

GCSE Maths: Changing the subject: one step and two steps (Foundation): answers

GCSE Maths - Substitution and Formulae - Foundation - Lesson 8.6

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/gcse/maths/ch08-substitution-formulae/foundation/changing-the-subject-one-step-and-two-steps/

Exercise 8G Changing the subject: one and two steps Non-calculator

1 Make x the subject of each formula.

(a) Make x the subject of $y = x + 5$

Answer: $x = y - 5$

(b) Make x the subject of $y = x - 3$

Answer: $x = y + 3$

(c) Make x the subject of $y = 4x$

Answer: $x = \frac{y}{4}$

(d) Make x the subject of $y = \frac{x}{3}$

Answer: $x = 3y$

(e) Make x the subject of $y = x + a$

Answer: $x = y - a$

(f) Make x the subject of $y = kx$

Answer: $x = \frac{y}{k}$

2 Make x the subject of each formula.

(a) Make x the subject of $y = 2x + 3$

Answer: $x = \frac{y - 3}{2}$

(b) Make x the subject of $y = 5x - 4$

Answer: $x = \frac{y + 4}{5}$

(c) Make x the subject of $y = \frac{x}{2} + 1$

Answer: $x = 2(y - 1)$

(d) Make x the subject of $y = \frac{x}{4} - 2$

Answer: $x = 4(y + 2)$

- (e) Make x the subject of $y = 7 + 3x$

Answer: $x = \frac{y-7}{3}$

- (f) Make x the subject of $y = 2x - 9$

Answer: $x = \frac{y+9}{2}$

3 Rearrange each formula to make the letter in brackets the subject.

- (a) Make a the subject of $F = ma$

Answer: $a = \frac{F}{m}$

- (b) Make m the subject of $F = ma$

Answer: $m = \frac{F}{a}$

- (c) Make I the subject of $V = IR$

Answer: $I = \frac{V}{R}$

- (d) Make R the subject of $V = IR$

Answer: $R = \frac{V}{I}$

- (e) Make d the subject of $s = \frac{d}{t}$

Answer: $d = ts$

- (f) Make t the subject of $s = \frac{d}{t}$

Answer: $t = \frac{d}{s}$

4 Make the letter shown the subject.

- (a) Make u the subject of $v = u + at$

Answer: $u = v - at$

- (b) Make a the subject of $v = u + at$

Answer: $a = \frac{v-u}{t}$

- (c) Make d the subject of $C = \pi d$

Answer: $d = \frac{C}{\pi}$

- (d) Make h the subject of $A = \frac{1}{2}bh$

Answer: $h = \frac{2A}{b}$

- (e) Make w the subject of $P = 2l + 2w$

Answer: $w = \frac{P-2l}{2}$

- (f) Make s the subject of $P = 4s$

Answer: $s = \frac{P}{4}$

- 5 Make x the subject of each formula.

- (a) Make x the subject of $y = mx + c$

Answer: $x = \frac{y - c}{m}$

- (b) Make m the subject of $y = mx + c$

Answer: $m = \frac{y - c}{x}$

- (c) Make c the subject of $y = mx + c$

Answer: $c = y - mx$

- 6 Callum is asked to make x the subject of $y = 3x + 2$. He writes $x = y - \frac{2}{3}$. Use $x = 5$ to show that he is wrong, and give the correct answer.

Answer: $x = (y - 2)/3$

- 7 The cost, £ C , of hiring a van for d days is $C = 35d + 20$.

- (a) Make d the subject of the formula.

Answer: $d = \frac{C - 20}{35}$

- (b) Use your formula to find how many days the van was hired for when the cost was £195.

Answer: 5 days

- 8 The area of a triangle is $A = \frac{1}{2}bh$.

- (a) Make h the subject of the formula.

Answer: $h = \frac{2A}{b}$

- (b) A triangle has area 30 cm^2 and base 12 cm . Work out its height.

Answer: 5 cm

- 9 A car has mass m kg and a force of F newtons acts on it. The acceleration $a \text{ m/s}^2$ is given by $F = ma$.

- (a) Make a the subject of the formula.

Answer: $a = \frac{F}{m}$

- (b) Work out a when $F = 3000$ and $m = 1200$.

Answer: 2.5 m/s^2

- 10 A train travels a distance d km at an average speed s km/h. It takes t hours, where $s = d/t$.

- (a) Make t the subject.

Answer: $t = \frac{d}{s}$

- (b) How long does a journey of 360 km take at an average speed of 90 km/h?

Answer: 4 hours

- 11 The simple interest, I , earned on a sum of money P at $R\%$ a year for T years is $I = \frac{PRT}{100}$. Make P the subject.

Answer: $P = \frac{100I}{RT}$

- 12 Make y the subject of each formula.

- (a) Make y the subject of $x = 2y + 1$

Answer: $y = \frac{x - 1}{2}$

- (b) Make y the subject of $x = \frac{y}{5} - 3$

Answer: $y = 5(x + 3)$

- (c) Make y the subject of $a = 3y - b$

Answer: $y = \frac{a + b}{3}$

- (d) Make y the subject of $p = q + 4y$

Answer: $y = \frac{p - q}{4}$

- 13 The cooking time T minutes for a turkey of mass m kg is $T = 40m + 20$. Jess cooks a turkey for 180 minutes. Make m the subject and work out the mass of her turkey.

- (a) Make m the subject.

Answer: $m = \frac{T - 20}{40}$

- (b) Work out m when $T = 180$.

Answer: 4 kg

- 14 Starting from $s = d/t$, show that $d = st$.

Answer: $d = st$