PEARSON EDEXCEL INTERNATIONAL GCSE MATHEMATICS A (4MA1) · HIGHER TIER

# Rearranging Formulae: exam questions

10 questions · 27 marks · mark schemes at the end

Name _____ Date _____ Score / 27

- Calculators are allowed on both 4MA1 Higher papers (1H and 2H). Show your working: most marks are for method.
- Mark schemes start after the questions. M marks are for a correct method, A marks for an accurate answer that follows a correct method, and B marks for a correct result on its own.
- Online, with more practice: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/rearranging-formulae

**1.** **2 marks**

Make $t$ the subject of $v = u + at$.

**2.** **2 marks**

Make $r$ the subject of $A = \pi r^2$, where $r > 0$.

**3.** **2 marks**

Make $x$ the subject of $y = \dfrac{3x + 2}{5}$.

**4.** **3 marks**

Make $x$ the subject of $ax + b = cx + d$.

**5.** **4 marks**

Make $w$ the subject of $p = \dfrac{2w + 3}{w - 1}$.

**6.** **2 marks**

Make $h$ the subject of $V = \frac{1}{3}\pi r^2 h$.

**7.** **3 marks**

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

**8.** **3 marks**

Make $L$ the subject of $T = 2\pi\sqrt{\frac{L}{g}}$.

**9.** **3 marks**

Make $y$ the subject of $\frac{1}{x} + \frac{1}{y} = \frac{1}{f}$.

**10.** **3 marks**

$E = \frac{1}{2}mv^2$

(a) Make $v$ the subject of the formula, where $v > 0$. **(2)**

(b) Work out the value of $v$ when $E = 300$ and $m = 6$. **(1)**

## Answers and worked solutions

### Question 1 — 2 marks

**M1** $v - u = at$

**A1** $t = \dfrac{v-u}{a}$

**Answer:** $t = \dfrac{v-u}{a}$

### Question 2 — 2 marks

**M1** $r^2 = \dfrac{A}{\pi}$

**A1** $r = \sqrt{\dfrac{A}{\pi}}$

**Answer:** $r = \sqrt{\dfrac{A}{\pi}}$

### Question 3 — 2 marks

**M1** $5y = 3x + 2$

**A1** $x = \dfrac{5y-2}{3}$

**Answer:** $x = \dfrac{5y-2}{3}$

### Question 4 — 3 marks

**M1** $ax - cx = d - b$

**M1** $x(a-c) = d - b$

**A1** $x = \dfrac{d-b}{a-c}$

**Answer:** $x = \dfrac{d-b}{a-c}$

### Question 5 — 4 marks

**M1** $p(w-1) = 2w + 3$

**M1** $pw - 2w = p + 3$

**M1** $w(p-2) = p + 3$

**A1** $w = \dfrac{p+3}{p-2}$

**Answer:** $w = \dfrac{p+3}{p-2}$

### Question 6 — 2 marks

**M1** $3V = \pi r^2 h$

**A1** $h = \dfrac{3V}{\pi r^2}$

**Answer:** $h = \dfrac{3V}{\pi r^2}$

### Question 7 — 3 marks

**M1** $s - ut = \frac{1}{2}at^2$

**M1** $2(s-ut) = at^2$

**A1** $a = \dfrac{2(s-ut)}{t^2}$

**Answer:** $a = \dfrac{2(s-ut)}{t^2}$

### Question 8 — 3 marks

**M1** $\dfrac{T}{2\pi} = \sqrt{\dfrac{L}{g}}$

**M1** $\dfrac{T^2}{4\pi^2} = \dfrac{L}{g}$

**A1** $L = \dfrac{gT^2}{4\pi^2}$

**Answer:** $L = \dfrac{gT^2}{4\pi^2}$

### Question 9 — 3 marks

**M1** $\dfrac{1}{y} = \dfrac{1}{f} - \dfrac{1}{x} = \dfrac{x-f}{fx}$

**M1** multiplying through by $fxy$: $fy + fx = xy$, or inverting correctly

**A1** $y = \dfrac{fx}{x-f}$

**Answer:** $y = \dfrac{fx}{x-f}$

### Question 10 — 3 marks

**(a)**

**M1** $v^2 = \dfrac{2E}{m}$

**A1** $v = \sqrt{\dfrac{2E}{m}}$

**(b)**

**B1** 10

**Answer:** (a) $v = \sqrt{\dfrac{2E}{m}}$; (b) 10

Online, with every solution: igcsemathrevision.com/igcse-frontend/4ma1/exam-questions/rearranging-formulae
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