Spot the Pattern

Recognise arithmetic sequences and find the nth term



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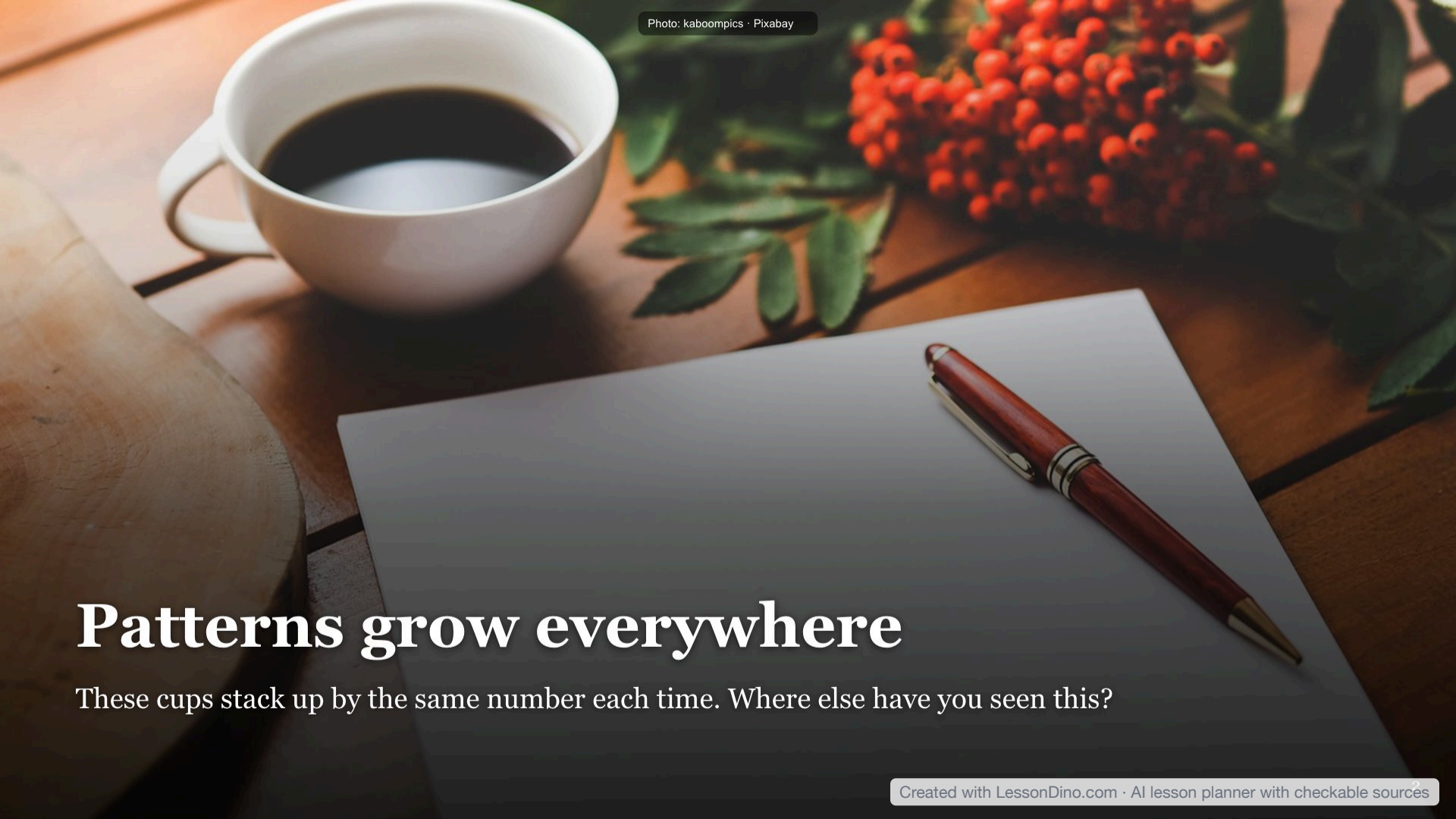

Patterns grow everywhere

These cups stack up by the same number each time. Where else have you seen this?

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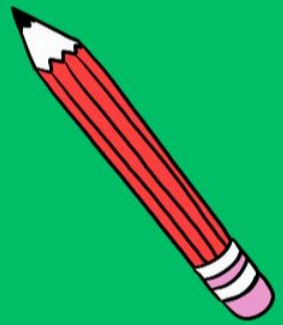
$a^2+b^2=c^2$

Find the nth term in 4 steps

1. Check all gaps are the same
2. Put that difference in front of n
3. Fix the start to fit term 1
4. Test it on term 2 and 3



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Which ones are arithmetic?

+

5, 9, 13, 17

Yes - add 4 every time.

−

20, 15, 10, 5

Yes - subtract 5 every time.

×

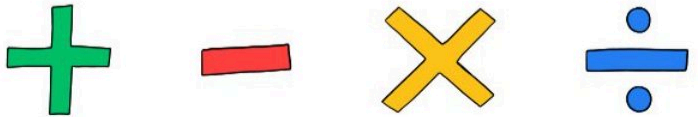
2, 4, 8, 16

No - gaps double each time.

🔷

1, 4, 9, 16

No - gaps grow 3, 5, 7.



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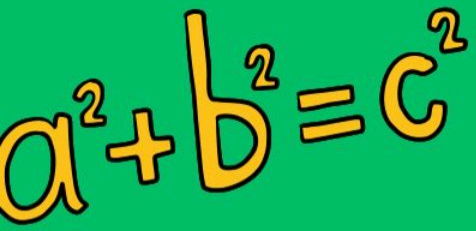
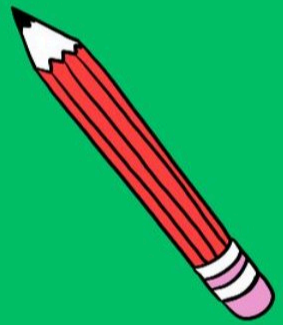


Your favourite shortcut?

You need the 100th term. What would you do?



A Keep adding the difference again and again

B Draw all 100 terms and count

C Find the nth term rule, then use n = 100

Vote with your hands, then explain why.

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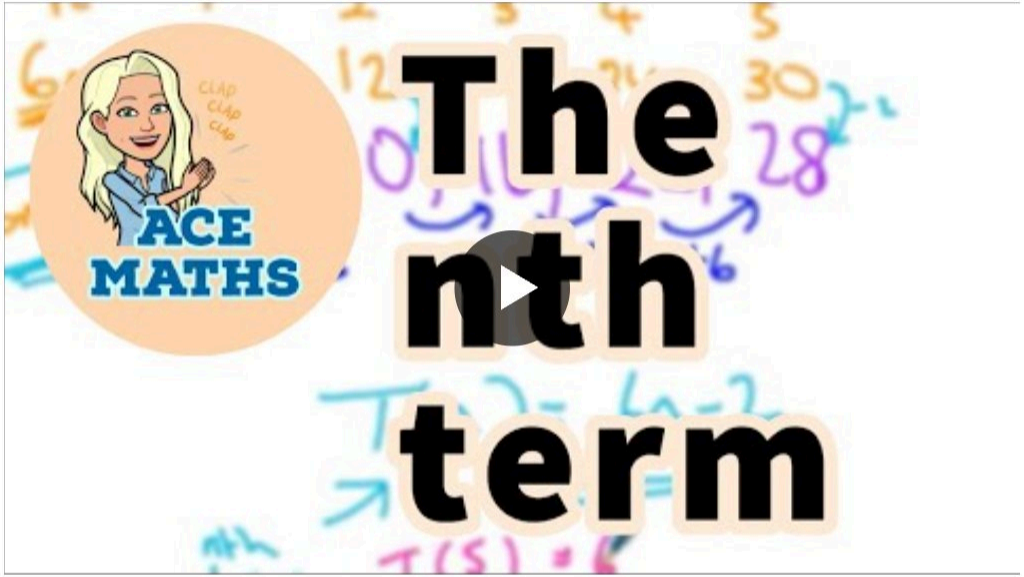
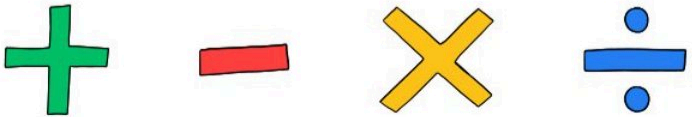
Watch: nth term magic



▶ 0:00 – 5:00

- Spot how difference goes in front of n
- Listen for fixing the first term
- Try the first example with the video



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$a^2+b^2=c^2$

Key words

sequence

List of numbers in order

term

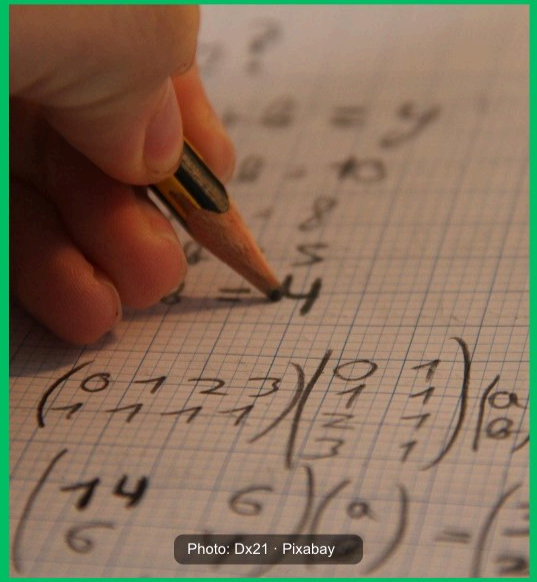
Each number in a sequence

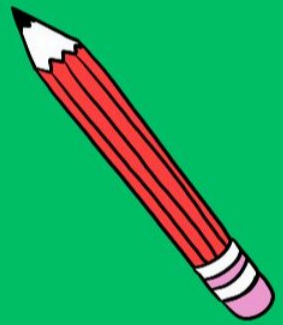
common difference

Same amount added each time

nth term

Rule to get any number from its position





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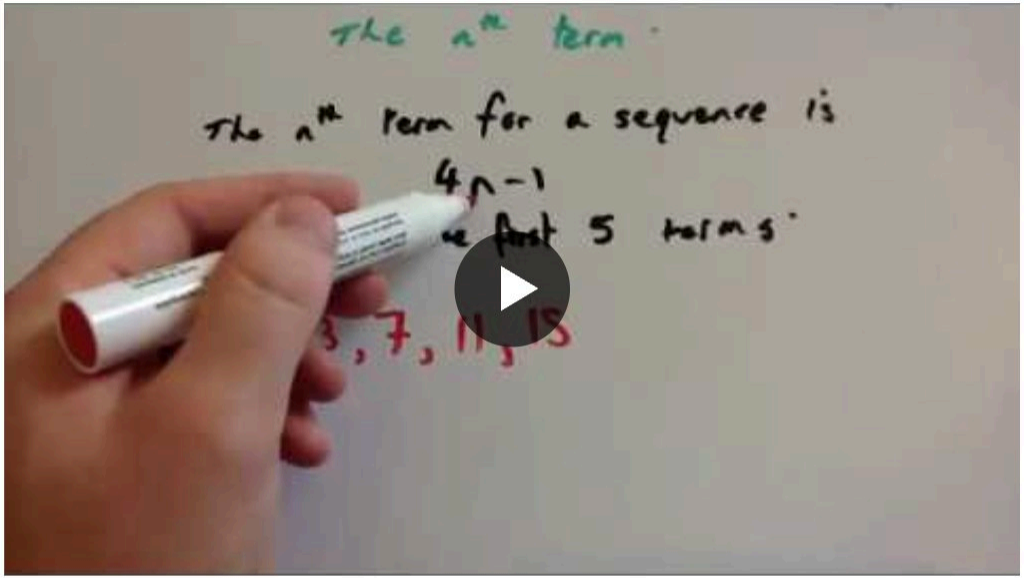
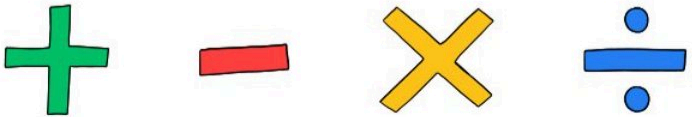
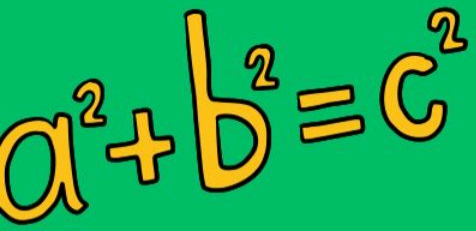
Second look: using the rule



▶ 0:00 – 5:00

- Check how to test the rule
- Watch how to find the 20th term
- Note the clear steady steps





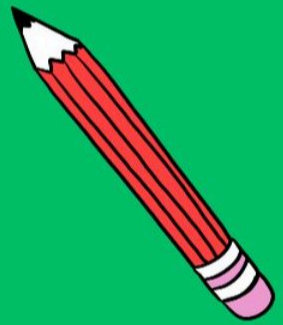
Your task

Find the nth term for three sequences, then use it to find the 20th term: 3, 8, 13...; 22, 19, 16...; 1.5, 3, 4.5...

1. Match each sequence to its difference
2. Write the nth term and test it
3. Find the 20th term and compare answers

10 min

In pairs



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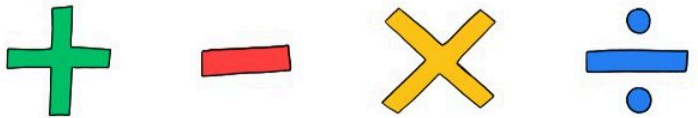
Arithmetic vs tricky ones

Arithmetic

- Same difference every step
- Rule looks like dn + e
- Easy to jump to any term

Not arithmetic

- Difference keeps changing
- No simple dn + e rule
- Needs a different pattern



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$a^2+b^2=c^2$

What could this be?

First shelf holds 6 boxes. Each shelf above holds 3 more. How many on shelf 10?





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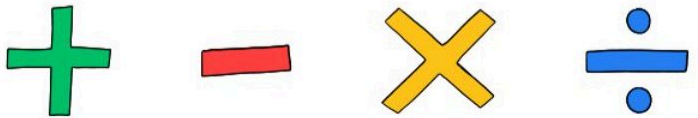
Quick quiz

1. Is 7, 12, 17, 22 arithmetic? What is the difference?
2. Find the nth term of 7, 12, 17, 22...
3. Rule is 4n - 1. What is the 10th term?
4. True or false: 2, 4, 8, 16 is arithmetic?



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