Edexcel GCSE

Mathematics (Linear) – 1MA0

Answer by Mathed Up!

MORE DIFFICULT REARRANGEING FORMULAE

Materials required for examination
Ruler graduated in centimetres and
millimetres, protractor, compasses,
pen, HB pencil, eraser.
Tracing paper may be used.

Items included with question papers
Nil

Instructions

Use black ink or ball-point pen.
Fill in the boxes at the top of this page with your name, centre number and candidate number.
Answer all questions.
Answer the questions in the spaces provided – there may be more space than you need.
Calculators may be used.

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 – you should take particular care on these questions with your spelling, punctuation
and grammar, as well as the clarity of expression.

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

$\div a$ | $q - c = \dfrac{d}{a}$ | $\div a$

$+ c$ | $q = \dfrac{d}{a} + c$ | $+ c$

or

$aq - ac = d$

$+ac$ | $aq = d + ac$ | $+ac$

$\div a$ | $q = \dfrac{d + ac}{a}$ | $\div a$

$q = \ \dfrac{d}{a} + c$ ....

(3)

(Total 5 marks)

2. (a) Make n the subject of the formula $m = 5n - 21$

$+21$ | $m + 21 = 5n$ | $+21$

$\div 5$ | $\dfrac{m + 21}{5} = n$ | $\div 5$

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

$n = \ \dfrac{m + 21}{5}$ ....

(2)

(b) Make *p* the subject of the formula $4(p - 2q) = 3p + 2$

$$4p - 8q = 3p + 2$$

$-3p$ $\quad$ $p - 8q = 2$ $\qquad$ $-3p$

$+8q$ $\quad\quad$ $p = 2 + 8q$ $\qquad$ $+8q$

$p =$ $2 + 8q$

(3)

(Total 5 marks)

3. $\qquad\qquad$ $P = \pi r + 2r + 2a$

Make $\qquad$ *r* $\qquad$ the subject of the formula

$$P = r(\pi + 2) + 2a$$

$-2a$ $\quad$ $P - 2a = r(\pi + 2)$ $\qquad$ $-2a$

$\div(\pi + 2)$ $\quad$ $\dfrac{P - 2a}{\pi + 2} = r$ $\qquad$ $\div(\pi + 2)$

$$r = \frac{P - 2a}{\pi + 2}$$

$r =$ $\dfrac{P - 2a}{\pi + 2}$

(Total 3 marks)

4. Make   *a*   the subject of the formula

$$2(3a - c) = 5c + 1$$

$+2c$ $\begin{vmatrix} 6a - 2c = 5c + 1 \\ 6a = 7c + 1 \\ a = \dfrac{7c+1}{6} \end{vmatrix}$ $+2c$

$\div 6$ $\div 6$

$$a = \frac{7c+1}{6}$$

(Total 3 marks)

5. Make   *m*   the subject of the formula $2(2p + m) = 3 - 5m$

$+5m$ $\begin{vmatrix} 4p + 2m = 3 - 5m \\ 4p + 7m = 3 \\ 7m = 3 - 4p \\ m = \dfrac{3-4p}{7} \end{vmatrix}$ $+5m$

$-4p$ $-4p$

$\div 7$ $\div 7$

$$m = \frac{3-4p}{7}$$

(Total 3 marks)

6. Make x the subject of

$$5(x - 3) = y(4 - 3x)$$

$5x - 15 = 4y - 3xy$

$+3xy \quad 5x + 3xy - 15 = 4y \qquad +3xy$

$+15 \quad 5x + 3xy = 4y + 15 \qquad +15$

factorise $\quad x(5 + 3y) = 4y + 15$

$\div (5 + 3y) \qquad x = \dfrac{4y + 15}{5 + 3y}$

$x = \dfrac{4y + 15}{5 + 3y}$

(Total 4 marks)

7. 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

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

square $\quad d^2 = \dfrac{3h}{2} \quad$ square

$\times 2 \quad 2d^2 = 3h \qquad \wedge 2$

$\div 3 \quad \dfrac{2d^2}{3} = h \qquad \div 3$

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

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

(Total 4 marks)

8. $y = \dfrac{2pt}{p-t}$

Rearrange the formula to make t the subject.

$$y = \frac{2pt}{p-t}$$

$\times(p-t)$ $\quad y(p-t) = 2pt \quad$ $\times(p-t)$

expand $\quad yp - yt = 2pt$

$+yt \quad\quad yp = 2tp + yt \quad +yt$

$\quad\quad yp = t(2p+y) \quad$ factorise

$\div(2p+y) \quad \dfrac{yp}{2p+y} = t \quad\quad \div(2p+y)$

$\quad\quad t = \dfrac{yp}{2p+y}$

$t = \dfrac{yp}{2p+y}$ ....

(Total 4 marks)

9. Make b the subject of the formula $\quad a = \dfrac{2-7b}{b-5}$

$$a = \frac{2-7b}{b-5}$$

$\times(b-5)$ $\quad a(b-5) = 2-7b \quad$ $\times(b-5)$

expand $\quad ab - 5a = 2-7b$

$+7b \quad\quad ab - 5a + 7b = 2 \quad +7b$

$+5a \quad\quad ab + 7b = 2 + 5a \quad +5a$

factorise $\quad b(a+7) = 2 + 5a$

$\div(a+7) \quad\quad b = \dfrac{2+5a}{a+7} \quad \div(a+7)$

$b = \dfrac{2+5a}{a+7}$

....

(Total 4 marks)

10. $P = \dfrac{n^2 + a}{n + a}$

Rearrange the formula to make a the subject.

$$P = \frac{n^2 + a}{n + a}$$

$\times (n+a)$ $P(n+a) = n^2 + a$ $\times (n + a)$

expand $Pn + Pa = n^2 + a$

$-Pn$ $Pa = n^2 + a - Pn$ $-Pn$

$-a$ $Pa - a = n^2 - Pn$ $-a$

factorise $a(P-1) = n^2 - Pn$

$\div (P-1)$ $a = \dfrac{n^2 - Pn}{P - 1}$ $\div (P-1)$

$a = \dfrac{n^2 - Pn}{P - 1}$

(Total 4 marks)

11. $\dfrac{x}{x + c} = \dfrac{p}{q}$

Make x the subject of the formula.

$$\frac{x}{x+c} = \frac{p}{q}$$

$\times (x+c)$ $x = \dfrac{p(x+c)}{q}$ $\times (x+c)$

$\times q$ $xq = p(x+c)$ $\times q$

   $xq = px + pc$ expand

$-px$ $xq - px = pc$ $-px$

factorise $x(q - p) = pc$

$\div (q-p)$ $x = \dfrac{pc}{q - p}$ $\div (q-p)$

$x = \dfrac{pc}{q - p}$

(Total 4 marks)

12. Rearrange $\dfrac{1}{u}+\dfrac{1}{v}=\dfrac{1}{f}$

to make u the subject of the formula.

Give your answer in its simplest form.

$$\frac{1}{u}+\frac{1}{v}=\frac{1}{f}$$

$\times uvf$ $\qquad \dfrac{uvf}{u}+\dfrac{uvf}{v}=\dfrac{uvf}{f}$ $\qquad \times uvf$

$$vf + uf = uv$$

$-uf$ $\qquad vf = uv - uf$ $\qquad -uf$

$$vf = u(v-f)$$ factorise

$\div v-f$ $\qquad \dfrac{vf}{v-f}=u$ $\qquad \div v-f$

$$u = \frac{vf}{v-f}$$

$$u = \frac{vf}{v-f}$$

(Total 5 marks)