

GCSE Maths: Direct and inverse proportion (Foundation): answers

GCSE Maths - Units and Compound Measures - Foundation - Lesson 16.7

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch16-units-compound-measures/foundation/direct-and-inverse-proportion/

Exercise 16I Direct proportion Calculator allowed

- 1 5 pens cost £3. Work out the cost of 15 pens.

Answer: £9

- 2 In each table, decide whether y is directly proportional to x . If it is, write down the value of k .

- (a) x : 2, 3, 5 and y : 6, 9, 15

Answer: Yes, directly proportional ($k = 3$)

- (b) x : 1, 2, 3 and y : 4, 8, 11

Answer: No, not directly proportional

- (c) x : 4, 6, 10 and y : 10, 15, 25

Answer: Yes, directly proportional ($k = 2.5$)

- (d) x : 2, 4, 6 and y : 5, 8, 11

Answer: No, not directly proportional

- 3 y is directly proportional to x . When $x = 2$, $y = 6$. Find y when:

- (a) $x = 5$

Answer: 15

- (b) $x = 8$

Answer: 24

- (c) $x = 10$

Answer: 30

- 4 A recipe for 4 people uses 300 g of flour. How much flour is needed for 10 people?

Answer: 750 g

- 5 In each part y is directly proportional to x . Find the missing value.

- (a) When $x = 3$, $y = 12$. Find y when $x = 10$.

Answer: 40

- (b) When $x = 5$, $y = 35$. Find y when $x = 8$.

Answer: 56

- (c) When $x = 8$, $y = 20$. Find x when $y = 35$.

Answer: 14

- (d) When $x = 6$, $y = 9$. Find y when $x = 14$.

Answer: 21

- 6 The extension e cm of a spring is directly proportional to the force F newtons pulling it. A force of 12 N gives an extension of 3 cm. Find (a) the extension for a force of 20 N, (b) the force needed for an extension of 7.5 cm.

- (a) Extension for 20 N

Answer: 5 cm

- (b) Force for 7.5 cm

Answer: 30 N

- 7 The cost C pounds of n tickets is given by $C = 12.5n$. (a) What does 12.5 represent? (b) Find the cost of 8 tickets. (c) How many tickets can be bought for £200?

- (a) Meaning of 12.5

Answer: The cost of one ticket (£12.50)

- (b) Cost of 8

Answer: £100

- (c) Tickets for £200

Answer: 16 tickets

- 8 Pay is directly proportional to the hours worked. For 15 hours Lena is paid £127.50. Work out (a) her pay for 22 hours, (b) the number of hours she works for pay of £204.

- (a) Pay for 22 hours

Answer: 187 pounds

- (b) Hours for £204

Answer: 24 hours

- 9 A map is drawn so that 2 cm on the map represents 5 km on the ground. Find (a) the real distance for 7.5 cm on the map, (b) the length on the map for a real distance of 32.5 km.

- (a) Real distance

Answer: 18.75 km

- (b) Map length

Answer: 13 cm

- 10 A taxi company charges £3 plus £2 for every mile. Pat says "The cost is directly proportional to the distance." Show that Pat is wrong.

Answer: 1 mile costs £5 but 2 miles cost £7, not £10

- 11 Pat says "y is proportional to x because y goes up when x goes up." The table shows x: 1, 2, 3 and y: 3, 5, 7. Is Pat correct?

Answer: No: $y \div x$ is 3, 2.5, 2.33... (not constant)

- 12 Printing 250 leaflets costs £17.50. Work out the cost of printing 600 leaflets at the same rate.

Answer: £42

- 13** A machine fills 360 bottles in 45 minutes. At the same rate, how many hours will it take to fill 2400 bottles?

Answer: 5 hours

Exercise 16J Inverse proportion Calculator allowed

- 1** 3 people take 12 hours to paint a long fence. How long would 6 people take, working at the same rate?

Answer: 6 hours

- 2** In each table, decide whether y is inversely proportional to x . If it is, write down k .

- (a) x : 1, 2, 3, 4 and y : 24, 12, 8, 6

Answer: Yes, inversely proportional ($k = 24$)

- (b) x : 2, 4, 5 and y : 10, 5, 3

Answer: No, not inversely proportional

- (c) x : 2, 5, 10 and y : 15, 6, 3

Answer: Yes, inversely proportional ($k = 30$)

- (d) x : 1, 2, 3 and y : 10, 8, 6

Answer: No, not inversely proportional

- 3** The number of days d a job takes is inversely proportional to the number of workers n . With 6 workers the job takes 10 days. How many days does it take with:

- (a) 4 workers

Answer: 15 days

- (b) 12 workers

Answer: 5 days

- (c) 15 workers

Answer: 4 days

- (d) 5 workers

Answer: 12 days

- 4** A journey of 180 km takes 3 hours at 60 km/h. For a fixed distance, time t hours is inversely proportional to speed v km/h. Find the time at:

- (a) 90 km/h

Answer: 2 hours

- (b) 45 km/h

Answer: 4 hours

- (c) 120 km/h

Answer: 1.5 hours

- 5** y is inversely proportional to x and $y = 24$ when $x = 1$. Find the missing values.

- (a) Find y when $x = 2$

Answer: 12

- (b) Find y when $x = 3$

Answer: 8

- (c) Find y when $x = 4$

Answer: 6

- (d) Find y when $x = 8$

Answer: 3

- 6 Say whether each pair of quantities is in direct proportion, inverse proportion, or neither. Give a reason.

- (a) The number of taps filling a bath (all the same) and the time to fill it

Answer: Inverse proportion

- (b) A child's age and the child's height

Answer: Neither

- (c) The time for a 100 km journey and the speed

Answer: Inverse proportion

- (d) The number of people sharing £60 and the amount each gets

Answer: Inverse proportion

- (e) The number of books bought and the total cost at £4.50 each

Answer: Direct proportion

- 7 A bag of 60 sweets is shared equally between n children, so each child gets s sweets, where s is inversely proportional to n . When $n = 10$, $s = 6$. Find (a) s when $n = 12$, (b) n when $s = 4$.

- (a) Sweets each for 12 children

Answer: 5

- (b) Children when each gets 4

Answer: 15

- 8 y is inversely proportional to x . Explain what happens to y when x is multiplied by 4.

Answer: y is divided by 4

- 9 The volume V litres of a gas is inversely proportional to the pressure P kPa. When $P = 150$, $V = 12$. Find V when $P = 200$.

Answer: 9 litres

- 10 10 workers can build a wall in 12 days. After 4 days, 2 of the workers leave. How many more days will it take to finish the wall?

Answer: 10 days