

Name: _____

GCSE (1 – 9)

Rearranging Harder Formula

Instructions

- Use **black** ink or ball-point pen.
- Answer all questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- Diagrams are **NOT** accurately drawn, unless otherwise indicated.
- You must **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.*

Advice

- Read each question carefully before you start to answer it.
- Keep an eye on the time.
- Try to answer every question.
- Check your answers if you have time at the end

1 Make u the subject of the formula $v = u + at$
 $-at$ $-at$

$$v - at = u$$

$$u = v - at$$

.....

(Total for question 1 is 1 marks)

2 Make a the subject of the formula $v = u + at$
 $-u$ $-u$

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

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

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

.....

(Total for question 2 is 2 marks)

3 Make u the subject of the formula $v^2 = u^2 + 2as$

$$-2as \quad -2as$$

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

$$\sqrt{v^2 - 2as} = u$$

$$u = \sqrt{v^2 - 2as}$$

(Total for question 3 is 2 marks)

4 Make a the subject of the formula $v^2 = u^2 + 2as$

$$-u^2 \quad -u^2$$

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

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

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

(Total for question 4 is 2 marks)

5 Make a the subject of the formula $s = ut + \frac{1}{2}at^2$

$$-ut \quad -ut$$

$$s - ut = \frac{1}{2}at^2$$

$$2(s - ut) = at^2$$

$$a = \frac{2(s - ut)}{t^2}$$

$$a = \frac{2(s - ut)}{t^2}$$

(Total for question 5 is 2 marks)

6 Make v the subject of the formula $T = \frac{1}{2}mv^2$

$$2T = mv^2$$

$$\frac{2T}{m} = v^2$$

$$\sqrt{\frac{2T}{m}} = v$$

$$v = \sqrt{\frac{2T}{m}}$$

(Total for question 6 is 2 marks)

7 Make x the subject of the formula $2x + a = b(x - 2)$

$$2x + a = bx - 2b$$

$-2x \qquad \qquad -2x$

$$a = bx - 2x - 2b$$

$+2b \qquad \qquad \qquad +2b$

$$a + 2b = bx - 2x$$

$$a + 2b = x(b - 2)$$

$$x = \frac{a + 2b}{b - 2}$$

or $x = \frac{-2b - a}{2 - b}$

$$x = \frac{a + 2b}{b - 2}$$

(Total for question 7 is 3 marks)

8 Make x the subject of the formula $x(2 + a) = b(x + 3)$

$$2x + ax = bx + 3b$$

$-bx \quad -bx$

$$2x + ax - bx = 3b$$

$$x(2 + a - b) = 3b$$

$$x = \frac{3b}{2 + a - b}$$

or $x = \frac{-3b}{b - a - 2}$

$$x = \frac{3b}{2 + a - b}$$

(Total for question 8 is 3 marks)

9 Make x the subject of the formula $a = \frac{x+4}{x+2}$

$$a(x+2) = x+4$$

$$ax + 2a = x + 4$$

$-x \qquad -x$

$$ax - x + 2a = \cancel{4} - 2a$$

$-2a \qquad -2a$

$$ax - x = 4 - 2a$$

$$x(a-1) = 4-2a$$

$$x = \frac{4-2a}{a-1}$$

$$\text{or } x = \frac{2a-4}{1-a}$$

$$x = \frac{4-2a}{a-1}$$

.....

(Total for question 9 is 3 marks)

10 Make x the subject of the formula $a = \frac{x+c}{x-b}$

$$a(x-b) = x+c$$

$$ax - ab = x + c$$

$-x \qquad -x$

$$ax - x - ab = c$$

$+ab \qquad +ab$

$$ax - x = c + ab$$

$$x(a-1) = c + ab$$

$$x = \frac{c+ab}{a-1}$$

$$\text{or } x = \frac{-c-ab}{1-a}$$

$$x = \frac{c+ab}{a-1}$$

.....

(Total for question 10 is 3 marks)

11 Make x the subject of the formula $\frac{a}{b} = \frac{2x}{x+5}$

$$a(x+5) = 2x(b)$$

$$ax + 5a = 2bx$$

$$5a = 2bx - ax$$

$$5a = x(2b - a)$$

$$x = \frac{5a}{2b - a}$$

$$\text{or } x = \frac{-5a}{a - 2b}$$

$$x = \frac{5a}{2b - a}$$

(Total for question 11 is 3 marks)

12 Make x the subject of the formula $a = \frac{4 + 2bx}{2x - 3}$

$$a(2x - 3) = 4 + 2bx$$

$$2ax - 3a = 4 + 2bx$$

$$2ax - 2bx - 3a = 4$$

$$2ax - 2bx = 4 + 3a$$

$$x(2a - 2b) = 4 + 3a$$

$$x = \frac{4 + 3a}{2a - 2b}$$

$$\text{or } x = \frac{-3a - 4}{2b - 2a}$$

$$x = \frac{4 + 3a}{2a - 2b}$$

(Total for question 12 is 3 marks)

13 Make b the subject of the formula $\frac{1}{a} = \frac{1}{b} + \frac{1}{c}$

$$1 = \frac{a}{b} + \frac{a}{c} \quad (\times a)$$

$$b = a + \frac{ab}{c} \quad (\times b)$$

$$bc = ac + ab \quad (\times c)$$

$$bc - ab = ac$$

$$b(c-a) = ac$$

$$b = \frac{ac}{c-a}$$

$$\text{or } b = \frac{-ac}{a-c}$$

$$b = \frac{ac}{c-a}$$

(Total for question 13 is 4 marks)