Name: SOLUTIONS

GCSE (1 - 9) Harder Changing the Subject	Solutions:

These questions represent all of the times that this topic has appeared in unlocked Pearson Edexcel GCSE maths papers as of July 2023. More questions can be found at examq.co.uk

Question	Where the question appeared
1	Edexcel, GCSE, Autumn 2017, Paper 1H, Q14
2	Edexcel, GCSE, Autumn 2018, Paper 1H, Q2
3	Edexcel, GCSE, Autumn 2019, Paper 1H, Q12
4	Edexcel, GCSE, Autumn 2019, Paper 2H, Q10
5	Edexcel, GCSE, Autumn 2020, Paper 1H, Q17
6	Edexcel, GCSE, Summer 2017, Paper 3H, Q14
7	Edexcel, GCSE, Summer 2019, Paper 2H, Q15

1

The ratio $(y+x):(y-x)$ is equivalent to $k:1$

Show that $y = \dfrac{x(k+1)}{k-1}$

$(y+x):(y-x) = k:1$

So

$$\frac{y+x}{y-x} = \frac{k}{1}$$

$$1(y+x) = k(y-x)$$

$$y + x = ky - kx$$

$$y - ky = -kx - x$$

$$y(1-k) = -kx - x$$

$$y = \frac{-kx - x}{1-k}$$

or

$$y = \frac{kx + x}{k-1} = \frac{x(k+1)}{k-1}$$

(Total for Question 14 is 3 marks)

[Edexcel, GCSE, Autumn 2017, Paper 1H, Q14]

2

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

$u = 12$ $a = -3$ $s = 18$

(a) Work out a value of v.

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

$v^2 = (12)^2 + 2 \times (-3) \times (18)$

$v^2 = 144 - 108$

$v^2 = 36$

$v = \sqrt{36} = \pm 6$

(2)

(b) Make s the subject of $v^2 = u^2 + 2as$

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

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

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

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

(2)

(Total for Question 2 is 4 marks)

[Edexcel, GCSE, Autumn 2018, Paper 1H, Q2]

3

$T = \frac{q}{2} + 5$

Here is Spencer's method to make q the subject of the formula.

$2 \times T = q + 5$

$q = 2T - 5$

What mistake did Spencer make in the first line of his method?

$T = \frac{q}{2} + 5$

$2T = q + 10$

$q = 2T - 10$

He needed to times everything by 2.
He should also have multiplied the 5 by 2.

(Total for Question 12 is 1 mark)

[Edexcel, GCSE, Autumn 2019, Paper 1H, Q12]

4

Make k the subject of the formula $y = \sqrt{2m - k}$

$\sqrt{2m-k} = y$

$2m - k = y^2$

$-k = y^2 - 2m$

$k = 2m - y^2$

$k = 2m - y^2$

(Total for Question 10 is 2 marks)

[Edexcel, GCSE, Autumn 2019, Paper 2H, Q10]

5

Make f the subject of the formula $d = \dfrac{3(1-f)}{f-4}$

$$d = \frac{3-3f}{f-4}$$

$$d(f-4) = 3-3f$$

$$df - 4d = 3 - 3f$$

$$df + 3f = 4d + 3$$

$$f(d+3) = 4d+3$$

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

$f = \dfrac{4d+3}{d+3}$

(Total for Question 17 is 4 marks)

[Edexcel, GCSE, Autumn 2020, Paper 1H, Q17]

6

(a) Simplify $\dfrac{x^2 - 16}{2x^2 - 5x - 12}$ $= \dfrac{(x+4)(x-4)}{(2x+3)(x-4)}$

$\dfrac{(x+4)(x-4)}{(2x+3)(x-4)} = \dfrac{x+4}{2x+3}$

(3)

(b) Make v the subject of the formula $w = \dfrac{15(t - 2v)}{v}$

$w = \dfrac{15t - 30v}{v}$

$vw = 15t - 30v$

$vw + 30v = 15t$

$v(w + 30) = 15t$

$v = \dfrac{15t}{w+30}$

$V = \dfrac{15t}{w+30}$

(3)

(Total for Question 14 is 6 marks)

[Edexcel, GCSE, Summer 2017, Paper 3H, Q14]

7

Make m the subject of the formula $f = \dfrac{3m + 4}{m - 1}$

$$f = \frac{3m+4}{m-1}$$

$$f(m-1) = 3m+4$$

$$fm - f = 3m+4$$

$$fm - 3m = f + 4$$

$$m(f-3) = f+4$$

$$m = \frac{f+4}{f-3}$$

$m = \dfrac{f+4}{f-3}$

(Total for Question 15 is 3 marks)

[Edexcel, GCSE, Summer 2019, Paper 2H, Q15]