MATHEMATICS · GRADES 10-12

Finding common differences

Difficulty level: Advanced

Mathematics: Grades 10-12

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Overview of the concept

This is how you spot the steady step in a pattern. The same pay rise each year, or the same amount saved each month, both add a fixed amount every time. Spotting that steady step lets you predict what comes next without working it out from scratch. It is the pattern behind savings plans, pay scales, and any quantity that grows by the same amount each time.



Rule

Common difference: in an arithmetic sequence, every term is the last term plus the same fixed amount.

Find it by subtracting any term from the one after it: d = next term - previous term.

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Worked examples

EXAMPLE 1

Q Find the common difference of 8, 13, 18, 23.

SOLUTION

Pick any two neighbours, for example 13 and 8.

Subtract: 13 − 8 = 5

The common difference is 5

EXAMPLE 2

Q Find the common difference of 40, 32, 24.

SOLUTION

Subtract neighbours: 32 − 40 = −8

Check with the next pair: 24 − 32 = −8

The common difference is −8

Practice questions

1 A plant grows 4, 9, 14 cm over three weeks. What is the common difference?

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2 A temperature falls 12, 9, 6 degrees over three hours. What is the common difference?

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3 A runner covers 2, 5, 8 km over three days. What distance will she cover on the fourth day?

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4 A temperature falls 20, ?, 10 degrees over three hours. What is the missing middle temperature?

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5 A score stays 3, 3, 3 over three rounds. What is the common difference?

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6 A savings balance is 2.5, 3.0, 3.5 dollars over three weeks. What is the common difference?

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7 A price falls by 2 dollars each week. In week 3 it is 90 dollars. What was it in week 1?

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8

A temperature rises from -5 to 0 to 5 degrees. What is the common difference?

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9

A sequence has a common difference. How do you find it?

A. Add any two terms together

B. Subtract any term from the term after it

C. Divide any term by the term before it

D. Multiply the first term by the number of terms

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10 A sequence starts at 4 and adds 6 each time. What is the third term?

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ANSWER KEY

1. 5

2. -3

3. 11

4. 15

5. 0

6. 0.5

7. 94

8. 5

9. Subtract any term from the term after it

10. 16

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