GCSE Maths: Proportion as equality of ratios; ratio and linear functions (Higher): answers

GCSE Maths - Ratio and Proportion - Higher - Lesson 15.8

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at **websink.site/gcse/maths/ch15-ratio-proportion/higher/proportion-as-equality-of-ratios-ratio-and-linear-functions/**

Exercise 15H Equal ratios and direct proportion

Non-calculator

1 Find the missing number in each pair of equal ratios.

(a) 2 : 3 = 8 : ?

Answer: 12

(b) 5 : 4 = 20 : ?

Answer: 16

(c) 3 : 7 = ? : 21

Answer: 9

(d) 4 : 9 = ? : 36

Answer: 16

(e) 6 : 4 = 9 : ?

Answer: 6

(f) 10 : 6 = 4 : ?

Answer: 2.4

2 Are the two ratios equal? Write yes or no and show how you know.

(a) 4 : 6 and 10 : 15

Answer: Yes

(b) 3 : 5 and 9 : 20

Answer: No

(c) 8 : 12 and 6 : 9

Answer: Yes

(d) 5 : 7 and 15 : 22

Answer: No

3 A recipe uses 3 cups of rice for every 5 cups of water. How many cups of water are needed for 12 cups of rice?

Answer: 20

4 Flour and sugar are in the ratio 5 : 3 in a recipe. Sam uses 450 g of flour. How much sugar does he need?

Answer: 270

5 The table shows the cost y (£) of x tickets. Show that y is directly proportional to x, and write a rule connecting y and x.

Tickets (x)	2	5	8
Cost in £ (y)	7	17.5	28

Answer: y = 3.5x

6 *y* is directly proportional to *x*. Use the information to find the missing value.

(a) $x = 4$, $y = 10$. Find y when $x = 14$

Answer: 35

(b) $x = 6$, $y = 15$. Find y when $x = 10$

Answer: 25

(c) $x = 5$, $y = 2$. Find x when $y = 8$

Answer: 20

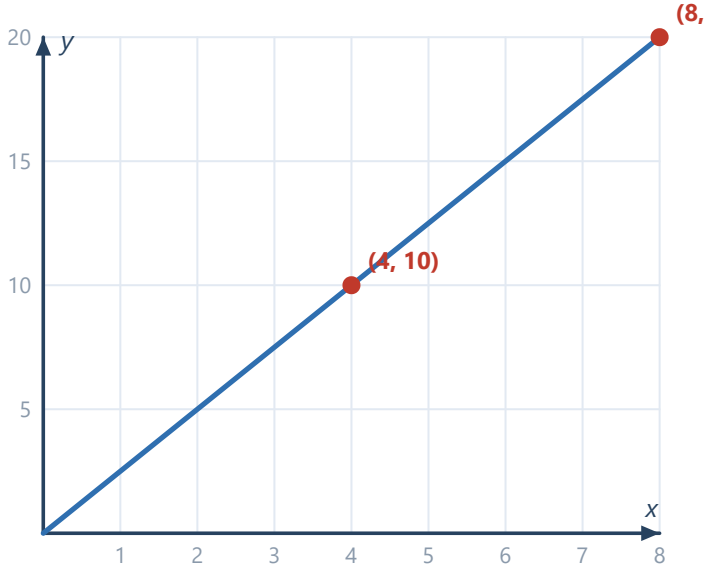
(d) $x = 8$, $y = 36$. Find x when $y = 54$

Answer: 12

7 The mass M grams of a piece of steel is directly proportional to its volume V cm^3. A piece with volume 5 cm^3 has mass 39 g. Work out the mass of a piece with volume 8 cm^3.

Answer: 62.4

8 The graph shows the cost y (£) of hiring a bike for x hours. The line is straight and passes through the origin.



(a) Work out the gradient of the line (the hourly cost).

Answer: £2.50

(b) Write the equation of the line in the form y = kx.

Answer: y = 2.5x

(c) Find the cost of hiring the bike for 10 hours.

Answer: £25

(d) For how many hours can the bike be hired for £35?

Answer: 14 hours

9 **Which of these equations show that y is directly proportional to x?** $y = 3x$ $y = x + 3$ $y = x/2$ $y = 5x - 1$

Answer: y = 3x and y = x/2

10 **Two tables show values of x and y. In which table is y directly proportional to x? Table P: x = 5, 10, 15 and y = 12, 24, 36. Table Q: x = 5, 10, 15 and y = 12, 22, 32.**

Answer: Table P

11 **The exchange rate is £1 = $1.25. (a) Change £40 to dollars. (b) Change $100 to pounds.**

(a) £40 to dollars

Answer: $50

(b) $100 to pounds

Answer: £80

12 **A train fare depends on the distance travelled. The fare for 8 km is £5.60 and the fare for 20 km is £14. (a) Show that the fare is directly proportional to the distance. (b) Work out the fare for 35 km.**

(a) Show that the fare is directly proportional to the distance

Answer: Both give £0.70 per km

(b) Fare for 35 km

Answer: £24.50

13 **A taxi charges £3 plus £2 for each kilometre. Is the cost directly proportional to the distance? Give a reason.**

Answer: No

14 **Explain how you can tell from a graph that two quantities are in direct proportion.**

Answer: The graph is a straight line through the origin

15 **A photograph is 15 cm wide and 10 cm high. It is enlarged so that its width is 24 cm and it keeps the same shape. (a) Find the height of the enlargement. (b) Another enlargement has a height of 25 cm. Find its width. (c) Show that a copy that is 24 cm by 20 cm is not in proportion to the original.**

(a) Height when the width is 24 cm

Answer: 16 cm

(b) Width when the height is 25 cm

Answer: 37.5 cm

(c) Show that 24 cm by 20 cm is not in proportion

Answer: No

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