MATHEMATICS · GRADES 7-9

Proportional relationships

Difficulty level: Intermediate

Mathematics: Grades 7-9

This document was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

Overview of the concept

This is how you work out the cost of any amount of something sold at a steady price, like 7 apples when you know the price of 3, or how far a car goes on any amount of fuel. A shopper works out the price of a bigger bag of apples from the price of a small one, and a driver works out the fuel for a long trip from the fuel used on a short one. A cook scaling a recipe uses the same idea, since doubling the servings doubles every ingredient. When the price or rate stays steady, one known amount is all you need to work out any other amount.



Rule

A relationship is proportional if the ratio y to x is the same for every pair.

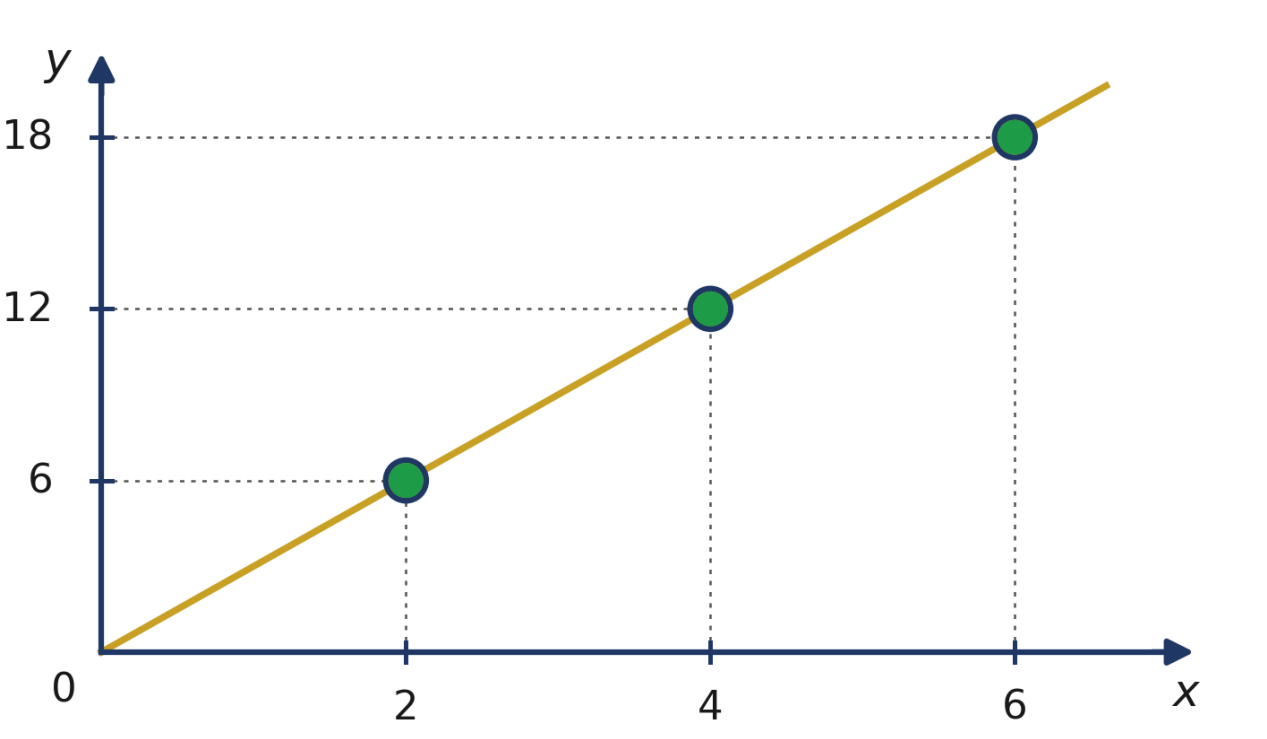
Then y = k × x, where k is that constant ratio. A proportional relationship always goes through the origin.

© 2026 Brett Robbins. All Rights Reserved.

Worked examples

EXAMPLE 1

Q Is this a proportional relationship? x: 2, 4, 6 and y: 6, 12, 18



SOLUTION

Check the ratio y to x for each pair: $\frac{6}{2} = 3$, $\frac{12}{4} = 3$, $\frac{18}{6} = 3$.

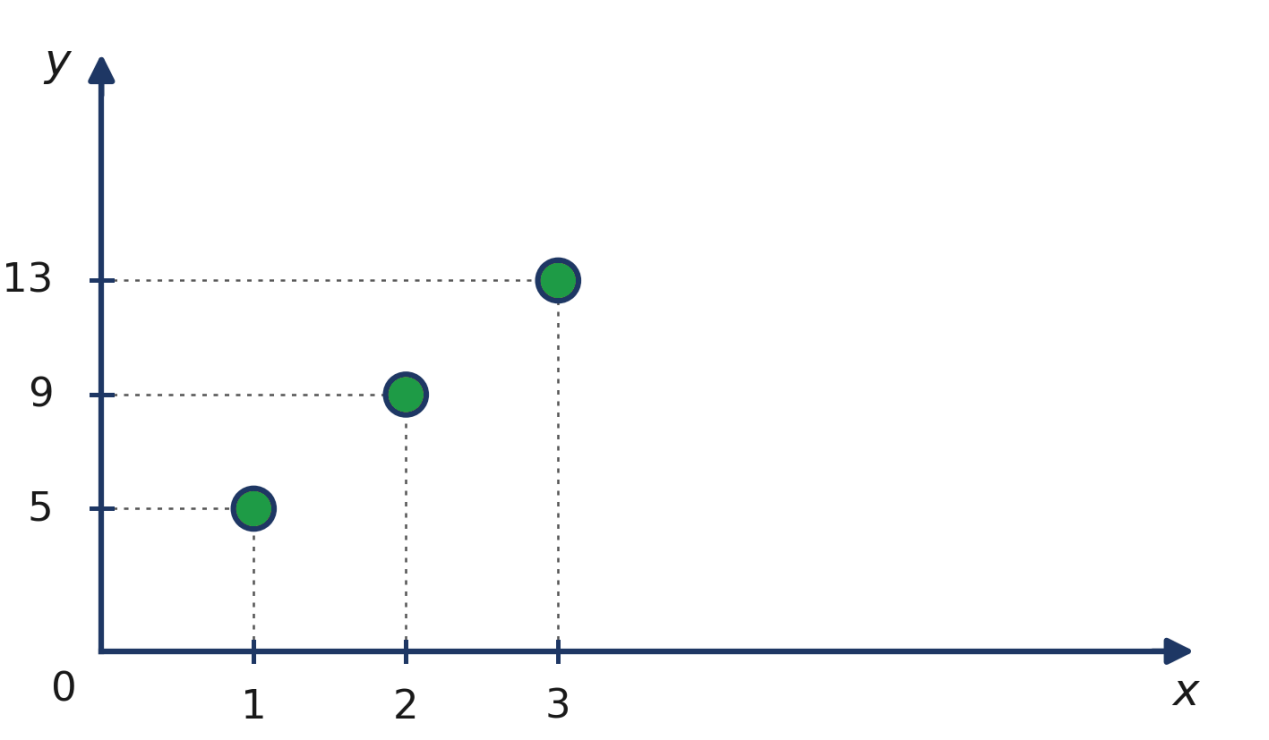
The ratio is the same every time.

Yes, it is proportional, with constant 3.

© 2026 Brett Robbins. All Rights Reserved.

EXAMPLE 2

Q Does this table show a proportional relationship? x: 1, 2, 3 and y: 5, 9, 13



SOLUTION

Check the ratio y to x for each pair: $\frac{5}{1} = 5$, $\frac{9}{2} = 4.5$, $\frac{13}{3}$ is not 5.

The ratio is not the same every time.

No, it is not proportional.

© 2026 Brett Robbins. All Rights Reserved.

Practice questions

1 For these amounts, you get this many apples:
$1: 4 apples
$2: 8 apples
$3: 12 apples
Is the relationship proportional? Answer yes or no.

A Yes

B No

Understand It with Pulse | Flag a mistake

2 A taxi charges these fares:
1 km: $3
2 km: $5
3 km: $7
Is the relationship proportional? Answer yes or no.

A Yes

B No

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

3 These bags hold this many apples:
2 bags: 10 apples
5 bags: 25 apples
Which equation relates bags x to apples y?

- **A** $y = 5x$
- **B** $y = 2x$
- **C** $y = 10x$
- **D** $y = x + 5$

Understand It with Pulse | Flag a mistake

4 Which of these relationships is proportional?

- **A** $y = x + 3$
- **B** $y = 3$
- **C** $y = 3x$
- **D** $y = 3x + 2$

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

5 A recipe uses y = 4x, where x is the number of servings. What is y when x = 5?

Understand It with Pulse | Flag a mistake

6 A recipe uses y = 4x, where x is the number of servings. What is x when y = 36?

Understand It with Pulse | Flag a mistake

7 A car travels 6 km on 1 litre of fuel. How far does it go on 7 litres?

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

8 A taxi charges $2 per km plus a $1 booking fee, so $y = 2x + 1$. Is this a proportional relationship? Answer yes or no.

A Yes

B No

Understand It with Pulse | Flag a mistake

9 These packs hold this many pencils:
4 packs: 12 pencils
8 packs: 24 pencils
What is the constant of proportionality?

Understand It with Pulse | Flag a mistake

10 Three pens cost $6. How much do 7 pens cost at the same rate?

Understand It with Pulse | Flag a mistake

© 2026 Brett Robbins. All Rights Reserved.

ANSWER KEY

1. Yes

2. No

3. $y = 5x$

4. $y = 3x$

5. 20

6. 9

7. 42

8. No

9. 3

10. 14

© 2026 Brett Robbins. All Rights Reserved.