

Lesson 9

GCSE Mathematics Algebra, Rearranging Formulae

9.1 Test

Question 1

If I divide one side of an equation by 8, what must I do to the other side ?

[1 mark]

Question 2

Quick 'In your head' Questions.

In each of the following, there is one manipulation that takes you from the question to the answer and so there is no need for any working.

(i) Make x the subject; $x - 7h^2 = 4w$

[2 marks]

(ii) Make x the subject; $15gx = k$

[2 marks]

(iii) Make x the subject; $\frac{x}{9} = \sqrt{f}$

[2 marks]

(iv) Make x the subject; $\frac{1}{x} = \frac{m + 2s}{8v^2}$

[2 marks]

Question 3

Showing full working, make x the subject

$$a + xk^2 = 13 + s^2$$

[3 marks]

Question 4

Showing full working, by first expanding the brackets, make x the subject

$$5 (7x - 9y) = 1 - u^2$$

[3 marks]

Question 5

GCSE examination question from November 2004, paper 4H, Q15

Make v the subject of the formula

$$m (v - u) = I$$

[3 marks]

Question 6

Showing full working, make x the subject

$$11g + 13x = 8x + 3b$$

[3 marks]

Question 7

GCSE examination question from November 2007, paper 3H, Q11

Make x the subject of the formula

$$3x - y = x + 7$$

[3 marks]

Question 8

GCSE examination question from January 2012, paper 3H, Q11

Make y the subject of the formula

$$3 (y + 2x - 1) = x + 5y$$

[3 marks]

Question 9

Showing full working, by first making brackets, make x the subject

$$17x + wx = p^2$$

[3 marks]

Question 10

Showing full working, make x the subject

$$\frac{1}{8x - 5y} = \frac{1}{13h - 5x}$$

[3 marks]

Question 11

GCSE examination question from November 2006, paper 4H, Q4

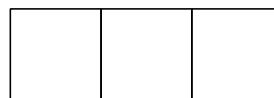
Here is a pattern of shapes made from centimetre squares.



**Shape
number 1**



**Shape
number 2**



**Shape
number 3**

This rule can be used to find the perimeter of a shape in this pattern.

Add 1 to the Shape number and then multiply your answer by 2

P cm is the perimeter of Shape number n .

(a) Write down a formula for P in terms of n .

[3 marks]

(b) Make n the subject of the formula in part **(a)**.

[3 marks]

Question 12

Showing full working, by first squaring both sides, make x the subject

$$\sqrt{14x^2 + v - 3c^2} = 5x$$

[4 marks]

Question 13

GCSE examination question from January 2014, paper 3H, Q16

Given that y is positive, make y the subject of

$$y = \sqrt{ay^2 + n}$$

Show clear algebraic working.

[5 marks]

Question 14

GCSE examination question from November 2010, paper 3H, Q18

Make x the subject of

$$P = \frac{100 (y - x)}{x}$$

[4 marks]

Question 15

GCSE examination question from November 2009, paper 3H, Q11

Make a the subject of

$$P = \sqrt{ab}$$

[2 marks]

Question 16

GCSE examination question from May 2012, paper 4H, Q10

Given that r is positive, make r the subject of the formula

$$V = \pi r^2 h$$

[2 marks]

Question 17

GCSE examination question from January 2013, paper 3H, Q12

Make h the subject of the formula

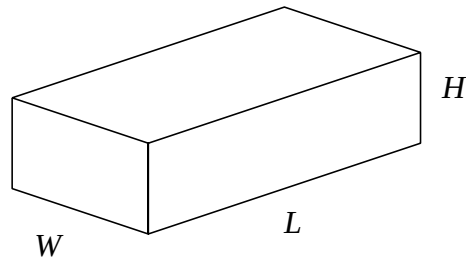
$$A = 2\pi r (r + h)$$

[2 marks]

Question 18

GCSE examination question from May 2009, paper 3H, Q13

Here is a cuboid with length L , width W and height H .



The total surface area, A , of the cuboid is given by the formula

$$A = 2 (LW + HW + HL)$$

- (a) $A = 70$ $W = 4$ $H = 2$
Work out the value of L

[3 marks]

- (b) Make W the subject of the formula

$$A = 2 (LW + HW + HL)$$

[4 marks]

Question 19

GCSE examination question from May 2014, paper 3H, Q17

Make x the subject of;

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

[4 marks]

Question 20

GCSE examination question from June 2011, paper 4H, Q15 (c)

Make q the subject of the formula

$$p = \sqrt{q} - 5r$$

[2 marks]

Question 21

GCSE examination question from May 2006, paper 3H, Q20

Make R the subject of the formula

$$A = \pi (R + r) (R - r)$$

[4 marks]

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Teachers may obtain detailed worked solutions to the exercises by email from MHHShrewsbury@Gmail.com