



MATHEMATICS



N.S. Yr. 3 P. 55

Strategies for Mental Calculation

Equipment

Paper, pencil, ruler
Number lines
Times ten grid

MathSphere

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Concepts

Several key mental strategies are used in this module.

1. the effect of multiplying a number by 10.

Many children are told that all you have to do to multiply by ten is 'add a nought'. This is fatal! When they move on to multiplying decimals, for instance, adding a nought gives an incorrect answer. ($2.4 \times 10 = 24$, not 2.40)

They should understand that the units digit moves one place to the left, into the tens column and a nought is placed in the empty units column.

2. the effect of dividing by 10.

As division is the reverse of multiplication, to divide by ten, numbers can be moved one place to the right. To avoid confusion with the decimal point, keep to multiples of 10 in year 3.

3. Multiplying by 4 by doubling and doubling.

This is a very effective mental strategy. Having a sound knowledge of the double of all numbers up to ten can speed up mental calculations enormously.

4. Dividing by 4 by halving and halving.

As for multiplying, it is very important that children know the halves of numbers below 20 and have quick strategies for finding others.

5. Inverse

Finally there is re-inforcement of the relationship between multiplication and division, and how this can lead to other statements

Eg if $24 \div 6 = 4$ then $6 \times 4 = 24$ etc.

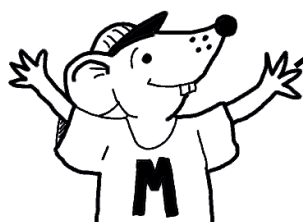
Multiplying by 10

Multiplying by ten is easy – if you know what you are doing.

Look at the table below.

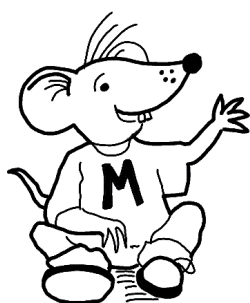


1	2	3	4	5	6	7	8	9
10	20	30	40	50	60	70	80	90
100	200	300	400	500	600	700	800	900



Notice how the digits move one place to the left each time you multiply by 10.

A nought is placed in the column that the digit has moved from.



Some people (no-one you know I hope) say that you can times by ten by adding a nought.

Aargh!!!!!!!!!!!!!!

This will get you into BIG trouble later on in maths, so never say it!

Multiplying by 10

Fill in the missing numbers in this grid.
Each line is ten times more than the line above it.



1		3	4		6		8	
10	20	30				70		90
	200		400	500				

Try to answer these as quickly as possible.

1. $6 \times 10 =$

2. $4 \times 10 =$

3. $10 \times 10 =$

4. $10 \times 7 =$

5. $10 \times 20 =$

6. $10 \times 60 =$

7. $30 \times 10 =$

8. $10 \times 50 =$

9. $40 \times 10 =$

10. $10 \times 70 =$

Multiplying by 10

Remember: never say 'add a nought'.

Fill in the missing numbers in this ten times table grid.



1	2			5		7		9
			40	50			80	
100		300			600			

Try to answer these as quickly as possible.

1. $5 \times 10 =$

2. $3 \times 10 =$

3. $9 \times 10 =$

4. $10 \times 7 =$

5. $10 \times 30 =$

6. $10 \times 40 =$

7. $80 \times 10 =$

8. $10 \times 90 =$

9. $50 \times 10 =$

10. $10 \times 10 =$

Dividing by 10

When you divide by ten you
move each digit one place to
the right.
It's that easy!



Try to answer these as quickly as possible.

1. $50 \div 10 =$

2. $40 \div 10 =$

3. $80 \div 10 =$

4. $20 \div 10 =$

5. $30 \div 10 =$

6. $200 \div 10 =$

7. $400 \div 10 =$

8. $500 \div 10 =$

9. $300 \div 10 =$

10. $100 \div 10 =$

Dividing by 10

Remember how to divide by ten.

Move each digit one place to the right.



Try to answer these as quickly as possible.

1. $30 \div 10 =$

2. $60 \div 10 =$

3. $10 \div 10 =$

4. $70 \div 10 =$

5. $90 \div 10 =$

6. $600 \div 10 =$

7. $800 \div 10 =$

8. $900 \div 10 =$

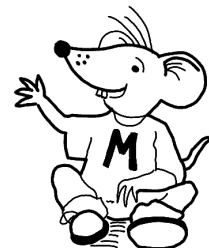
9. $700 \div 10 =$

10. $400 \div 10 =$

Multiply by 4 by doubling

If you know your 2 times table it is easy to work out your 4 times table.

All you need to do is double each answer!!



Write in the answers to your 4 times table

2 times table

$1 \times 2 = 2$

$2 \times 2 = 4$

$3 \times 2 = 6$

$4 \times 2 = 8$

$5 \times 2 = 10$

$6 \times 2 = 12$

$7 \times 2 = 14$

$8 \times 2 = 16$

$9 \times 2 = 18$

$10 \times 2 = 20$

Double 2 \longrightarrow

Double 4 \longrightarrow

Double 6 \longrightarrow

Double 8 \longrightarrow

Double 10 \longrightarrow

Double 12 \longrightarrow

Double 14 \longrightarrow

Double 16 \longrightarrow

Double 18 \longrightarrow

Double 20 \longrightarrow

4 times table

$1 \times 4 =$

$2 \times 4 =$

$3 \times 4 =$

$4 \times 4 =$

$5 \times 4 =$

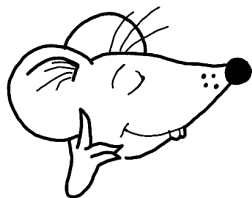
$6 \times 4 =$

$7 \times 4 =$

$8 \times 4 =$

$9 \times 4 =$

$10 \times 4 =$

Multiply by 4 by doubling

To multiply by 4, just double the number and then double again!

It's pretty easy if you know your doubles!

Example: 12×4

Double 12 = 24

Double 24 = 48

$12 \times 4 = 48$

Try this:

1. 8×4

Double 8 =

Double =

$8 \times 4 =$

Now multiply these by 4:

2. $7 \times 4 =$

3. $9 \times 4 =$

4. $11 \times 4 =$

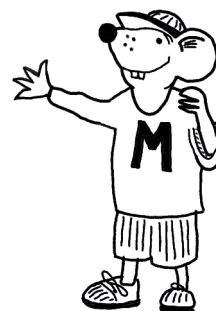
5. $15 \times 4 =$

6. $20 \times 4 =$

7. $30 \times 4 =$

Multiply by 4 by doubling

Work out the answers to these by doubling and then doubling again.



1. $11 \times 4 =$

2. $21 \times 4 =$

3. $13 \times 4 =$

4. $30 \times 4 =$

5. $50 \times 4 =$

6. $22 \times 4 =$

7. $40 \times 4 =$

8. $16 \times 4 =$

9. $20 \times 4 =$

10. $12 \times 4 =$



Double, double
Toil and trouble.

If you know all your doubles
You'll never have any troubles!
Hee, hee!

Finding a quarter

To find a quarter of a number,
halve it and then halve it
again.
Easy!

Example: find a quarter of 20.

Half of 20 = 10.

Half of 10 = 5 A quarter of 20 = 5

Find a quarter of these numbers by halving and then halving again:

1. A quarter of 40 =

2. A quarter of 12 =

3. A quarter of 16 =

4. A quarter of 24 =

5. A quarter of 60 =

6. A quarter of 80 =

7. A quarter of 44 =

8. A quarter of 28 =

9. A quarter of 88 =

10. A quarter of 48 =

11. A quarter of 32 =

12. A quarter of 100 =

Finding a quarter

Halve it and halve it.
What have you got?
A quarter!

Example: find a quarter of 40.

Half of 40 = 20.

Half of 20 = 10 A quarter of 40 = 10

Find a quarter of these numbers by halving and then halving again:

1. A quarter of 20 =

2. A quarter of 36 =

3. A quarter of 120 =

4. A quarter of 160 =

5. A quarter of 200 =

6. A quarter of 800 =

7. A quarter of 180 =

8. A quarter of 400 =

9. A quarter of 280 =

10. A quarter of 300 =

11. A quarter of 240 =

12. A quarter of 500 =

Making sums

4

5

20

Using these numbers make 4 multiplication and division sums

1. $\square \times \square = \square$ 2. $\square \times \square = \square$

3. $\square \div \square = \square$ 4. $\square \div \square = \square$

24

6

4

Using these numbers make 4 multiplication and division sums

1. $\square \times \square = \square$ 2. $\square \times \square = \square$

3. $\square \div \square = \square$ 4. $\square \div \square = \square$

Making sums

30

5

6

Using these numbers make 4 multiplication and division sums

1.

x

=

2.

x

=

3.

÷

=

4.

÷

=

7

35

5

Using these numbers make 4 multiplication and division sums

1.

x

=

2.

x

=

3.

÷

=

4.

÷

=

Making sums from three numbers

1. $\square \times \square = \square$ 2. $\square \times \square = \square$

3. $\square \div \square = \square$ 4. $\square \div \square = \square$

1. $\square \times \square = \square$ 2. $\square \times \square = \square$

3. $\square \div \square = \square$ 4. $\square \div \square = \square$

1. $\square \times \square = \square$ 2. $\square \times \square = \square$

3. $\square \div \square = \square$ 4. $\square \div \square = \square$

1. $\square \times \square = \square$ 2. $\square \times \square = \square$

3. $\square \div \square = \square$ 4. $\square \div \square = \square$

Answers

Page 4

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. 60	2. 40	3. 100	4. 70	5. 200	6. 600	7. 300	8. 500	9. 400	10. 700	

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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. 50	2. 30	3. 90	4. 70	5. 300	6. 400	7. 800	8. 900	9. 500	10. 100	

Page 6

1.5 2.4 3.8 4.2 5.3 6.20 7.40 8.50 9.30 10.10

Page 7

1.3 2.6 3.1 4.7 5.9 6.60 7.80 8.90 9.70 10.40

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4 x table answers: 4, 8, 12, 16, 20, 24, 28, 32, 36, 40

Page 9

1. 16, 16, 32, 32 2. 28 3. 36 4. 44 5. 60 6. 80 7. 120

Page 10

1.44 2.84 3.52 4.120 5.200 6.88 7.160 8.64 9.80 10.48

Page 11

1. 10 2. 3 3. 4 4. 6 5. 15 6. 20 7. 11 8. 7 9. 22 10. 12 11. 8 12. 25

Page 12

1.5 2.9 3.30 4.40 5.50 6.200 7.45 8.100 9.70 10.75 11.60 12.125

Page 13

1. $4 \times 5 = 20$, **2.** $5 \times 4 = 20$, **3.** $20 \div 5 = 4$, **4.** $20 \div 4 = 5$ (or vice versa)

1. $4 \times 6 = 24$, 2. $6 \times 4 = 24$, 3. $24 \div 6 = 4$, 4. $24 \div 4 = 6$ (or vice versa)

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1. $6 \times 5 = 30$, **2.** $5 \times 6 = 30$, **3.** $30 \div 5 = 6$, **4.** $30 \div 6 = 5$ (or vice versa)

1. $5 \times 7 = 35$, **2.** $7 \times 5 = 35$, **3.** $35 \div 7 = 5$, **4.** $35 \div 5 = 7$ (or vice versa)