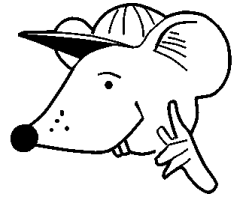


MATHEMATICS



N.S. Yr. 4 P.54

**Understanding division and its
relationship to subtraction and multiplication.**

Equipment

Paper, pencil, calculator

MathSphere

© MathSphere P.O. Box 1234 Worthing BN13 2UJ www.mathsphere.co.uk

Concepts

Children should be able to understand the operation of division in its two aspects:

a) Sharing. If **45** sweets are shared between **nine** people, how many sweets does each person have? This is normally achieved with a philosophy of 'one for you, one for you....'

b) Grouping. If **45** sweets are available, how many people can have **5** sweets each? This is normally achieved by putting the sweets in piles of five and seeing how many piles there are.

They should understand the following words and be able to read and write them:

share, group, divide, divided by, divided into, divisible by, factor, quotient, remainder, inverse

and they should know and recognise the division sign (\div) and its alternative ($/$).

Definitions:

Quotient is the answer to a division sum.

Eg. the quotient of **20** and **4** is **5**.

Factors: The whole numbers that will divide exactly into a number.

Eg. the factors of **21** are **1, 3, 7** and **21**

Notice that the number itself (**21**) is included in the factors. The factors not including the number itself are called **proper factors**.

Inverse: Opposite.

Eg. the inverse of multiplication is division.

Eg. the inverse of addition is subtraction.

Concepts (Continued)

Children should understand the **commutative law** (but, not thankfully, the word itself) as applied to division.

Definition:

Commutative Law. This is simply that if you swap the numbers in a multiplication sum or addition sum, the answer remains the same.

Eg. $14 \times 6 = 6 \times 14$

Eg. $6 + 8 = 8 + 6$

N.B. This is **not true for division**, for example. $16 \div 4$ is not equal to $4 \div 16$!

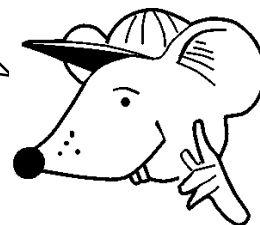
Children should be able to give a reasonable explanation of how they tackle a given problem. In a group situation this stimulates discussion and draws attention to other methods of solving the same problem.

In general, it is good policy, when discussing methods, to keep the numbers as simple as possible without losing the essential element of the problem. Unnecessarily difficult numbers cloud the mind when trying to understand a new idea.

Did you know that **twelve divided by three** is **not** the same as **three divided by twelve**?

How can you show this with counters or bricks?

Try it and see. Discuss this with your teacher or parent.



Which of these are true?

1. $15 \div 3 = 3 \div 15$ 2. $10 \div 2 = 2 \div 10$ 3. $25 \div 5 = 5 \div 25$

Which of these are true?

4. The answer to $14 \div 7$ is greater than 1.
5. The answer to $28 \div 4$ is smaller than 28.
6. The answer to $20 \div 2$ is smaller than 2 and smaller than 20.
7. The answer to $40 \div 8$ is greater than 1.

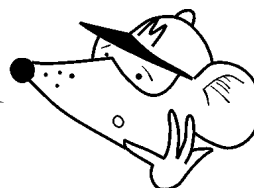


What happens when you divide a number by **1** ?

Can you write down the answers to these sums very quickly?

8. $13 \div 1$ 9. $45 \div 1$ 10. $12 \div 1$ 11. $20 \div 1$ 12. $20 \div 2 \div 1$

You cannot divide a number by 0.



Write down which of these questions have an answer and which cannot be worked out. Work out the ones that can be done.

1. $5 \div 0$ 2. $27 \div 0$ 3. $0 \div 3$ 4. $15 \div 0$

5. $2 \div 0 \times 5$ 6. $12 \div 3 \times 5 \div 2 \times 0$ 7. $12 \times 0 \div 3$



Now here's a tricky one!

What happens if you divide **24** by **6** and then multiply the answer by **6** ?

How quickly can you work out these sums?

8. $40 \div 5 \times 5$ 9. $12 \div 6 \times 6$ 10. $15 \div 3 \times 3$

Is the same true if we multiply first and then divide?

11. $10 \times 5 \div 5$ 12. $13 \times 2 \div 2$ 13. $20 \times 4 \div 4$

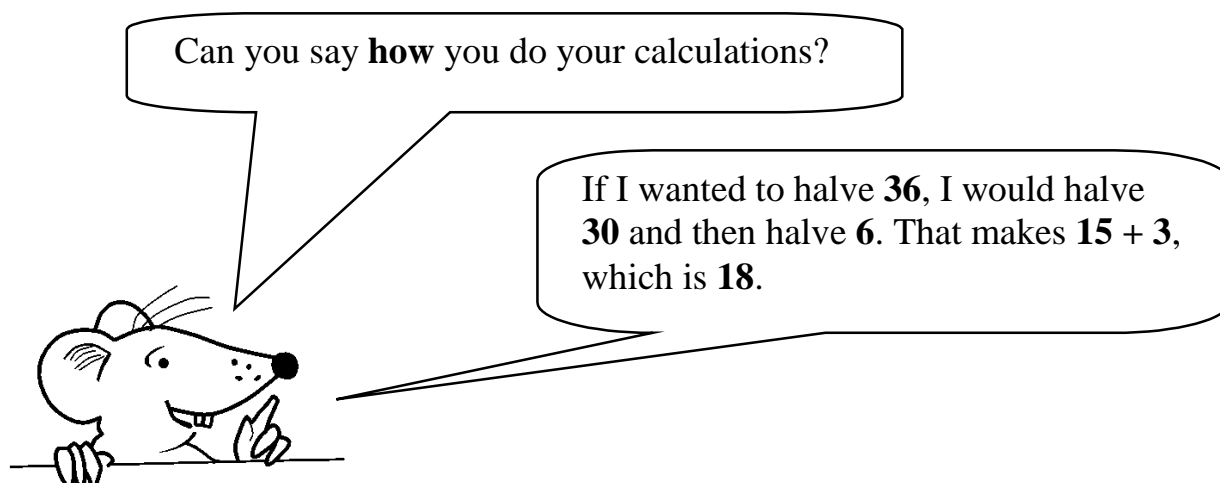
We can use this idea to check our division sums, like this:

$30 \div 5 = 6$. Check by multiplying 6 by 5: $6 \times 5 = 30$ Yippee!

Work out these sums and check them by multiplying.

14. $36 \div 4$ 15. $22 \div 11$ 16. $30 \div 6$ 17. $24 \div 4$

18. $10 \div 5$ 19. $50 \div 25$ 20. $40 \div 8$ 21. $42 \div 6$



Say **how** you would do these calculations and then do them:

1. Halve 46
2. 28 divided by 4
3. Find a quarter of 32
4. Share 24 between 8 people.
5. Divide 3 into 42.
6. How many groups of 6 can be made from 36 ?
7. How many lengths of 10cm can you make from 170 cm?
8. What are the factors of 15 ?
9. Is 48 divisible by 6 ?
10. Write down a pair of numbers with a quotient of 6.
11. Write down six pairs of numbers with a quotient of 4.

Play a game with a friend. You give your friend a sum like the ones above. Your friend tells you **how** to do it and then works it out. Your friend must not do the sum until they have told you how to do it.

Then it is your friend's turn to give you a sum. Hard work, eh!



We can find a fraction of something using division. Eg. $\frac{1}{2}$ of 8
is the same as $8 \div 2$, which is 4.

A fraction is like a division sum.

$\frac{10}{2}$ means $10 \div 2$, which is 5.



Work these sums out:

1. $\frac{1}{4}$ of 12

2. $\frac{1}{2}$ of 8

3. $\frac{1}{3}$ of 12

4. $\frac{1}{5}$ of 20

5. $\frac{1}{4}$ of 16

6. $\frac{1}{5}$ of 35

Work these out by dividing:

7. $\frac{8}{4} =$

8. $\frac{9}{3} =$

9. $\frac{12}{6} =$

10. $\frac{15}{5} =$

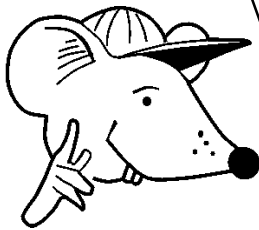
11. $\frac{18}{6} =$

12. $\frac{14}{2} =$

Quick Question Sheet

Answer these questions.

You need to be **quick**
accurate
neat.



1. Which are true?:

- a) $12 \div 6 = 6 \div 12$ b) $16 \div 2 \div 2 = 2 \div 16 \div 2$ c) $20 \div 5 = 5 \div 20$
d) A half of 50 is 25 e) A quarter of sixteen is four.

2. Calculate:

- a) $24 \div 1$ b) $248 \div 1$ c) $42 \div 1$
d) $28 - 4 - 4 - 4 - 4 - 4$ e) $45 - 5 - 5 - 5 - 5 - 5 - 5$

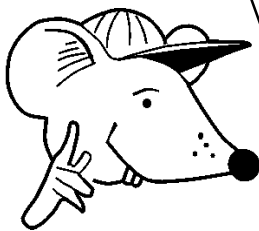
3. Which are true?

- a) $46 \div 1$ is greater than 1 b) $46 \div 1$ is greater than 46
c) $24 \div 0$ is impossible to calculate. d) $25 \times 3 \div 3 = 25$
e) If $12 \times 13 = 156$, then $156 \div 12 = 13$.
f) If $196 \div 14 = 14$, then $14 \times 14 = 196$.

Quick Question Sheet

Answer these questions.

You need to be **quick**
accurate
neat.



1. Fill in the boxes:

a) $12 \div 3 = \square$ b) $18 \div 6 = \square$ c) $15 \div \square = 3$

d) $42 \div 7 = \square$ e) $64 \div 2 = \square$ f) $20 \div \square = 2$

g) $15 \div 3 + \square = 12$ h) $12 + (\square \div 4) = 16$

2. Using a calculator, fill in the boxes.

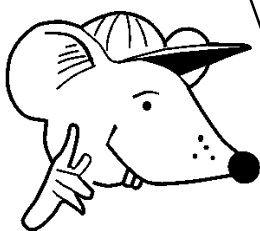
a) $85\,413 \div 213 = \square$ b) $\square \div \square = 24$

c) $\square \div 16 = 218$ d) $12\,360 \div \square = 824$

Quick Question Sheet

Answer these questions.

You need to be **quick**
accurate
neat.



1. Which are true?:

a) $18 \div 3 = 3 \div 18$ b) $44 \div 4 \div 11 = 11 \div 4 \div 44$ c) $36 \div 4 = 4 \div 36$

d) One fifth of twenty is four. e) One third of twenty one is seven.

2. Calculate:

a) $38 \div 1$ b) $92 \div 1$ c) $40 \div 1$

d) $30 - 2 - 2 - 2 - 2 - 2$ e) $38 - 3 - 3 - 3 - 3 - 3$

3. Which are true?

a) $28 \div 1$ is greater than 28. b) $28 \div 1$ is smaller than 1.

c) $0 \div 40 = 0$ d) $40 \div 0 = 40$

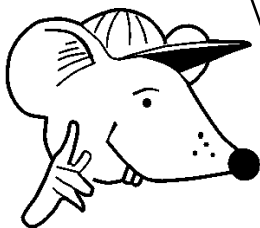
e) If $92 \times 21 = 1\,932$, then $1\,932 \div 21 = 92$

f) If $625 \div 25 = 25$, then $25 \times 25 = 625$.

Quick Question Sheet

Answer these questions.

You need to be **quick**
accurate
neat.



1. Fill in the boxes:

a) $25 \div 5 = \square$ b) $22 \div 11 = \square$ c) $40 \div \square = 8$

d) $30 \div 15 = \square$ e) $\frac{1}{5}$ of 20 = \square f) $\frac{1}{3}$ of $\square = 8$

g) $12 \div 3 + \square = 20$ h) $15 + (\square \div 5) = 20$

2. Using a calculator, fill in the boxes.

a) $190\,710 \div 815 = \square$ b) $\square \div \square = 78$

c) $\square \div 22 = 338$ d) $299\,425 \div \square = 725$

Answers

Page 4

1. False 2. False 3. False 4. True 5. True 6. False 7. True
8. 13 9. 45 10. 12 11. 20 12. 10

Page 5

1. No answer 2. No answer 3. 0 4. No answer 5. No answer 6. 0
7. 0 8. 40 9. 12 10. 15 11. 10 12. 13 13. 20 14. 9 15. 2
16. 5 17. 6 18. 2 19. 2 20. 5 21. 7

Page 6

1. 23 2. 7 3. 8 4. 3 5. 14 6. 6 7. 17
8. 1, 3, 5, 15 9. Yes
10. Any pair such as 54 and 9. 11. Any six pairs such as 80 and 20.

Page 7

1. 3 2. 4 3. 4 4. 4 5. 4 6. 7 7. 2 8. 3 9. 2 10. 3
11. 3 12. 7

Page 8

1. a) False b) False c) False d) True e) True
2. a) 24 b) 248 c) 42 d) 8 e) 15
3. a) True b) False c) True d) True e) True f) True

Page 9

1. a) 4 b) 3 c) 5 d) 6 e) 32 f) 10 g) 7 h) 16
2. a) 401 b) Any two eg $15\,600 \div 650$ c) 3 488 d) 15

Page 10

1. a) False b) False c) False d) True e) True
2. a) 38 b) 92 c) 40 d) 20 e) 23
3. a) False b) False c) True d) False e) True f) True

Page 11

1. a) 5 b) 2 c) 5 d) 2 e) 4 f) 24 g) 16 h) 25
2. a) 234 b) Any two, eg $4\,368 \div 56$ c) 7 436 d) 413