



7.7D Rearranging Harder Formulae: Fluency and Exam Drill

EDEXCEL Edexcel 1MA1 · Calculator allowed · about 60 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** Work out x from $18 = 5x + x$.

(Total for Question 1 is 1 mark)

- 2** Rearrange the formula $R = rk/(k + r)$ to make r the subject. Give your answer in simplest form.

(Total for Question 2 is 3 marks)

- 3** Make f the subject of $1/f = 1/a + 1/b$.

(Total for Question 3 is 2 marks)

- 4** Rearrange $t = \sqrt{(2s)/g}$ to make s the subject.

(Total for Question 4 is 2 marks)

- 5** Make x the subject of $y = \sqrt{x} + 1$.

(Total for Question 5 is 2 marks)

6 Rearrange $S = 3x/(x + 2)$ to make x the subject. Give your answer in simplest form.

(Total for Question 6 is 3 marks)

7 Make a the subject of $s = ut + 0.5 a t^2$.

(Total for Question 7 is 2 marks)

8 Rearrange $m = \sqrt{(x + 4)/(2x)}$ to make x the subject. Give your answer in simplest form.

(Total for Question 8 is 3 marks)

9 Rearrange $y = kx + m/x$ to make x the subject. Give your answer using the quadratic formula.

(Total for Question 9 is 4 marks)

10 The period of a mass on a spring is given by $T = 2\pi \sqrt{m/k}$. Rearrange this formula to make k the subject.

(Total for Question 10 is 3 marks)

11 Make t the subject of $s = vt + 0.5 a t^2$. Give your answer in terms of s , v and a .

(Total for Question 11 is 4 marks)

12 Rearrange $R = (x + 3)/(2x)$ to make x the subject. Give your answer in simplest form.

(Total for Question 12 is 3 marks)

13 Rearrange $p = (x^2 + 2x)/(x - 1)$ to make x the subject. Give your answer using the quadratic formula.

(Total for Question 13 is 4 marks)

14 Rearrange $y = (a x + b)/(c x + d)$ to make x the subject. Give your answer in simplest form.

(Total for Question 14 is 4 marks)

Mark scheme · 7.7D Rearranging Harder Formulae: Fluency and Exam Drill

Question 1

- **B1** $x = 3$ cao
- **Answer: 3**

Question 2

- **M1** multiply both sides by $(k + r)$ to obtain $Rk + Rr = rk$
- **M1** collect r terms to get $Rk = r(k - R)$ or equivalent
- **A1** $r = Rk/(k - R)$ cao
- **Answer: $r = Rk/(k - R)$**

Question 3

- **M1** combine RHS: $1/f = (a + b)/(ab)$
- **A1** $f = ab/(a + b)$ cao
- **Answer: $f = ab/(a + b)$**

Question 4

- **M1** square both sides to get $t^2 = 2s/g$
- **A1** $s = g t^2/2$ cao
- **Answer: $s = g t^2/2$**

Question 5

- **M1** isolate $\sqrt{x}$: $\sqrt{x} = y - 1$
- **A1** $x = (y - 1)^2$ cao
- **Answer: $x = (y - 1)^2$**

Question 6

- **M1** multiply both sides by $(x + 2)$ to get $S(x + 2) = 3x$
- **M1** collect x terms to reach $x(3 - S) = 2S$
- **A1** $x = 2S/(3 - S)$ cao
- **Answer: $x = 2S/(3 - S)$**

Question 7

- **M1** isolate the a term: $s - ut = 0.5 a t^2$
- **A1** $a = 2(s - ut)/t^2$ cao
- **Answer: $a = 2(s - ut)/t^2$**

Question 8

- **M1** square both sides to get $m^2 = (x + 4)/(2x)$ and clear fraction to $2m^2 x = x + 4$
- **M1** collect x terms to give $x(2m^2 - 1) = 4$
- **A1** $x = 4/(2m^2 - 1)$ cao
- **Answer: $x = 4/(2m^2 - 1)$**

Question 9

- **M1** multiply both sides by x to obtain $yx = kx^2 + m$
- **M1** rearrange to quadratic form $kx^2 - yx + m = 0$
- **M1** apply the quadratic formula with $a = k$, $b = -y$, $c = m$
- **A1** $x = [y \pm \sqrt{y^2 - 4km}]/(2k)$ cao
- **Answer: $x = [y \pm \sqrt{y^2 - 4km}]/(2k)$**

Question 10

- **M1** isolate the square root: $T/(2\pi) = \sqrt{m/k}$, then square both sides
- **M1** obtain $T^2/(4\pi^2) = m/k$ and rearrange to $k = 4\pi^2 m/T^2$
- **A1** $k = 4\pi^2 m/T^2$ cao
- **Answer: $k = 4\pi^2 m/T^2$**

Question 11

- **M1** rearrange to quadratic form $0.5 a t^2 + v t - s = 0$ (or multiply by 2 to $a t^2 + 2v t - 2s = 0$)
- **M1** identify coefficients and use quadratic formula
- **M1** substitute and simplify the discriminant to $v^2 + 2as$
- **A1** $t = \frac{-v \pm \sqrt{v^2 + 2as}}{a}$ cao
- **Answer: $t = \frac{-v \pm \sqrt{v^2 + 2as}}{a}$**

Question 12

- **M1** multiply both sides by $2x$ to get $2Rx = x + 3$
- **M1** collect x terms to $x(2R - 1) = 3$
- **A1** $x = 3/(2R - 1)$ cao
- **Answer: $x = 3/(2R - 1)$**

Question 13

- **M1** multiply both sides by $(x - 1)$ and expand to get $p(x - 1) = x^2 + 2x$
- **M1** rearrange to quadratic form $x^2 + (2 - p)x + p = 0$
- **M1** apply the quadratic formula with $a = 1$, $b = (2 - p)$, $c = p$
- **A1** $x = \frac{-(2 - p) \pm \sqrt{(2 - p)^2 - 4p}}{2}$ cao
- **Answer: $x = \frac{-(2 - p) \pm \sqrt{(2 - p)^2 - 4p}}{2}$**

Question 14

- **M1** multiply both sides by $(c x + d)$ to get $y(c x + d) = a x + b$
- **M1** collect x terms to reach $x(y c - a) = b - y d$
- **M1** divide to isolate x
- **A1** $x = (b - y d)/(y c - a)$ cao
- **Answer: $x = (b - y d)/(y c - a)$**