



Identifying linear, quadratic, and exponential patterns

Mana Maths

Te reo Māori terms



hikuaua rārangi

linear pattern

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hikuaua pūrua

quadratic pattern

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**hikuaua
whakareatanga**

exponential pattern

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**rerekētanga
tuatahi**

first difference

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Identifying linear, quadratic, and exponential patterns — Foundation

1. Classify as linear, quadratic, or exponential: 4, 7, 10, 13, 16
2. Classify as linear, quadratic, or exponential: 3, 6, 12, 24, 48
3. Classify as linear, quadratic, or exponential: 1, 4, 9, 16, 25
4. Classify as linear, quadratic, or exponential: 20, 15, 10, 5, 0
5. Classify as linear, quadratic, or exponential: 2, 5, 10, 17, 26
6. Classify as linear, quadratic, or exponential: 160, 80, 40, 20
7. Which pattern has a constant difference?
5, 9, 13, 17
8. Which pattern has a constant ratio?
2, 6, 18, 54
9. Which pattern has constant second differences?
7, 12, 19, 28, 39

10. A pattern grows by adding 6 each time. Is it linear, quadratic, or exponential?

11. A pattern doubles each time. Is it linear, quadratic, or exponential?

12. A pattern has first differences 3, 5, 7, 9. Is it linear, quadratic, or exponential?

13. Match to a type: 50, 47, 44, ~~41~~, 38 Match to a type: 1, 3, 9, 27, 81

Identifying linear, quadratic, and exponential patterns — Proficient

1. Classify the pattern and justify using differences or ratios: $-2, 1, 4, 7, 10$

2. Classify the pattern and justify using differences or ratios: $5, 8, 13, 20, 29$

3. Classify the pattern and justify using differences or ratios: $7, 14, 28, 56, 112$

4. The first differences are $4, 4, 4, 4$. What type of pattern is this?

5. The first differences are $5, 7, 9, 11$. What type of pattern is this?

6. The ratio between terms is always $\times 3$. What type of pattern is this?

7. Explain why $3, 9, 27, 81$ is not linear.

8. Explain why $2, 6, 12, 20, 30$ is not exponential.

Which pattern is quadratic:
A $1, 5, 9, 13$ or B $4, 9, 16, 25$

10. Which pattern is exponential: A 6, 12, 18, 24 or B 6, 12, 24, 48?

11. A tile pattern has totals 4, 9, 16, 25. Classify it.

12. A population goes 300, 450, Classify it.

Identifying linear, quadratic, and exponential patterns — Excellence

1. For 2, 7, 12, 17, 22, name the pattern type and describe the evidence.
2. For 1, 4, 9, 16, 25, name the pattern type and describe the evidence.
3. For 5, 15, 45, 135, 405, name the pattern type and describe the evidence.
4. Two students debate 3, 8, 15, 24, 35. One says linear, one says quadratic. Who is correct? Explain.
5. A sequence has constant first differences. Could it be quadratic? Explain.
6. A sequence has constant second differences. Could it be exponential? Explain.
7. A sequence multiplies by 0.5 each term. Is it still exponential? Explain.
8. Classify and justify: 81, 27, 9, 3, 1. Classify and justify: 10, 6, 2,

- 10.** Classify and justify: 6, 11, 18, 27, 38, 51, 66, 81, 98, 117, 138, 161, 186, 213, 242, 273, 306, 341, 378, 417, 458, 501, 546, 593, 642, 693, 746, 801, 858, 917, 978, 1041, 1106, 1173, 1242, 1313, 1386, 1461, 1538, 1617, 1700, 1785, 1872, 1961, 2052, 2145, 2240, 2337, 2436, 2537, 2640, 2745, 2852, 2961, 3072, 3185, 3300, 3417, 3536, 3657, 3780, 3905, 4032, 4161, 4292, 4425, 4560, 4697, 4836, 4977, 5120, 5265, 5412, 5561, 5712, 5865, 6020, 6177, 6336, 6497, 6660, 6825, 6992, 7161, 7332, 7505, 7680, 7857, 8036, 8217, 8400, 8585, 8772, 8961, 9152, 9345, 9540, 9737, 9936, 10137, 10340, 10545, 10752, 10961, 11172, 11385, 11600, 11817, 12036, 12257, 12480, 12705, 12932, 13161, 13392, 13625, 13860, 14097, 14336, 14577, 14820, 15065, 15312, 15561, 15812, 16065, 16320, 16577, 16836, 17097, 17360, 17625, 17892, 18161, 18432, 18705, 18980, 19257, 19536, 19817, 20100, 20385, 20672, 20961, 21252, 21545, 21840, 22137, 22436, 22737, 23040, 23345, 23652, 23961, 24272, 24585, 24900, 25217, 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