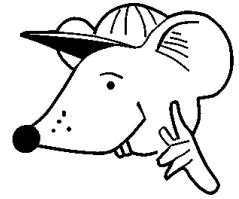


MATHEMATICS



N.S. Yr. 4 P.6

Multiply and divide by 10, 100 and 1000.

Equipment

Pencil and paper

Calculator

Base ten apparatus

(Parents: this may be cut out from the last few pages of this module and photocopied onto card if you wish to make it stronger)

MathSphere

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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. 3.98×10 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:

Eg.

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.

Eg. 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.

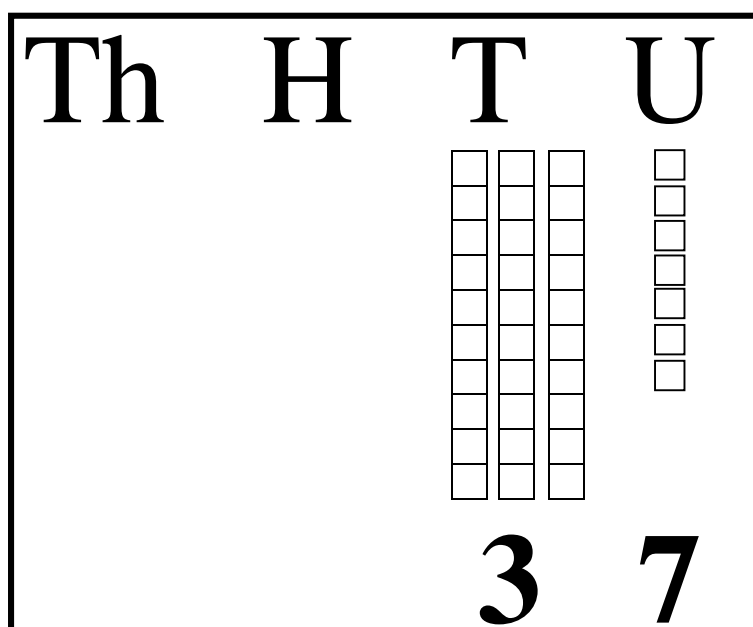
In both examples, the numbers have moved one place to the left.

You are going to **multiply** some numbers by **10**.

Lay out the number **37** on the number board using the base 10 apparatus.

Put three **ten** strips under the tens column and seven **ones** under the units column. Put the digit cards for three and seven under the strips and ones.

Your board should look like this:



Now multiply the **3** tens by 10 ($30 \times 10 = 300$). This becomes 3 in the hundreds column, so swap the **ten strips** for 3 **hundred squares**.

Multiply the **7** by 10 ($7 \times 10 = 70$). This becomes 7 in the tens column, so swap the **one squares** for **7 ten strips**.



Now just put a **zero** in the units column to show there are no units.

So $37 \times 10 = 370$

Now try the same with these multiplications:

1. 45×10

2. 26×10

3. 19×10

4. 84×10

5. 24×10

6. 22×10

What can you say happens when we multiply a number by ten?

Multiply these by 10 and then by 10 again:

7. $23 \times 10 \times 10$

8. $17 \times 10 \times 10$

9. $35 \times 10 \times 10$

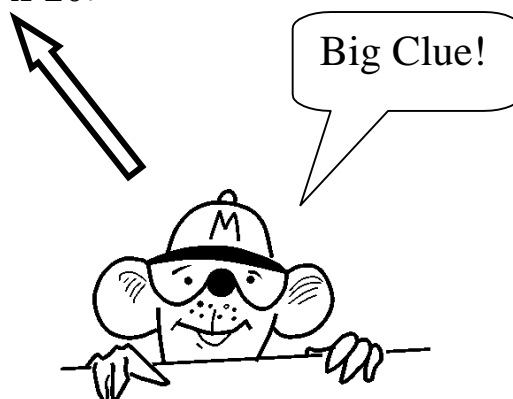
10. $48 \times 10 \times 10$

Multiplying by **10** and by **10** again is the same as multiplying by **100**.

What can you say happens when we multiply a number by **100**?

Can you see what will happen when we multiply by 1 000?

Don't forget **1 000 = 10 x 10 x 10**.



Finish with these:

11. 43×10

12. 65×100

13. $45 \times 1\,000$

14. 74×10

15. $88 \times 1\,000$

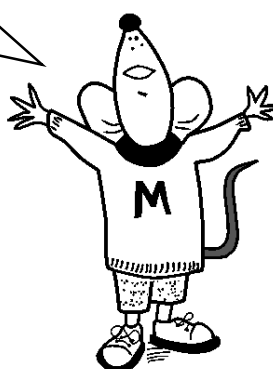
16. 66×100

Multy's Golden Rules:

When you multiply a number by 10 it moves one place to the left.

When you multiply a number by 100 it moves two places to the left.

When you multiply a number by 1 000 it moves three places to the left.



1. Can you fill in the missing numbers?

$$\begin{array}{l} 35 \times 10 = 350 \\ 350 \times 10 = \underline{\hspace{2cm}} \\ 3\,500 \times 10 = \underline{\hspace{2cm}} \end{array}$$

$$\begin{array}{l} 49 \times 10 = 490 \\ 490 \times 10 = \underline{\hspace{2cm}} \\ \underline{\hspace{2cm}} \times 10 = \underline{\hspace{2cm}} \end{array}$$

2. Can you describe what is happening in this table?

1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90
100	200	300	400	500	600	700	800	900
1 000	2 000	3 000	4 000	5 000	6 000	7 000	8 000	9 000

Remember Multy's Golden Rules to help you answer these questions:

1. 27×10
2. 56×100
3. 72×100
4. 79×10
5. 88×100
6. 49×100
7. 73×10
8. 293×10
9. 372×10
10. 583×100
11. 6×100
12. 8×100
13. 74×10
14. 55×10
15. 55×100
16. 83×10

Here are some questions written in words:

Crikey, words!



17. How many times is 80 bigger than 8 ?
18. How many times is 800 bigger than 8 ?
19. How many times is 930 bigger than 93 ?
20. How many times is 900 bigger than 9 ?
21. How many times is 4 600 bigger than 46 ?
22. How many times is 3 540 bigger than 354 ?
23. How many times is 35 400 bigger than 354 ?
24. How many times is 19 500 bigger than 195 ?

More problems for you to try! The first one has been done for you.

1. A tin of baked beans costs 38p. How much do 10 tins cost in pence.

Answer: 10 tins cost $38 \times 10 = 380$ pence.

2. A pack of nails costs 56p. How much do 10 packs cost in pence?
3. It costs 98p to feed a gerbil for a week. How much would it cost in pence to feed 10 gerbils for a week?
4. A man paints 38 cm of a piece of wood in one minute. How many centimetres could he paint in ten minutes?
5. A ruler is 30 cm long. How long would 100 rulers be in centimetres?
6. A roll of ribbon is 78 centimetres long. How long would 100 rolls be in centimetres?
7. A woman pays 55 cents for a bus ride to work. How much would this cost her in cents for 10 days?
8. Tiddle toy creatures cost 78p each. How much would 1 000 cost in pence?
9. Christmas decorations are 39p each. How much would 10 cost?
How much would 100 cost? How much would 1 000 cost?
10. The school fete charged 20p entry. 1 000 people went in. How much did they pay altogether to get in?
11. Petrol costs 69p per litre. How much does 10 litres cost?
How much does 100 litres cost?

More problems for you to try!
The first one has been done for you.



1. A cup of coffee costs 85p. How much do 10 cups cost in pence?

Answer: 10 cups cost $85 \times 10 = 850$ pence.

2. A computer disc costs 33p. How much would 10 discs cost in pence?

3. It costs 78p to feed a rabbit for a week. How much would it cost to feed 10 rabbits for a week in pence?

4. A woman mows 75 cm of her lawn in one second. How many centimetres could she mow in ten seconds?

5. A chop stick is 28 cm long. How long would 100 chop sticks be in centimetres?

6. A roll of tape is 78 centimetres long. How long would 100 rolls be in centimetres?

7. A woman pays 95 cents for a sandwich. How much would she pay in cents for 10 sandwiches?

8. Chocolate eggs cost 48p each. How much would 1 000 cost?

9. Doll shoes are 95p a pair. How much would 10 pairs cost?
How much would 100 pairs cost? How much would 1000 pairs cost?

10. A school charged 30p each for its pupils to come to school in mufti.
1 000 people dressed up.
How much did they pay altogether to dress in mufti?

11. Paraffin costs 45p per litre. How much does ten litres cost?
How much does a hundred litres cost?

Now it is time to **divide** some numbers by 10,
but this time let's use a **calculator**.



Calculator, yippee!



Using your calculator, work out these sums:

1. $50 \div 10$ 2. $500 \div 10$ 3. $980 \div 10$ 4. $12\,600 \div 10$

5. What happens to the number when you divide by 10 ?

6. $300 \div 100$ 7. $5\,200 \div 100$ 8. $6\,200 \div 100$ 9. $492\,000 \div 100$

10. What happens to the number when you divide by 100 ?

Now what do you think will happen when you divide some numbers
by 1 000?

Try these:

11. $58\,000 \div 1000$ 12. $48\,000 \div 1000$ 13. $23\,000 \div 1000$

Were you correct?

Of course!



Can you make up some Golden Rules for **Divvy**?

When you divide a number by 10 it moves one place to the ____.

When you divide a number by 100 it moves _____ to the ____.

When you divide a number by 1 000 it moves _____ to the ____.



Now try these problems to finish with:

1. How many £1 coins make £23 ?
2. How many 10p coins make £7 ?
3. How many 1p coins make £38 ?
4. If 10 tins of tuna cost 670 pence, how much does each tin cost?
5. If 100 cans of FUZZY drink cost 4 800 pence, how much does one can cost?
How much do ten cans cost in pence?
6. 10 new pencils are laid end to end and make a line 280 cm long.
How long is each pencil?
How long would a line of 100 pencils be?
7. Fill in the missing numbers:
£12 = _____ 10p coins = _____ penny coins.

Answers

Page 4

1. 450 2. 260 3. 190 4. 840 5. 240 6. 220

When you multiply by 10, the number moves one place to the left.

7. 2 300 8. 1 700 9. 3 500 10. 4 800

When you multiply by 100, the number moves two places to the left.

When you multiply by 1000, the number moves three places to the left.

11. 430 12. 6 500 13. 45 000 14. 740 15. 88 000 16. 6 600

Page 5

1. $350 \times 10 = 3\,500$ $490 \times 10 = 4\,900$

$$3\,500 \times 10 = 35\,000 \quad 4\,900 \times 10 = 49\,000$$

2. Each number at the top of a column is being multiplied by 10, then 100 and then 1 000.

Page 6

1. 270 2. 5 600 3. 7 200 4. 790 5. 8 800 6. 4900
7. 730 8. 2 930 9. 3 720 10. 58 300 11. 600 12. 800
13. 740 14. 550 15. 5 500 16. 830 17. 10 18. 100
19. 10 20. 100 21. 100 22. 10 23. 100 24. 100

Page 7

1. 380p 2. 560p 3. 980p 4. 380cm 5. 3 000 cm 6. 7 800 cm
7. 550 cents 8. 78 000p 9. 390p, 3 900p, 39000p 10. 20 000p
11. 690p 6 900p

Page 8

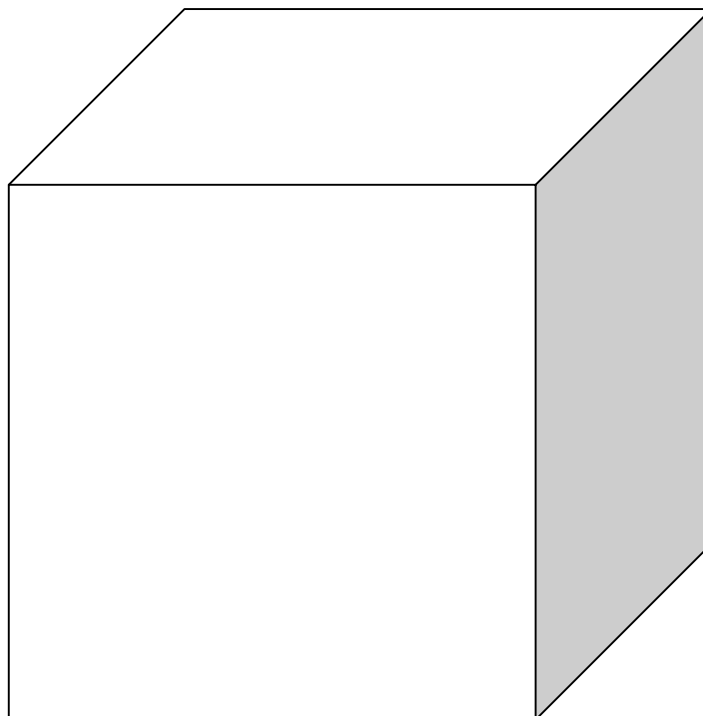
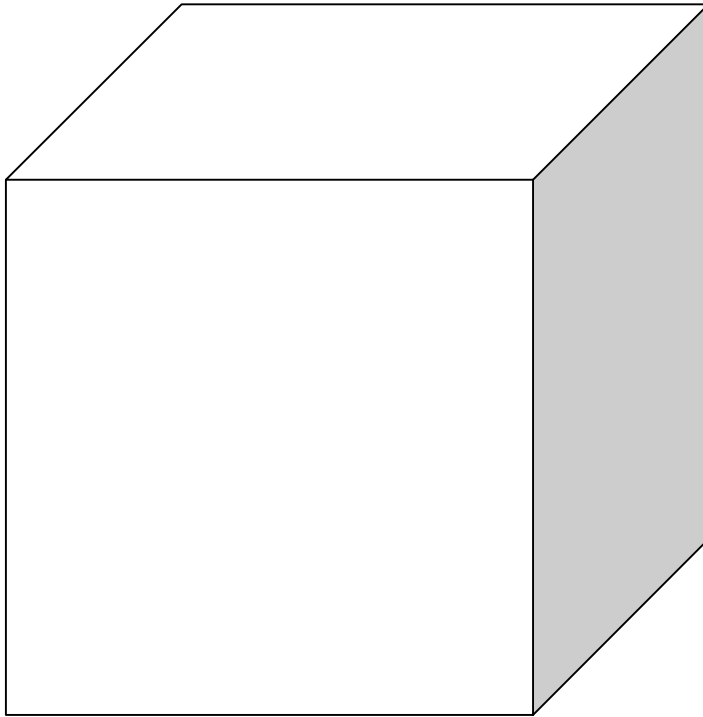
1. 850p 2. 330p 3. 780p 4. 750cm 5. 2 800cm 6. 7 800 cm
7. 950 cents 8. 48 000p 9. 950p 9 500p 95 000p 10. 30 000p
11. 450p 4 500p

Page 9

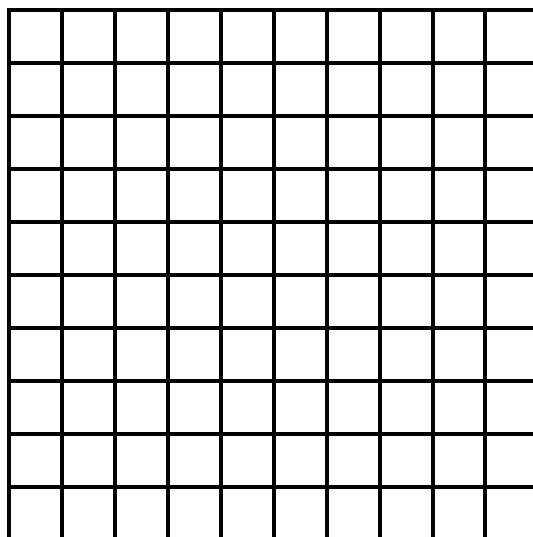
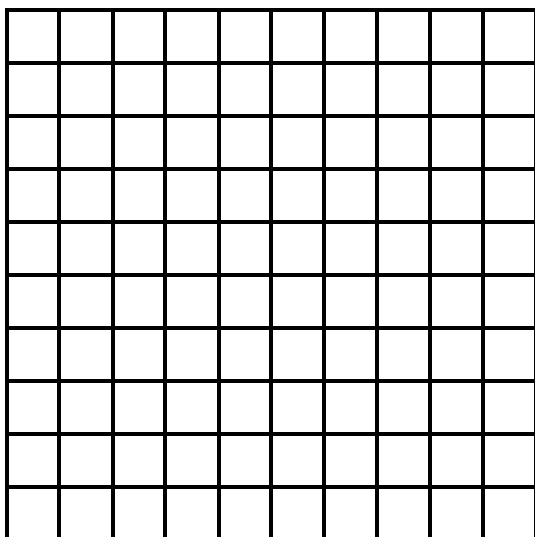
1. 5 2. 50 3. 98 4. 1 260
5. When dividing by 10 the number moves one place to the right.
6. 3 7. 52 8. 62 9. 4 920
10. When dividing by 100 the number moves two places to the right.
When dividing by 1 000 the number moves three places to the right.
11. 58 12. 48 13. 23

Page 10

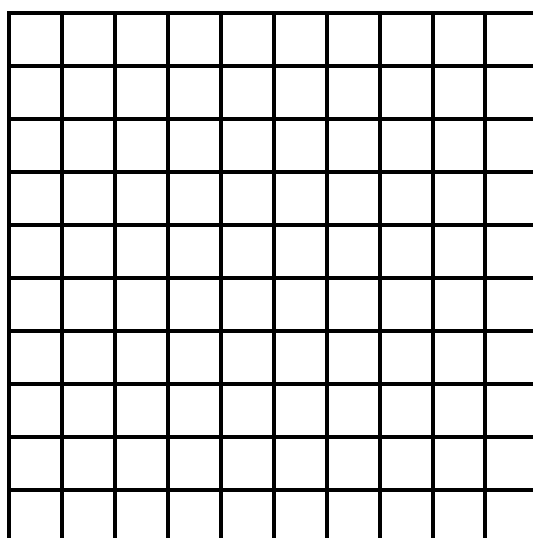
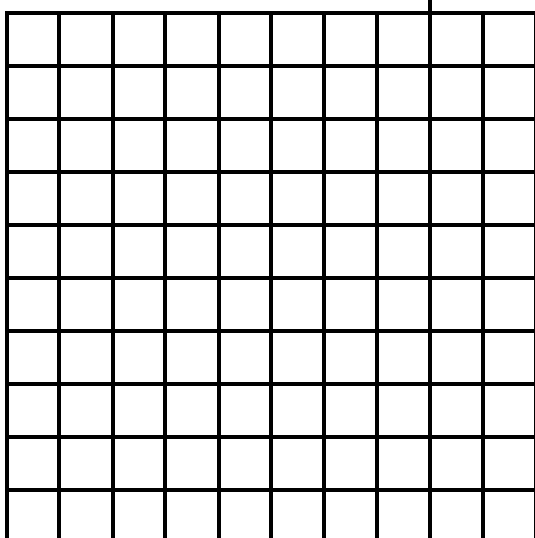
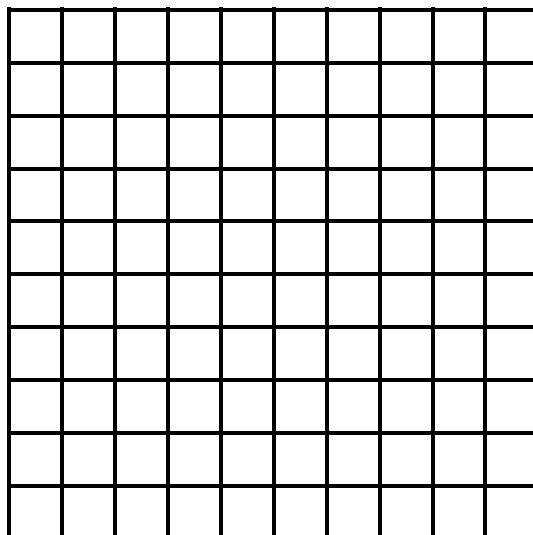
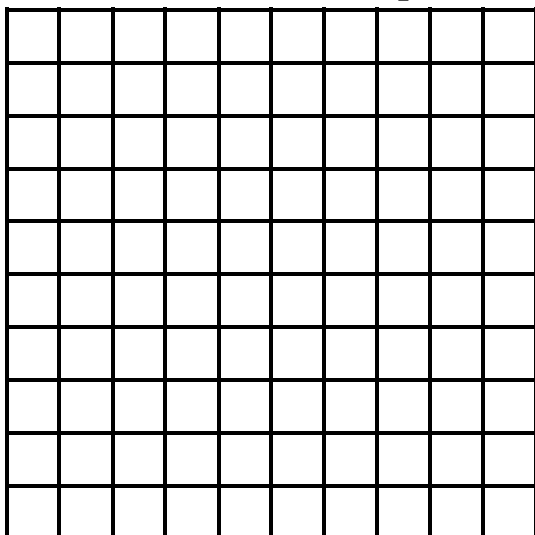
1. 23 2. 70 3. 3 800 4. 67 5. 48p 480p
6. 28cm 2 800cm 7. £12 = 120 ten pence coins = 1 200 penny coins

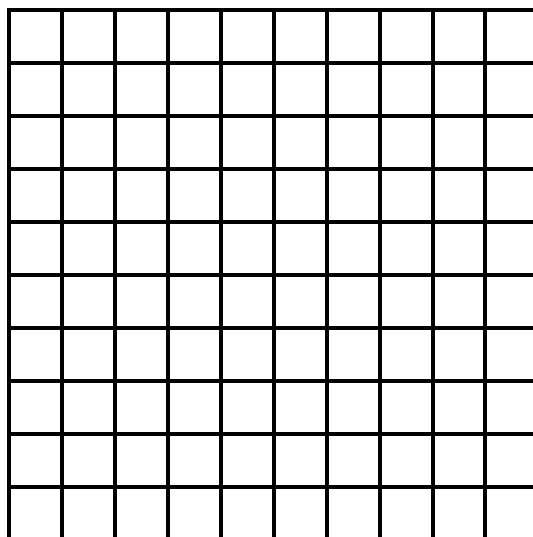
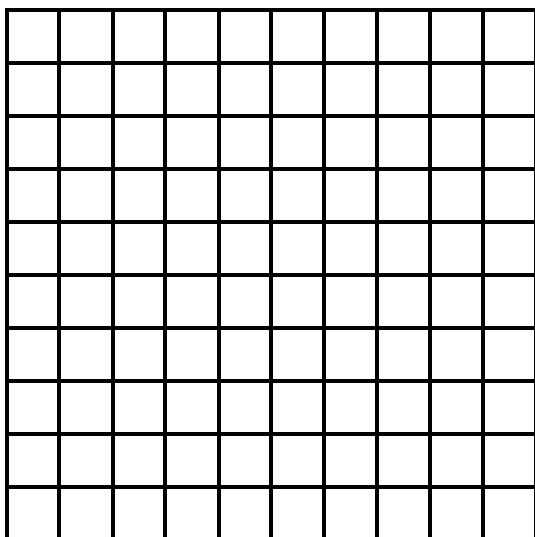


These are **thousand cubes**. Print off as many as you need and cut them out.

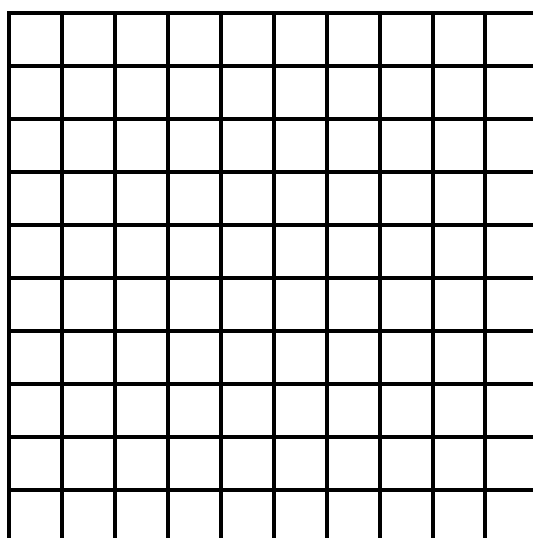
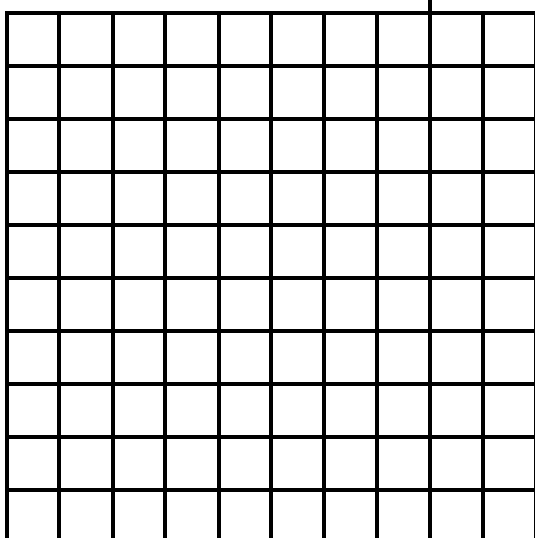
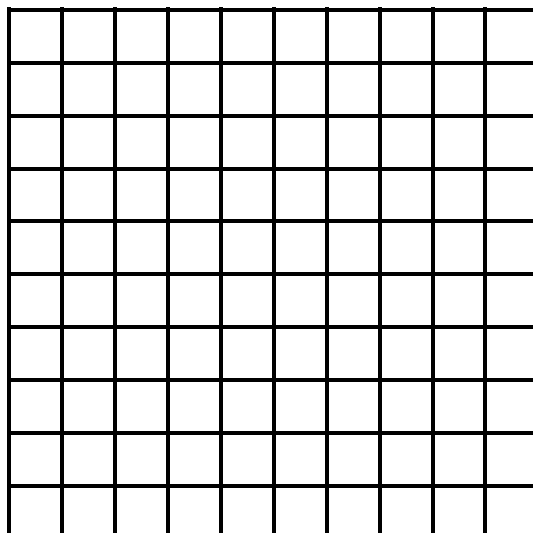
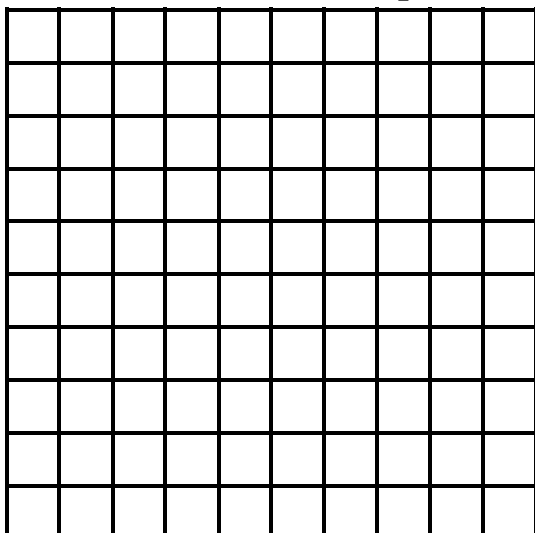


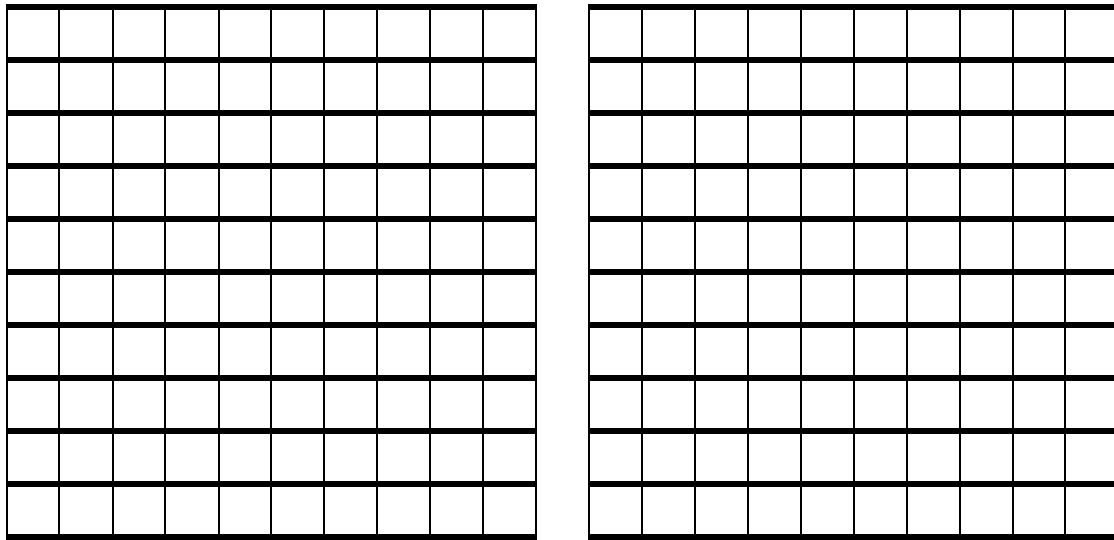
Cut out these **hundred squares**.



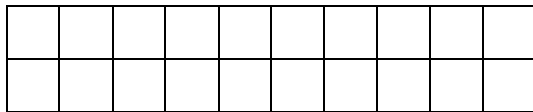


Cut out these **hundred squares**.

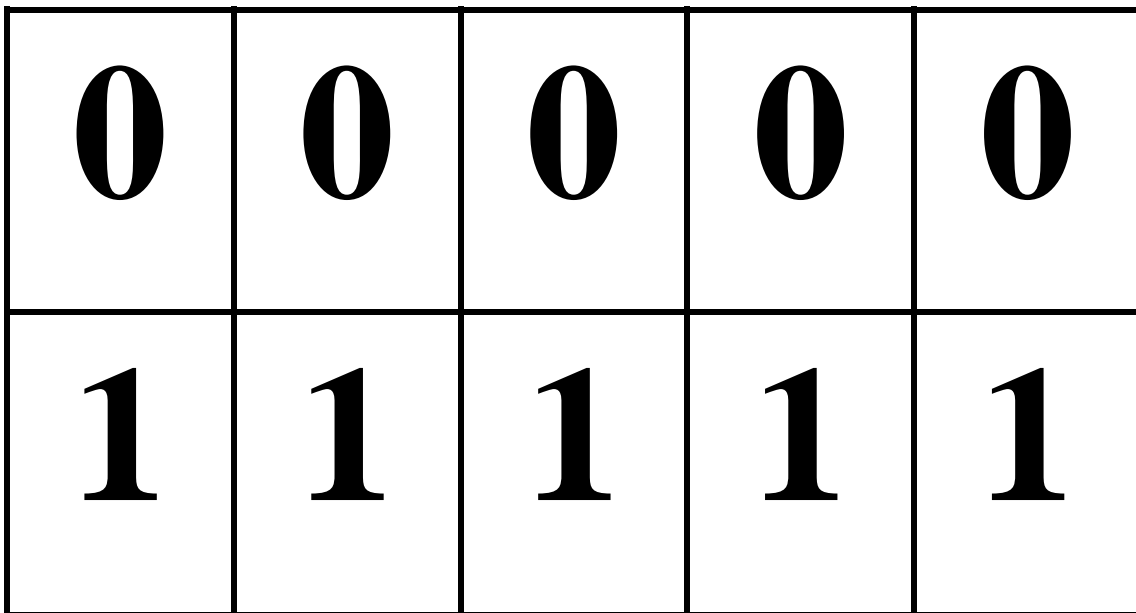




Cut these into strips 10 x 1. These are **ten strips**.



Cut these into 1 x 1 squares. These are **ones**.



Cut out these individual numbers. These are **digit cards**.

2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6

7	7	7	7	7
8	8	8	8	8
9	9	9	9	9