

SIGMABUDGIE · GRADE 3

Multiplication & Division

A gentle walkthrough & a 24-question exam

Part 1 walks through multiplication and division from the very beginning, with drawings. Part 2 is a 24-question exam that starts easy and slowly builds to harder, ISEE-style reasoning questions. Work through the lesson together first, then let your child try the exam. The answer key at the back explains every question.

1 · Equal groups

Here are 3 bags with 4 apples in each bag. To count them all you could add: $4 + 4 + 4 = 12$.

Multiplication is a faster way to say the same thing: **3 groups of 4** = $3 \times 4 = 12$. The $\times$ sign means "groups of."

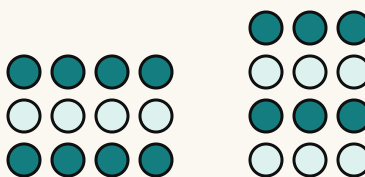


3 groups of 4 = $3 \times 4 = 12$

2 · Arrays: rows and columns

Line the dots up in rows and you get an **array**. This one has 3 rows with 4 dots in each row: $3 \times 4 = 12$.

Turn it on its side and it has 4 rows of 3. Same dots, same answer: $4 \times 3 = 12$. You can multiply in either order.



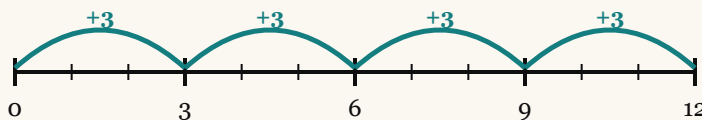
3 rows of 4 = 12

4 rows of 3 = 12

3 · Skip counting on a number line

Multiplying is also **skip counting**. 4×3 means 4 jumps of 3: land on 3, 6, 9, **12**.

Skip counting by 2s, 5s, and 10s is the fastest way to learn those tables.



4 jumps of 3 land on 12

4 • Tricks for the times tables

$\times 2$ is doubling. $\times 5$ always ends in 0 or 5. $\times 10$ puts a 0 on the end. $\times 1$ keeps the number, and $\times 0$ is always 0.

A times table shows every fact at once. Slide across row 3 and down column 4 to find $3 \times 4 = 12$.

$\times$	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25

row 3, column 4: 12

5 • Division: sharing equally

Division is the opposite of multiplication. 12 cookies shared equally by 3 kids: each kid gets $12 \div 3 = 4$.

The $\div$ sign means "split into equal parts."



12 shared by 3 = 4 each

6 • Division: making groups

Division also answers "how many groups?" 12 cookies, 4 in each bag: $12 \div 4 = 3$ bags.

Same drawing, different question. Sharing asks "how many in each?" Grouping asks "how many groups?"

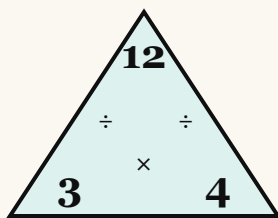


12 in groups of 4 = 3 groups

7 • Fact families

The numbers 3, 4, and 12 make a **fact family**: $3 \times 4 = 12$, $4 \times 3 = 12$, $12 \div 3 = 4$, $12 \div 4 = 3$.

Know one fact and you know all four. The big number always sits on top of the triangle.

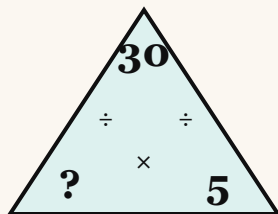


$$3 \times 4 = 12, \text{ so } 12 \div 4 = 3$$

8 • Missing numbers

$5 \times \square = 30$. Ask "5 times what is 30?" or use the family: $30 \div 5 = 6$.

$\square \div 4 = 7$. The missing number is the big one, so multiply: $7 \times 4 = 28$.

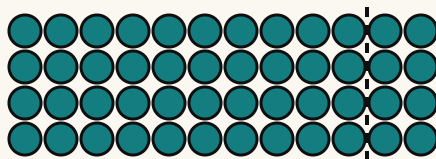


$$5 \times ? = 30, \text{ so } ? = 30 \div 5 = 6$$

9 • Bigger numbers: break them apart

3×20 : think 3×2 tens = 6 tens = **60**.

4×12 : split 12 into 10 and 2. $4 \times 10 = 40$ and $4 \times 2 = 8$, so $40 + 8 = 48$. The dotted line shows the split.

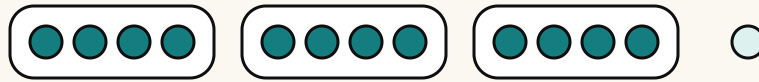


$$4 \times 12 = (4 \times 10) + (4 \times 2) = 40 + 8 = 48$$

10 • Leftovers: remainders

Sometimes the groups do not come out even. 13 cookies in bags of 4: 3 full bags and **1 left over**.

We write $13 \div 4 = 3 \text{ R}1$. The R means remainder.



$$13 \div 4 = 3 \text{ R}1$$

11 • Which operation?

Read for the clues. "**Each** box has 6, there are 5 boxes, how many in all?" You know the groups and the size: **multiply**, $5 \times 6 = 30$.

"28 stickers **shared** by 4 friends, how many each?" You know the total: **divide**, $28 \div 4 = 7$.

12 • Two steps and checking

Some problems take two steps. "3 packs of 8 pencils, then 5 are given away." First $3 \times 8 = 24$, then $24 - 5 = 19$.

Check a division by multiplying back: $42 \div 6 = 7$ because $7 \times 6 = 42$. You are ready for the test! 🎉

Read each drawing first, then choose the best answer. Take your time, there is no clock here. Questions start gentle and get harder toward the end. Circle your answer.

- 1 There are 3 bags with 4 apples in each. How many apples are there in all?



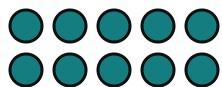
A 7

B 9

C 16

D 12

- 2 Which number sentence matches this array?



A $2 + 5 = 7$

B $2 \times 5 = 10$

C $5 \times 5 = 25$

D $10 \div 5 = 5$

- 3 $3 \times 4 = ?$

A 12

B 7

C 9

D 15

- 4 $5 \times 6 = ?$

A 25

B 11

C 30

D 35

- 5 $10 \times 7 = ?$

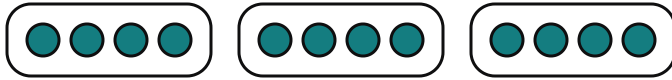
A 17

B 70

C 7

D 107

- 6 12 cookies are shared equally by 3 kids. How many cookies does each kid get?



- A 3
B 9
C 36
D 4

- 7 $6 \times 8 = ?$

- A 42
B 54
C 48
D 14

- 8 $24 \div 4 = ?$

- A 6
B 8
C 20
D 4

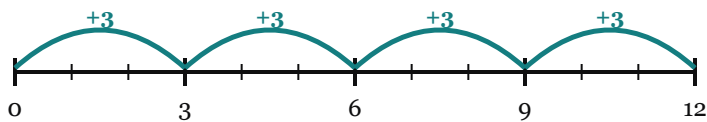
- 9 Which fact is in the same fact family as $3 \times 7 = 21$?

- A $21 - 7 = 14$
B $3 + 7 = 10$
C $21 \div 7 = 14$
D $21 \div 3 = 7$

- 10 $5 \times \square = 35$. What is the missing number?

- A 6
B 7
C 30
D 8

- 11 Which number sentence matches the jumps on the number line?



- A $4 \times 3 = 12$
B $3 + 4 = 7$
C $12 \div 3 = 3$
D $3 \times 3 = 12$

12 $7 \times 7 = ?$

A 42

B 56

C 49

D 14

13 $42 \div 6 = ?$

A 6

B 7

C 8

D 36

14 Each box holds 6 crayons. There are 5 boxes. How many crayons are there in all?

A 11

B 25

C 35

D 30

15 28 stickers are shared equally among 4 friends. How many stickers does each friend get?

A 6

B 24

C 7

D 8

16 $3 \times 20 = ?$

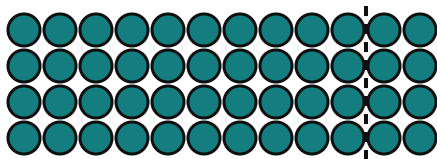
A 60

B 23

C 50

D 600

17 Use the split array. $4 \times 12 = ?$



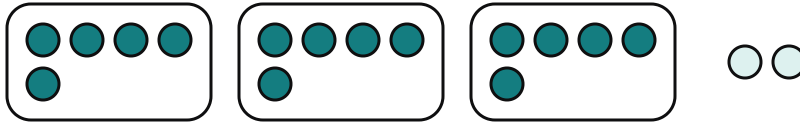
A 48

B 44

C 52

D 16

- 18 17 cookies are put into bags of 5. How many full bags are there, and how many cookies are left over?



- A 3 bags, 0 left over
B 2 bags, 7 left over
C 3 bags, 2 left over
D 4 bags, 3 left over

- 19 $\square \div 6 = 4$. What is the missing number?

- A 10
B 2
C 18
D 24

- 20 $9 \times 8 = ?$

- A 64
B 72
C 81
D 17

- 21 Leo buys 3 packs of pencils with 8 pencils in each pack. He gives 5 pencils to his sister. How many pencils does Leo have left?

- A 24
B 29
C 19
D 11

- 22 Ms. Lee has 45 pencils. She puts 9 pencils in each box. Then she finds 2 more full boxes in the closet. How many boxes does she have now?

- A 7
B 5
C 11
D 36

- 23 Which statement is true?

- A $6 \times 4 > 8 \times 3$
B $6 \times 4 = 8 \times 3$
C $6 \times 4 < 8 \times 3$
D $6 + 4 = 8 + 3$

- 24 A number times 4 equals 32. What is that same number times 5?

- A 36
B 37
C 45
D 40

ANSWER KEY & EXPLANATIONS

- 1 D** 3 groups of 4: $4 + 4 + 4 = 12$, or $3 \times 4 = 12$.
- 2 B** 2 rows with 5 dots in each row: $2 \times 5 = 10$.
- 3 A** 3 groups of 4 is 12.
- 4 C** Count by 5s six times: 5, 10, 15, 20, 25, 30.
- 5 B** Multiplying by 10 puts a 0 on the end: 70.
- 6 D** $12 \div 3 = 4$. Each ring holds 4.
- 7 C** $6 \times 8 = 48$. (Check: 6×8 is double $3 \times 8 = 24$.)
- 8 A** $4 \times 6 = 24$, so $24 \div 4 = 6$.
- 9 D** The family for 3, 7, 21 is 3×7 , 7×3 , $21 \div 3 = 7$, and $21 \div 7 = 3$.
- 10 B** $35 \div 5 = 7$, and $5 \times 7 = 35$.
- 11 A** 4 jumps of 3 land on 12: $4 \times 3 = 12$.
- 12 C** $7 \times 7 = 49$.
- 13 B** $6 \times 7 = 42$, so $42 \div 6 = 7$.
- 14 D** 5 boxes of 6: $5 \times 6 = 30$.
- 15 C** Share means divide: $28 \div 4 = 7$.
- 16 A** 3×2 tens = 6 tens = 60.
- 17 A** $4 \times 10 = 40$ and $4 \times 2 = 8$. $40 + 8 = 48$.
- 18 C** $5 + 5 + 5 = 15$, and $17 - 15 = 2$. So $17 \div 5 = 3$ R2.
- 19 D** The missing number is the big one: $4 \times 6 = 24$.
- 20 B** $9 \times 8 = 72$. (Trick: $10 \times 8 = 80$, take away one 8.)
- 21 C** First $3 \times 8 = 24$ pencils. Then $24 - 5 = 19$.
- 22 A** $45 \div 9 = 5$ boxes, plus 2 more boxes = 7.
- 23 B** $6 \times 4 = 24$ and $8 \times 3 = 24$, so they are equal.
- 24 D** $32 \div 4 = 8$, so the number is 8. Then $8 \times 5 = 40$.