GCSE Maths: Changing the subject: brackets, fractions, powers and roots (Foundation): answers

GCSE Maths - Substitution and Formulae - Foundation - Lesson 8.7

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-brackets-fractions-powers-and-roots/**

Exercise 8H Brackets, fractions, powers and roots Non-calculator

1 Make x the subject of each formula.

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

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

(b) Make x the subject of $y = 5(x - 1)$

Answer: $x = \frac{y}{5} + 1$

(c) Make x the subject of $y = 4(x + 3) - 1$

Answer: $x = \frac{y + 1}{4} - 3$

(d) Make x the subject of $y = 2(3x - 1)$

Answer: $x = \frac{\frac{y}{2} + 1}{3}$

2 Make the letter shown the subject of each formula.

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

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

(b) Make b the subject of $A = \frac{1}{2}(a + b)h$

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

(c) Make C the subject of $F = \frac{9}{5}C + 32$

Answer: $C = \frac{5}{9}(F - 32)$

(d) Make a the subject of $S = 2(ab + bc)$

Answer: $a = \frac{\frac{S}{2} - bc}{b}$

3 Make x the subject of each formula.

(a) Make x the subject of $y = \frac{x}{5}$

Answer: $x = 5y$

(b) Make x the subject of $y = \frac{x + 3}{2}$

Answer: $x = 2y - 3$

(c) Make x the subject of $y = \frac{2x - 1}{3}$

Answer: $x = \frac{3y + 1}{2}$

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

Answer: $x = 2M - y$

4 Make r (or the letter shown) the subject of each formula.

(a) Make s the subject of $A = s^2$

Answer: $s = \sqrt{A}$

(b) Make r the subject of $A = \pi r^2$

Answer: $r = \sqrt{\frac{A}{\pi}}$

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

Answer: $x = \sqrt{y - 3}$

(d) Make v the subject of $E = \frac{1}{2}mv^2$

Answer: $v = \sqrt{\frac{2E}{m}}$

(e) Make x the subject of $y = 2x^2$

Answer: $x = \sqrt{\frac{y}{2}}$

5 Make x (or the letter shown) the subject of each formula.

(a) Make x the subject of $y = \sqrt{x}$

Answer: $x = y^2$

(b) Make x the subject of $y = \sqrt{x} + 3$

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

(c) Make h the subject of $v = \sqrt{2gh}$

Answer: $h = \frac{v^2}{2g}$

(d) Make x the subject of $y = \sqrt{5x}$

Answer: $x = \frac{y^2}{5}$

6 Ben says that $A = \pi r^2$ can be rearranged to $r = \sqrt{A/\pi}$. Use $r = 2$ to show that he is wrong, and write the correct formula.

Answer: $r = \sqrt{(A/\pi)}$

7 **The area of a circular pond is $A = \pi r^2$.**

(a) Make r the subject.

Answer: $r = \sqrt{\frac{A}{\pi}}$

(b) The pond has area 28.26 m^2. Use $\pi = 3.14$ to work out its radius.

Answer: 3 m

8 **An object dropped from rest falls a distance d metres in t seconds, where $d = \frac{1}{2}gt^2$ and $g = 10$.**

(a) Make t the subject.

Answer: $t = \sqrt{\frac{2d}{g}}$

(b) How long does it take to fall 80 m?

Answer: 4 seconds

9 **The kinetic energy of an object is $E = \frac{1}{2}mv^2$.**

(a) Make v the subject.

Answer: $v = \sqrt{\frac{2E}{m}}$

(b) Work out v when $E = 100$ joules and $m = 2$ kg.

Answer: 10 m/s

10 **Make h the subject of $A = \frac{h(a + b)}{2}$ and work out h when $A = 48$, $a = 5$ and $b = 7$.**

(a) Make h the subject

Answer: $h = \frac{2A}{(a + b)}$

(b) Work out h

Answer: 8 cm

11 **(a) Make x the subject of $y = 2x^2$. (b) Work out x when $y = 50$. (c) There is a second value of x that also gives $y = 50$. What is it?**

(a) Make x the subject

Answer: $x = \sqrt{\frac{y}{2}}$

(b) x when $y = 50$

Answer: 5

(c) The second value of x

Answer: $x = -5$

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