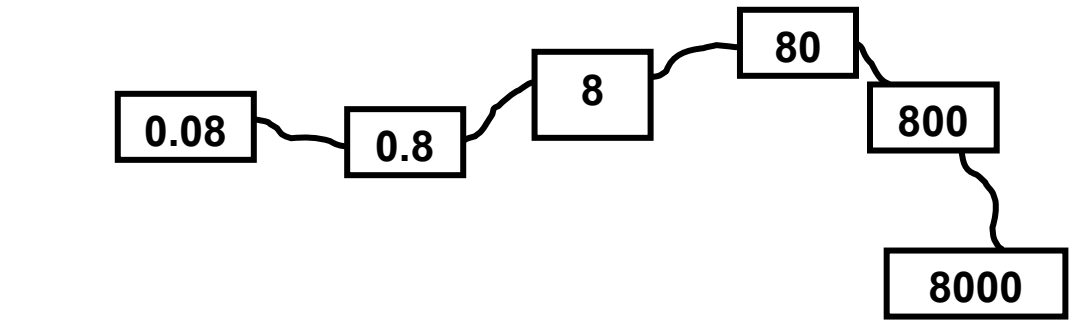
Th	H	T	U	t	h			Th	H	T	U	t	h
	4	5	8	. 2	5	x 10	=	4	5	8	2	. 5	0

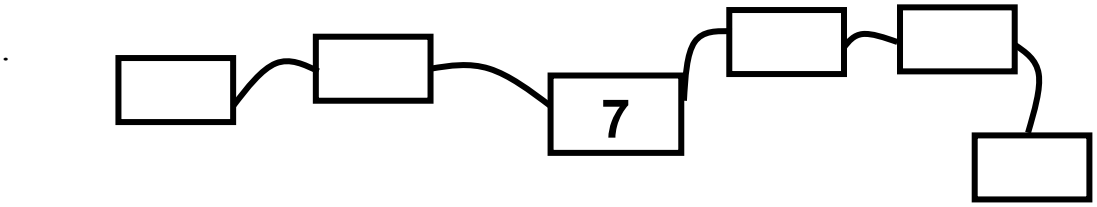
This zero is optional, but by no means necessary.

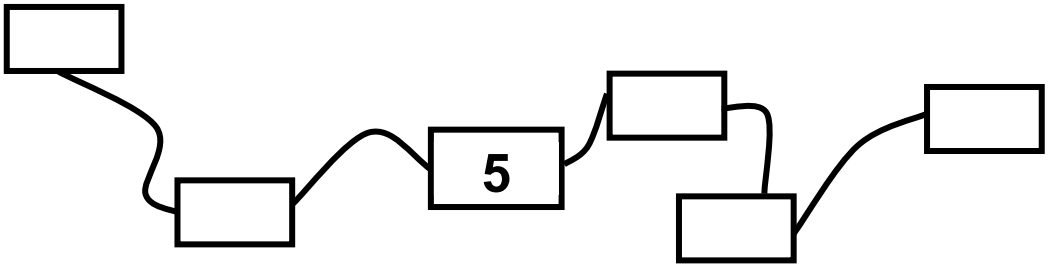
Use a calculator to work out these sums:

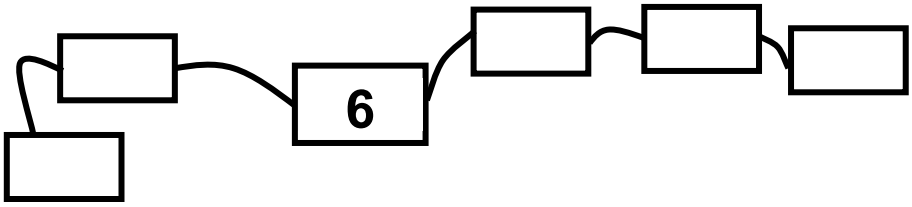
1. 12 x 10 **2.** 45.7 x 10 **3.** 84.98 x 10 **4.** 34 x 100
5. 15 ÷ 10 **6.** 68.9 ÷ 10 **7.** 49.3 ÷ 100 **8.** 75 ÷ 100

Make chains of numbers on these cards by **multiplying by 10** going in one direction and **dividing by 10** going in the other direction. The first one has been done for you.









Multiply each number in the tables by 10 going down and divide by 10 going up.

Some of the first one has been done for you.

0.3	Nought point three
3	Three
30	Thirty
300	Three hundred
	Three thousand

Describe this pattern.

2	Two

Describe this pattern.

1. Use a calculator to complete this table by multiplying and dividing by 10 and 100.

N ÷ 100	N ÷ 10	N	N x 10	N x 100
		12		
		4.6		
		150		
		34.8		
		17		
		0.7		
		0.23		
		9.34		
		27.4		

2. Describe what happens when:

a) a number is multiplied by 10
b) a number is multiplied by 100
c) a number is divided by 10
d) a number is divided by 100

3. In this table fill in the missing numbers.

N ÷ 100	N ÷ 10	N	N x 10	N x 100
			150	
				2300
	8			
0.09				
			47.6	
				3600
	0.78			
2.34				
			9	

Divvy wants to multiply 2.4 by 10 **twice**. He does it like this:

$$2.4 \times 10 = 24$$

$$24 \times 10 = 240$$

Multy thinks he knows a short cut.

$$2.4 \times 100 = 240$$

What rule did Multy know that Divvy did not use?

Work these out on your calculator using Multy's shortcut rule.

1. 5.7 x 10 x 10 **2.** 3.2 x 10 x 10 **3.** 25 x 10 x 10

4. 0.8 x 10 x 10 **5.** 6.78 x 10 x 10

6. 45.9 x 10 x 10 **7.** 0.1 x 10 x 10

8. 23.7 x 10 x 10 **9.** 89.6 x 10 x 10 **10.** 4.8 x 10 x 10

Multy has a similar rule for **dividing** by 10 and by 10 again.

What do you think Multy's rule for dividing by 10 and by 10 again is?

Work these out on your calculator using Multy's shortcut rule for division.

11. 3800 ÷ 10 ÷ 10 **12.** 4500 ÷ 10 ÷ 10

13. 76.9 ÷ 10 ÷ 10 **14.** 9 ÷ 10 ÷ 10

15. 230 ÷ 10 ÷ 10 **16.** 53.8 ÷ 10 ÷ 10

17. 100 ÷ 10 ÷ 10 **18.** 200 ÷ 10 ÷ 10

19. 450 ÷ 10 ÷ 10 **20.** 4.7 ÷ 10 ÷ 10

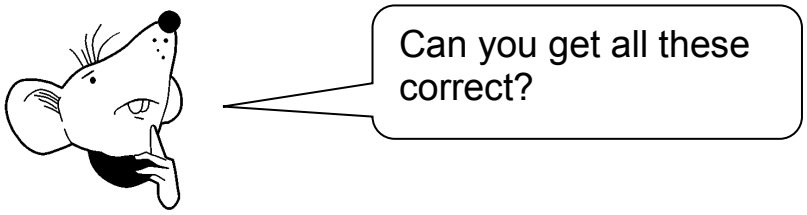
Can you get all these correct?

1. How many times **larger** is 230 than 23 ?
2. How many times **larger** is 45 than 4.5 ?
3. How many times **larger** is 3700 than 37 ?
4. How many times **larger** is 23.4 than 2.34 ?
5. How many times **larger** is 900 than 9 ?
6. How many times **larger** is 2340 than 23. 4 ?
7. How many times **larger** is 100 than 1 ?
8. How many times **larger** is 300 than 30 ?
9. How many times **larger** is 693.8 than 6.938 ?
10. How many times **larger** is 0.7 than 0.07 ?

11. How many times **smaller** is 4 than 400 ?
12. How many times **smaller** is 45 than 4500 ?
13. How many times **smaller** is 2.5 than 25 ?
14. How many times **smaller** is 6 than 600 ?
15. How many times **smaller** is 23.4 than 234 ?
16. How many times **smaller** is 9.98 than 998 ?
17. How many times **smaller** is 3 than 300 ?
18. How many times **smaller** is 3.5 than 35 ?
19. How many times **smaller** is 3.5 than 350 ?
20. How many times **smaller** is 22 than 220 ?

21. Thirty people build a house. How much longer would the house take to build if only three people worked on it?

22. Twenty three people pack oranges into boxes. How much quicker would be if two hundred and thirty people packed the oranges?

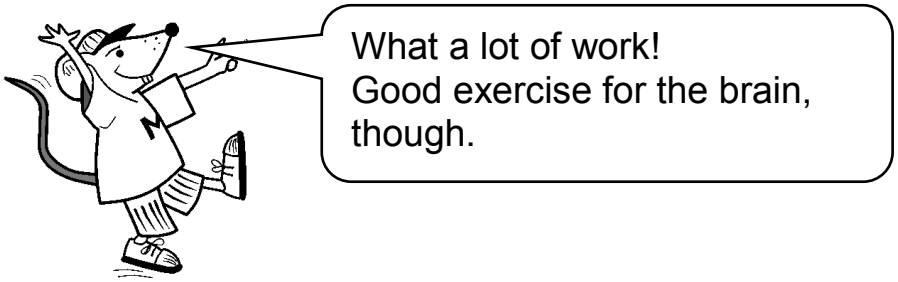


1. How many times **larger** is 450 than 45 ?
2. How many times **larger** is 29 than 2.9 ?
3. How many times **larger** is 5500 than 55 ?
4. How many times **larger** is 65.2 than 6.52 ?
5. How many times **larger** is 300 than 3 ?
6. How many times **larger** is 4920 than 49.2 ?
7. How many times **larger** is 700 than 7 ?
8. How many times **larger** is 200 than 20 ?
9. How many times **larger** is 183.2 than 1.832 ?
10. How many times **larger** is 0.4 than 0.04 ?

11. How many times **smaller** is 9 than 900 ?
12. How many times **smaller** is 26 than 2600 ?
13. How many times **smaller** is 4.6 than 46 ?
14. How many times **smaller** is 3 than 300 ?
15. How many times **smaller** is 31.1 than 311 ?
16. How many times **smaller** is 8.43 than 843 ?
17. How many times **smaller** is 6 than 600 ?
18. How many times **smaller** is 9.4 than 94 ?
19. How many times **smaller** is 2.2 than 220 ?
20. How many times **smaller** is 86 than 860 ?

21. Fifty people make a car. How much longer would the car take to build if only five people worked on it?

22. Thirty seven people plant apple trees in a large orchard. How much quicker would it be if three hundred and seventy people planted the trees?



1. Pencils cost 16p each. They are put in **packs** of 10.
How much does each **pack** cost in pence?
How much is this in pounds?

2. Rubbers cost 21p each. They are put in **packs** of 10.
These **packs** are put in **boxes** of 10 **packs**.
How much does each **box** cost in pence?
How much is this in pounds?

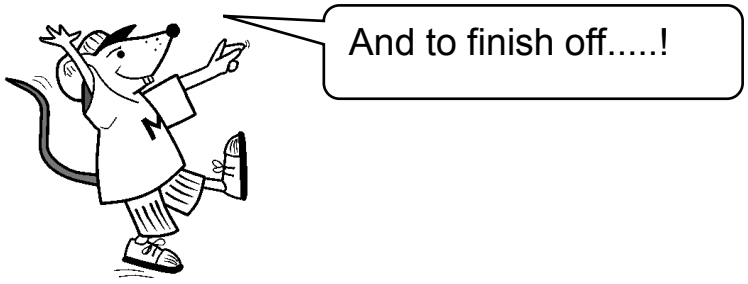
3. Computer discs cost 23p each. They are put in **boxes** of 100.
How much does a **box** cost in pence?
What is this in pounds?

4. A container holds 100 oranges. A container costs £23.
How many pence is this?
How much does each orange cost?

5. Cassette tapes are sold in packs of 10.
Ten packs are put into one box.
One box costs £135.
How many pennies is this?
How much does one cassette tape cost?

6. How many £10 notes would you need to make £240 ?
How many £1 coins?
How many 10p coins?
How many 1p coins?

7. How many £10 notes would you need to make £990 ?
How many £1 coins?
How many 10p coins?
How many 1p coins?



1. Crayons cost 19p each. They are put in **packs** of 10.
How much does each **pack** cost in pence?
How much is this in pounds?

2. Rulers cost 33p each. They are put in **packs** of 10.
These **packs** are put in **boxes** of 10 **packs**.
How much does each **box** cost in pence?
How much is this in pounds?

3. Toy dolls cost 56p each. They are put in **boxes** of 100.
How much does a **box** cost in pence?
What is this in pounds?

4. A container holds 100 castle guides. A container costs £37.
How many pence is this?
How much does each castle guide cost?

5. Door handles are sold in packs of 10.
Ten packs are put into one box.
One box costs £274.
How many pennies is this?
How much does one door handle cost?

6. How many £10 notes would you need to make £580 ?
How many £1 coins?
How many 10p coins?
How many 1p coins?

7. How many £10 notes would you need to make £470 ?
How many £1 coins?
How many 10p coins?
How many 1p coins?

Answers

Page 3

1. 120 **2.** 457 **3.** 849.8 **4.** 3400 **5.** 1.5 **6.** 6.89 **7.** 0.493 **8.** 0.75

0.07 ⇦ 0.7 ⇦ **7** ⇨ 70 ⇨ 700 ⇨ 7000
0.05 ⇦ 0.5 ⇦ **5** ⇨ 50 ⇨ 500 ⇨ 5000
0.06 ⇦ 0.6 ⇦ **6** ⇨ 60 ⇨ 600 ⇨ 6000

Page 4

0.03	Nought point nought three	0.02	Nought point nought two
0.3	Nought point three	0.2	Nought point two
3	Three	2	Two
30	Thirty	20	Twenty
300	Three hundred	200	Two hundred
3 000	Three thousand	2 000	Two thousand
30 000	Thirty thousand	20 000	Twenty thousand
300 000	Three hundred thousand	200 000	Two hundred thousand

In the pattern descriptions, the point should be made that the **numbers move left one place** every time **a multiplication by 10** occurs and **right one place** for a **division by 10.**

Page 5

1.

0.12	1.2	**12**	120	1200
0.046	0.46	**4.6**	46	460
1.5	15	**150**	1500	15000
0.348	3.48	**34.8**	348	3480
0.17	1.7	**17**	170	1700
0.007	0.07	**0.7**	7	70
0.0023	0.023	**0.23**	2.3	23
0.0934	0.934	**9.34**	93.4	934
0.274	2.74	**27.4**	274	2740

2. When a number is multiplied by 10 it moves one place to the left.
When a number is multiplied by 100 it moves two places to the left.
When a number is divided by 10 it moves one place to the right.
When a number is divided by 100 it moves two places to the right.

3.

0.15	1.5	15	**150**	1500
0.23	2.3	23	230	**2300**
0.8	**8**	80	800	8000
0.09	0.9	9	90	900
0.0476	0.476	4.76	**47.6**	476
0.36	3.6	36	360	**3600**
0.078	**0.78**	7.8	78	780
2.34	23.4	234	2340	23400
0.009	0.09	0.9	**9**	90

Answers

Page 6

Multy's Rule for multiplying: Instead of multiplying by 10 and by 10 again, simply **multiply by 100.**

1. 570	**2.** 320	**3.** 2500	**4.** 80	**5.** 678
6. 4590	**7.** 10	**8.** 2370	**9.** 8960	**10.** 480

Multy's Rule for dividing: Instead of dividing by 10 and by 10 again, simply **divide by 100.**

11. 38	**12.** 45	**13.** 0.769	**14.** 0.09	**15.** 2.3
16. 0.538	**17.** 1	**18.** 2	**19.** 4.5	**20.** 0.047

Page 7

1. 10	**2.** 10	**3.** 100	**4.** 10	**5.** 100
6. 100	**7.** 100	**8.** 10	**9.** 100	**10.** 10
11. 100	**12.** 100	**13.** 10	**14.** 100	**15.** 10
16. 100	**17.** 100	**18.** 10	**19.** 100	**20.** 10

21. Ten times longer. **22.** Ten times quicker.

Page 8

1. 10	**2.** 10	**3.** 100	**4.** 10	**5.** 100
6. 100	**7.** 100	**8.** 10	**9.** 100	**10.** 10
11. 100	**12.** 100	**13.** 10	**14.** 100	**15.** 10
16. 100	**17.** 100	**18.** 10	**19.** 100	**20.** 10

21. Ten times longer. **22.** Ten times quicker.

Page 9

1. 160p £1.60 **2.** 2 100p £21.00
3. 2 300p £23.00 **4.** 2 300p 23p
5. 13 500p 135p or £1.35
6. 24 240 2 400 24 000 **7.** 99 990 9 900 99 000

Page 10

1. 190p £1.90 **2.** 3 300p £33.00
3. 5 600p £56.00 **4.** 3 700p 37p
5. 27 400p 274p or £2.74
6. 58 580 5 800 58 000 **7.** 47 470 4 700 47 000