Solutions by
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GCSE (9-1) Grade 5

Changing the Subject of formula

Instructions

Use **black** ink or ball-point pen.
Fill in the boxes at the top of this page with your name.
Answer **all** questions.
Answer the questions in the spaces provided
– there may be more space than you need.
Show all your working out

Information

The marks for **each** question are shown in brackets.
use this as a guide as to how much time to spend on each question.
Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed

Advice

Read each question carefully before you start to answer it
Attempt every question
Check your answers if you have time at the end

1. Make p the subject of the formula $m = 3n + 2p$

$3n + 2p = m$

$2p = m - 3n$

$p = \frac{m - 3n}{2}$

$p = \frac{m - 3n}{2}$

(Total 2 marks)

2. Make c the subject of the formula $a = 3c - 4$

$3c - 4 = a$

$3c = a + 4$

$c = \frac{a+4}{3}$

$c = \frac{a+4}{3}$

(Total 2 marks)

3. Make b the subject of the formula $P = 2a + 2b$

$2a + 2b = P$

$2b = P - 2a$

$b = \frac{P-2a}{2}$

$b = \frac{P-2a}{2}$

(Total 2 marks)

4. Make c the subject of the formula $f = 3c - 4$

$3c - 4 = f$

$3c = f + 4$

$c = \frac{f+4}{3}$

$c =$ $\frac{f+4}{3}$

(Total 2 marks)

5. Make t the subject of the formula

$u = 7t + 30$

$7t + 30 = u$

$7t = u - 30$

$t = \frac{u-30}{7}$

$t =$ $\frac{u-30}{7}$

(Total 2 marks)

6. Make t the subject of the formula $v = u + 5t$

$$u + 5t = v$$

$$5t = v - u$$

$$t = \frac{v - u}{5}$$

$t =$ $\frac{v-u}{5}$

(Total 2 marks)

7. Make y the subject of the formula

$$x = 3y + 2$$

$$3y + 2 = x$$

$$3y = x - 2$$

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

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

(Total 2 marks)

8. Rearrange $y = \frac{1}{2}x + 1$ to make x the subject.

$\frac{1}{2}x + 1 = y$

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

$x = 2(y - 1)$

$x = 2y - 2$

$x = 2y - 2$

(Total 2 marks)

9. Make a the subject of the formula $s = \frac{a}{4} + 8u$

$\frac{a}{4} + 8u = s$

$\frac{a}{4} = s - 8u$

$a = 4(s - 8u)$

$a = 4s - 32u$

$a = 4s - 32u$

(Total 2 marks)

10. Make u the subject of the formula

$$D = ut + kt^2$$

$$ut + kt^2 = D$$

$$ut = D - kt^2$$

$$u = \frac{D - kt^2}{t}$$

$u =$ $\frac{D - kt^2}{t}$

(Total 2 marks)

11. Make s the subject of the formula $v^2 = u^2 + 2as$

$$u^2 + 2as = v^2$$

$$2as = v^2 - u^2$$

$$S = \frac{v^2 - u^2}{2a}$$

$s =$ $\frac{v^2 - u^2}{2a}$

(Total 2 marks)

12. Make t the subject of the formula

$2(t - 5) = y$

$2t - 10 = y$

$2t = y + 10$

$t = \frac{y + 10}{2}$

$t =$ $\frac{y+10}{2}$

(Total 3 marks)

13. Make n the subject of the formula $m = 5n - 21$

$5n - 21 = m$

$5n = m + 21$

$n = \frac{m + 21}{5}$

$n =$ $\frac{m+21}{5}$

(Total 2 marks)

14. Make q the subject of the formula $P = 2q + 10$

$2q + 10 = P$

$2q = P - 10$

$q = \frac{P-10}{2}$

$q = \frac{P-10}{2}$

(Total 2 marks)

15. When you are h feet above sea level, you can see d miles to the horizon, where

$$d = \sqrt{\frac{3h}{2}}$$

Make h the subject of the formula $d = \sqrt{\frac{3h}{2}}$

$\sqrt{\frac{3h}{2}} = d$

$\frac{3h}{2} = d^2$

$3h = 2d^2$

$h = \frac{2d^2}{3}$

$h = \frac{2d^2}{3}$

(Total 2 marks)

16. Rearrange $a(q - c) = d$ to make q the subject.

$a(q - c) = d$

$aq - ac = d$

$aq = d + ac$

$q = \frac{d + ac}{a}$

$q =$ $\frac{d+ac}{a}$

(3)

(Total 5 marks)

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17. The cost of hiring a car can be worked out using this rule.

Cost = £90 + 50p per mile

Bill hires a car and drives 80 miles.

(a) Work out the cost.

$C = 90 + 80 \times 0.5 = 90 + 40$

£ 130

(2)

The cost of hiring a car and driving m miles is C pounds.

(b) Complete the formula for C in terms of m.

$C =$ $90 + 0.5m$

(2)

Zara hired a car.

The cost is £240

(c) How many miles did Zara drive?

$90 + 0.5m = 240$

$0.5m = 150$

$m = 150 \times 2 = 300$

300 miles

(3)

(Total 7 marks)

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18. This rule is used to work out the total cost, in pounds, of hiring a carpet cleaner.

Multiply the number of days' hire by 4

Add 6 to your answer

Peter hires a carpet cleaner.
The total cost is £18

(a) Work out for how many days he hires the carpet cleaner.

$18 - 6 = 12$

$\frac{12}{4} = 3$

3 ..... days

(2)

(b) Write down an expression, in terms of n, for the total cost, in pounds, of hiring a carpet cleaner for n days.

$C = 4n + 6$

$C = 4n + 6$ .....

(2)
(Total 4 marks)

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