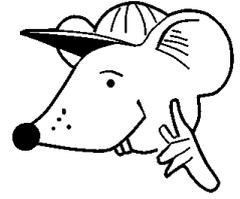




MATHEMATICS



N.S. Yr. 5 P.55

**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 **56** marbles are shared between **eight** people, how many marbles does each person have? This is normally achieved with a philosophy of 'one for you, one for you....'

b) Grouping. If **56** marbles are available, how many people can have **7** marbles each? This is normally achieved by putting the marbles in piles of seven 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 **24** and **6** is **4**.

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

Eg. the factors of **27** are **1, 3, 9** and **27**

Notice that the number itself (**27**) 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. $24 \times 3 = 3 \times 24$

Eg. $10 + 7 = 7 + 10$

N.B. This is **not true for division**, for example. $32 \div 8$ is not equal to $8 \div 32$!

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.

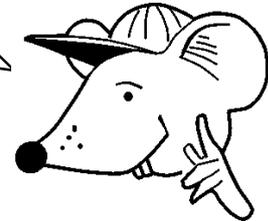
BODMAS

The order in which operations should be performed is determined by the acronym BODMAS (Brackets, of, division, multiplication, addition and subtraction). See our module devoted to this topic for further information and examples.

Did you know that **twenty one divided by seven** is **not** the same as **seven divided by twenty one**?

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. $84 \div 7 = 7 \div 84$ 2. $48 \div 8 = 8 \div 48$ 3. $100 \div 10 = 10 \div 100$

Which of these are true?

4. The answer to $23 \div 46$ is smaller than 1.
5. The answer to $48 \div 24$ is smaller than 48.
6. The answer to $50 \div 150$ is smaller than 50 and smaller than 1.
7. The answer to $90 \div 9$ is smaller than 1.

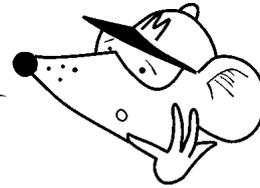


What happens when you divide a number by **1** ?

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

8. $147 \div 1$ 9. $236 \div 1$ 10. $84 \div 1$ 11. $22 \div 1$ 12. $85 \div 1$

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. $26 \div 0$ 2. $48 \div 0$ 3. $0 \div 17$ 4. $0 \div 22$
 5. $150 \div 0 \times 17$ 6. $24 \div 4 \times 2 \div 3 \div 0$ 7. $0 \div 240$



Now here's a tricky one!

What happens if you divide **98** by **7** and then multiply the answer by **7**?

How quickly can you work out these sums?

8. $23 \div 6 \times 6$ 9. $56 \div 7 \times 7$ 10. $84 \div 4 \times 4$

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

11. $48 \times 4 \div 4$ 12. $63 \times 12 \div 12$ 13. $92 \times 5 \div 5$

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

$60 \div 15 = 4$. Check by multiplying 4 by 15: $4 \times 15 = 60$ Yippee!

Work out these sums and check them by multiplying.

14. $48 \div 12$ 15. $36 \div 9$ 16. $70 \div 7$ 17. $80 \div 10$
 18. $28 \div 7$ 19. $55 \div 11$ 20. $72 \div 8$ 21. $76 \div 4$

Can you say **how** you do your calculations?

If I wanted to halve **76**, I would halve **70** and then halve **6**. That makes **$35 + 3$** , which is **38**.



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

1. Halve 86
2. 63 divided by 7
3. Find a sixth of 42
4. Share 50 between 10 people.
5. Divide 5 into 75.
6. How many groups of 15 can be made from 75 ?
7. How many lengths of 20cm can you make from 240 cm?
8. What are the factors of 60 ?
9. Is 240 divisible by 6 ?
10. Write down four pairs of numbers with a quotient of 12.
11. Write down eight pairs of numbers with a quotient of 10.

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. $\frac{1}{5}$ of 30
is the same as $30 \div 5$, which is 6.

A fraction is like a division sum.

$\frac{28}{4}$ means $28 \div 4$, which is 7.



Work these sums out:

1. $\frac{1}{6}$ of 30

2. $\frac{1}{7}$ of 21

3. $\frac{1}{6}$ of 12

4. $\frac{1}{8}$ of 24

5. $\frac{1}{3}$ of 36

6. $\frac{1}{8}$ of 40

Work these out by dividing:

7. $\frac{26}{13} = \square$

8. $\frac{24}{3} = \square$

9. $\frac{45}{9} = \square$

10. $\frac{200}{20} = \square$

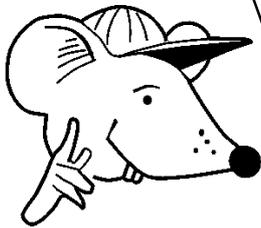
11. $\frac{56}{8} = \square$

12. $\frac{90}{5} = \square$

Quick Question Sheet

Answer these questions.

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



1. Which are true?:

a) $80 \div 8 = 8 \div 80$ b) $48 \div 2 \div 3 = 48 \div 3 \div 2$ c) $98 \div 7 = 7 \div 98$

d) A fifth of 60 is 120 e) A third of ninety is thirty.

2. Calculate:

a) $97 \div 1$ b) $56 \div 1$ c) $364 \div 1$

d) $76 - 5 - 5 - 5 - 5 - 5$ e) $100 - 15 - 15 - 15 - 15 - 15 - 15$

3. Which are true?

a) $67 \div 1$ is greater than 67 b) $38 \div 1$ is less than 1

c) $89 \div 0$ is impossible to calculate. d) $56 \times 17 \div 17 = 56$

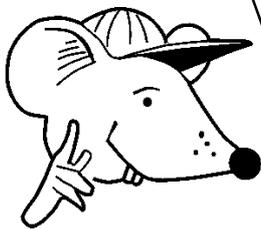
e) If $26 \times 39 = 1\,014$, then $1\,014 \div 26 = 39$.

f) If $6\,084 \div 78 = 78$, then $78 \times 78 = 6\,084$.

Quick Question Sheet

Answer these questions.

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



1. Fill in the boxes:

a) $34 \div 2 = \square$

b) $80 \div 4 = \square$

c) $49 \div \square = 7$

d) $22 \div 11 = \square$

e) $39 \div 3 = \square$

f) $85 \div \square = 17$

g) $28 \div \square = 7$

h) $20 + (\square \div 4) = 27$

2. Using a calculator, fill in the boxes.

a) $435\,786 \div 453 = \square$

b) $\square \div \square = 42$

c) $\square \div 34 = 306$

d) $12\,765 \div \square = 555$

Quick Question Sheet

Answer these questions.

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



1. Which are true?:

- a) $26 \div 13 = 13 \div 26$ b) $85 \div 5 \div 17 = 17 \div 5 \div 85$ c) $90 \div 5 = 5 \div 90$
d) One seventh of fourteen is three. e) One quarter of sixteen is five.

2. Calculate:

- a) $47 \div 1$ b) $74 \div 1$ c) $48 \div 1$
d) $90 - 6 - 6 - 6 - 6 - 6$ e) $100 - 10 - 10 - 10 - 10 - 10$

3. Which are true?

- a) $50 \div 1$ is smaller than 1. b) $76 \div 1$ is greater than 76.
c) $0 \div 38 = 0$ d) $27 \div 0 = 27$
e) If $54 \times 26 = 1\,404$, then $1\,404 \div 26 = 54$
f) If $784 \div 28 = 28$, then $28 \times 28 = 784$.

Quick Question Sheet

Answer these questions.

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



1. Fill in the boxes:

a) $56 \div 4 = \square$ b) $36 \div 12 = \square$ c) $45 \div \square = 9$

d) $42 \div 7 = \square$ e) $\frac{1}{5}$ of 45 = \square f) $\frac{1}{6}$ of $\square = 9$

g) $14 \div 2 + \square = 15$ h) $23 + (\square \div 6) = 27$

2. Using a calculator, fill in the boxes.

a) $134\,232 \div 564 = \square$ b) $\square \div \square = 67$

c) $\square \div 34 = 326$ d) $558\,785 \div \square = 989$

Answers**Page 4**

1. False 2. False 3. False 4. True 5. True 6. True 7. False
8. 147 9. 236 10. 84 11. 22 12. 85

Page 5

1. No answer 2. No answer 3. 0 4. 0 5. No answer 6. No answer
7. 0 8. 23 9. 56 10. 84 11. 48 12. 63 13. 92 14. 4 15. 4
16. 10 17. 8 18. 4 19. 5 20. 9 21. 19

Page 6

1. 43 2. 9 3. 7 4. 5 5. 15 6. 5 7. 12
8. 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60 9. Yes
10. Any four pairs such as 48 and 4. 11. Any eight pairs such as 70 and 7.

Page 7

1. 5 2. 3 3. 2 4. 3 5. 12 6. 5 7. 2 8. 8 9. 5 10. 10
11. 7 12. 18

Page 8

1. a) False b) True c) False d) False e) True
2. a) 97 b) 56 c) 364 d) 51 e) 10
3. a) False b) False c) True d) True e) True f) True

Page 9

1. a) 17 b) 20 c) 7 d) 2 e) 13 f) 5 g) 4 h) 28
2. a) 962 b) Any two eg $126 \div 3$ c) 10 404 d) 23

Page 10

1. a) False b) False c) False d) False e) False
2. a) 47 b) 74 c) 48 d) 60 e) 50
3. a) False b) False c) True d) False e) True f) True

Page 11

1. a) 14 b) 3 c) 5 d) 6 e) 9 f) 54 g) 8 h) 24
2. a) 238 b) Any two, eg $536 \div 8$ c) 11 084 d) 565