Factors and primes: fact sheet

Planner week 5 · Learn these facts

Factors

Factors of 18

1 × 18 2 × 9 3 × 6

1, 2, 3, 6, 9, 18

Numbers that **divide into** it exactly

Find them in pairs

Multiples

Multiples of 6

6, 12, 18, 24, 30 ...

The **times table** of the number

Multiple of 6 between 40 and 50: 42

Prime numbers

2 3 5 7 11 13

17 19 23 29 31 37

Exactly **two** factors: 1 and itself

1 is not prime. 2 is the only even prime

Square numbers

1 4 9 16 25

36 49 64 81 100

A number times itself

10^2 = 100, not 20

Which sheet do I need?

Factors and multiples ▸
factors and multiples

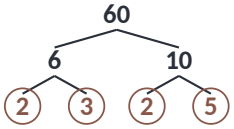
Primes, squares, odd and even ▸
prime, square, cube, odd or even

Product of prime factors ▸
"product of prime factors", a factor tree

Key words

- **Factor** divides exactly into a number
- **Multiple** in the times table
- **Prime** exactly two factors
- **Product** the answer to a multiplication

Product of primes



Split until every branch ends in a prime

60 = 2 × 2 × 3 × 5

Powers of primes

500 = 2 × 2 × 5 × 5 × 5

= $2^2 \times 5^3$

Write repeated primes as powers

Check: multiply back

Odd and even

odd + odd = even

even × anything = even

Use an example to show a statement is wrong

6 ÷ 2 = 3 (even ÷ even = odd)

Don't mix them up

Factor	goes **into** it (small)
Multiple	in its times table (big)
Prime	only 1 and itself
Square	n × n

Exam tips

- List factors in **pairs** so you don't miss any.
- 1 is a factor of every number, and the number is a factor of itself.
- Learn the primes up to 40.
- Prime factor tree: circle the primes as you go.
- Write the product with × signs, smallest first.
- "Show it is wrong": one example is enough.

Factors and multiples: fact sheet

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Worked example

QUESTION

Write down all the factors of 30.

ANSWER

1×30

2×15

3×10

5×6

1, 2, 3, 5, 6, 10, 15, 30

Stop when the pairs start to repeat

Find the factors in pairs.

How to do it

1. Factors: start at 1 and find pairs that multiply to the number.
2. Stop when the pairs meet in the middle.
3. Multiples: go up in the times table.
4. “Between 40 and 50”: list the multiples until you get there.
5. Check with a division.

Model answer:

1, 2, 3, 5, 6, 10, 15, 30

Watch out

- Mixing up factors and multiples.
- Missing 1 or the number itself.
- Missing a pair (e.g. 5×6).

Primes, squares, odd and even: fact sheet

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Worked example

QUESTION

Steve says, "There are more prime numbers between 20 and 30 than between 10 and 20."
Is Steve right? Show how you know.

ANSWER

1. Primes between 10 and 20: 11, 13, 17, 19 → 4 primes
2. Primes between 20 and 30: 23, 29 → 2 primes

No. There are 4 primes between 10 and 20 but only 2 between 20 and 30.

List the primes, then compare.

How to do it

1. A prime has exactly two factors: 1 and itself.
2. Check a number by dividing by 2, 3, 5, 7.
3. Square numbers: 1, 4, 9, 16, 25, 36, 49, 64, 81, 100.
4. To show a statement is wrong, give **one** example where it fails.
5. Always answer the question: Yes or No, with numbers.

Watch out

- Thinking 1 is prime.
- Thinking 27 or 21 is prime.
- $10^2 = 20$ (it is 100).

Product of prime factors: fact sheet

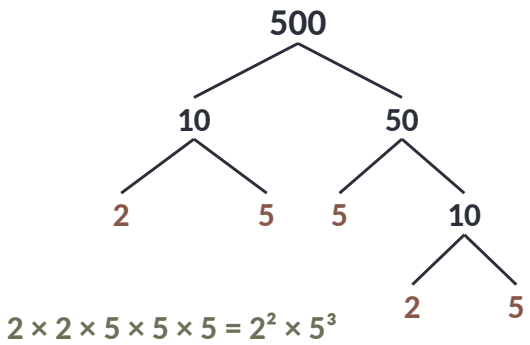
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Worked example

QUESTION

Write 500 as a product of its prime factors.

ANSWER



$2 \times 2 \times 5 \times 5 \times 5 = 2^2 \times 5^3$

Split into factor pairs until every branch ends in a prime.

How to do it

1. Split the number into any two factors.
2. Keep splitting until every branch ends in a **prime**.
3. Circle the primes.
4. Write them multiplied together, smallest first.
5. "Powers of": write repeated primes as powers ($2 \times 2 = 2^2$).
6. Check by multiplying back.

Model answer:

$500 = \mathbf{2^2 \times 5^3}$

Watch out

- Writing the primes with + or commas.
- Stopping at a number that isn't prime (e.g. 10).
- Including 1 in the product.