
A9...Rearranging Formula

OCR

20 (a) Rearrange this formula to make x the subject.

$$y = \frac{2x}{5}$$

(a) **[2]**

20 (a) Rearrange this formula to make x the subject.

$$y = \frac{2x}{5}$$

$$5y = 2x$$
$$\frac{5y}{2} = x \quad \checkmark$$

$$x \rightarrow \textcircled{\times 2} \rightarrow \textcircled{\div 5} \rightarrow y$$
$$\leftarrow \textcircled{\div 2} \leftarrow \textcircled{\times 5} \leftarrow y$$
$$x = \frac{5y}{2} \quad \checkmark$$

(a) $\frac{5y}{2}$ [2]

17 (a) Rearrange the equation to make x the subject.

$$y = 7x - 3$$

(a) $x = \dots\dots\dots$ [2]

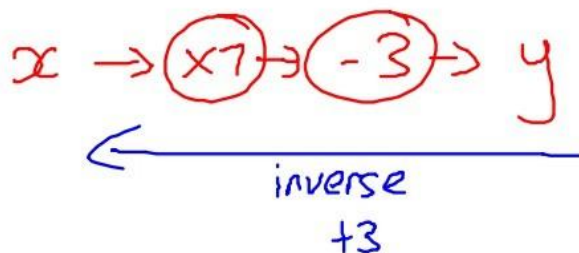
(b) Factorise.

(i) $x^2 - xy$

(b)(i) $\dots\dots\dots$ [1]

- 17 (a) Rearrange the equation to make x the subject. $x =$

$$y = 7x - 3$$



(a) $x = \frac{y+3}{7}$ [2]

- (b) Factorise.

(i) $x^2 - xy$

$$x(x-y)$$

(b)(i) $x(x-y)$ [1]

(c) Make d the subject of this formula.

$$c = 7d$$

(c) **[1]**

(c) Make d the subject of this formula.

$$c = 7d$$

$$\frac{c}{7} = d \checkmark$$

(c) $d = \frac{c}{7}$ [1]

(b) Find the value of $10h + 6t$ when $h = 12$ and $t = 4$.

(b) [2]

(c) Rearrange this formula to make d the subject.

$$e = f - 7d$$

(c) [2]

(b) Find the value of $10h + 6t$ when $h = 12$ and $t = 4$.

$$10h = 120$$

$$6t = 24$$

(b) 144 [2]

(c) Rearrange this formula to make d the subject.

$$e = f - 7d$$

on its own

$$e = -7d + f$$

$d \rightarrow \textcircled{x-7} \rightarrow \textcircled{-f} \rightarrow e$

$d = \frac{e-f}{-7}$ ✓

$$e = \textcircled{f} - 7d$$
$$e - f = \textcircled{-7d}$$
$$\frac{e-f}{-7} = d$$
 ✓

(c) [2]

6 You are given that $5y = 4x$.

(a) Find the value of y when $x = 10$.

A6

(a) $y =$ [2]

(b) Write y in terms of x .

A9

(b) $y =$ [1]

6 You are given that $5y = 4x$.

(a) Find the value of y when $x = 10$.

A6

$$5y = 40$$

$$y = \frac{40}{5} = 8$$

(a) $y = \dots\dots\dots 8 \dots\dots\dots$ [2]

(b) Write y in terms of x .

A9

$$y =$$

$$5y = 4x$$

$$y = \frac{4x}{5}$$

$$\frac{4x}{5}$$

(b) $y = \dots\dots\dots \frac{4x}{5} \dots\dots\dots$ [1]

9 (a) Rearrange this formula to make x the subject.

A9ab

$$y = x - 2$$

(a) [1]

(b) Rearrange this formula to make d the subject.

A9ab

$$C = \pi d$$

(b) [1]

9 (a) Rearrange this formula to make x the subject.

A9ab

$$y = x - 2$$

$$x \rightarrow (-2) \rightarrow y$$

$$x \leftarrow (+2) \leftarrow y$$

(a) $x = y + 2$ [1]

(b) Rearrange this formula to make d the subject.

A9ab

$$C = \pi d$$

$$d \rightarrow (\times \pi) \rightarrow C$$

$$d \leftarrow (\div \pi) \leftarrow C$$

(b) $d = \frac{C}{\pi}$ ✓ [1]

Use the formula $s = ut + \frac{1}{2}at^2$.

(b) Make a the subject of the formula.

A9 a/b

(b) $a = \dots\dots\dots$ [2]

Use the formula $s = \overset{\curvearrowright}{ut} + \frac{1}{2}at^2$.

(b) Make a the subject of the formula.

A9a/b

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

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

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

(b) $a = \dots\dots\dots$ [2]

9 Rearrange this formula to make y the subject.

A9

$$x = y^2 + 7$$

..... [2]

9 Rearrange this formula to make y the subject.

A9

$$x = y^2 + 7$$

$$y^2 + 7 = x$$

$$y^2 = x - 7$$

$$y = \sqrt{x - 7} \quad \checkmark \text{ full marks.}$$

$$y = \pm \sqrt{x - 7}$$

[2]

10 (a) Simplify fully.

(i) $3t + 5u - 2t + 3u$

A2

(a)(i) [2]

(ii) $6a \times 2a^2$

A3

(ii) [2]

(b) Make x the subject of the formula $y = x^2 - 1$.

A9

(b) [2]

10 (a) Simplify fully.

(i) $3t + 5u - 2t + 3u$

A2

(ii) $6a \times 2a^2$

A3

(a)(i) $t + 8u$ [2]

(ii) $12a^3$ [2]

(b) Make x the subject of the formula $y = x^2 - 1$.

A9

$$y = x^2 - 1$$

$$y + 1 = x^2$$

$$\sqrt{y + 1} = x$$

(b) $x = \sqrt{y + 1}$ [2]

(b) Rearrange the formula $v = u + at$ to make a the subject.

A9

(b) [2]

(b) Rearrange the formula $v = u + at$ to make a the subject.

A9

$$v = u + at$$

$$\textcircled{-u}$$

$$v - u = at$$

$$\textcircled{\div t}$$

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

$$\textcircled{-u}$$

$$\textcircled{\div t}$$

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

(b) [2]

12 Rearrange this formula to make w the subject.

A9 $P = 2w + 2h$

..... [2]

12 Rearrange this formula to make w the subject.

A9 $P = 2w + 2h$

$$2w + 2h = P$$


$$2w = P - 2h$$

$$w = \frac{P - 2h}{2}$$

$$w = \frac{P - 2h}{2}$$

..... [2]

20 $x^2 - 2y = 5$ and $4y + z = 7$.

A9 Write z in terms of x .

A64 Give your answer in its simplest form.

..... **[4]**

20 $x^2 - 2y = 5$ and $4y + z = 7$.

A9 Write z in terms of x .

A64 Give your answer in its simplest form.

$$z = x$$

$$x^2 - 2y = 5$$

$$-2y = 5 - x^2$$

$$2y = -5 + x^2$$

$$2y = x^2 - 5$$

$$y = \frac{x^2 - 5}{2}$$

$$4y + z = 7$$

$$4y = 7 - z$$

$$y = \frac{7 - z}{4}$$

$$\frac{x^2 - 5}{2} = \frac{7 - z}{4}$$

$$4(x^2 - 5) = 2(7 - z)$$

$$4x^2 - 20 = 14 - 2z$$

$$4x^2 - 20 - 14 = -2z$$

$$4x^2 - 34 = -2z$$

$$-4x^2 + 34 = 2z$$

$$\frac{-4x^2 + 34}{2} = z$$

$$-2x^2 + 17 = z$$

or
 $z = 17 - 2x^2$

[4]

Edexcel

11 $T = 4v + 3$

(a) Work out the value of T when $v = 2$

$$T = \dots\dots\dots$$

(2)

(b) Make v the subject of the formula $T = 4v + 3$

$$\dots\dots\dots$$

(2)

(Total for Question 11 is 4 marks)

11 $T = 4v + 3$

(a) Work out the value of T when $v = 2$

$$T = 8 + 3$$

$$T = \underline{11} \quad (2)$$

(b) Make v the subject of the formula $T = 4v + 3$

$$v \rightarrow \textcircled{\times 4} \rightarrow \textcircled{+ 3} \rightarrow T$$

$\xleftarrow{-3} \xleftarrow{\div 4}$

$$\begin{aligned} T &= 4v + 3 \\ T - 3 &= 4v \\ \frac{T - 3}{4} &= v \end{aligned}$$

$$v = \underline{\frac{T - 3}{4}} \quad (2)$$

(Total for Question 11 is 4 marks)

28 Make g the subject of the formula

$$T = \sqrt{\frac{g + 6}{2}}$$

A9a/b

.....

(Total for Question 28 is 3 marks)

28 Make g the subject of the formula

$$T = \sqrt{\frac{g+6}{2}}$$

A9a/b

$$T = \sqrt{\frac{g+6}{2}}$$

$$T^2 = \frac{g+6}{2}$$

$$2T^2 = g+6$$

$$2T^2 - 6 = g \quad \checkmark$$

$$\left\{ \begin{array}{l} g \rightarrow (+6) \rightarrow (\div 2) \rightarrow \sqrt{} \rightarrow T \\ g \leftarrow (-6) \leftarrow (\times 2) \leftarrow (T^2) \leftarrow T \end{array} \right.$$
$$g = 2T^2 - 6 \quad \checkmark$$
$$g = 2T^2 - 6$$

(Total for Question 28 is 3 marks)

(b) Make s the subject of $v^2 = u^2 + 2as$

A9a/b

(b) Make s the subject of $v^2 = \cancel{u^2} + 2as$

A9a/b $s =$

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

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

✓

(2)

8 Make t the subject of $p = \sqrt{a + \frac{t}{2}}$

.....
(Total for Question 8 is 3 marks)

8 Make t the subject of $p = \sqrt{a + \frac{t}{2}}$

$$\sqrt{a + \frac{t}{2}} = p$$

$$a + \frac{t}{2} = p^2$$

$$\frac{t}{2} = p^2 - a$$

$$t = 2(p^2 - a) \checkmark$$

(Total for Question 8 is 3 marks)

16 (a) Show that the equation $x^3 - 3x^2 + 3 = 0$ has a solution between $x = 2$ and $x = 3$

(2)

(b) Show that the equation $x^3 - 3x^2 + 3 = 0$ can be rearranged to give $x = \sqrt[3]{3x^2 - 3}$

(1)

16 (a) Show that the equation $x^3 - 3x^2 + 3 = 0$ has a solution between $x = 2$ and $x = 3$

$$x=2 \dots 2^3 - 3(2^2) + 3 = 8 - 12 + 3 = -1 \dots < 0$$

$$x=3 \dots 3^3 - 3(3^2) + 3 = 27 - 27 + 3 = 3 > 0$$

So this proves it has a solution between 2 and 3

(2)

(b) Show that the equation $x^3 - 3x^2 + 3 = 0$ can be rearranged to give $x = \sqrt[3]{3x^2 - 3}$

$$x = \sqrt[3]{3x^2 - 3}$$

$$x^3 = 3x^2 - 3$$

$$x^3 - 3x^2 + 3 = 0$$

(1)

$$u = \frac{3t}{4} + 2$$

(c) Make t the subject of the formula.

A9

$$u = \frac{3t}{4} + 2$$

(c) Make t the subject of the formula.

A9

$$\frac{3t}{4} + 2 = u$$

$$\frac{3t}{4} = u - 2$$

$$\underline{3t} = 4(u - 2)$$

$$t = \frac{4(u - 2)}{3}$$

(3)



(b) Show that the equation $x^3 + 7x - 5 = 0$ can be arranged to give $x = \frac{5}{x^2 + 7}$

(2)

(b) Show that the equation $x^3 + 7x - 5 = 0$ can be arranged to give $x = \frac{5}{x^2 + 7}$

$$x = \frac{5}{x^2 + 7}$$

$$x(x^2 + 7) = 5$$

$$x^3 + 7x = 5$$

$$x^3 + 7x - 5 = 0 \quad \checkmark$$

(2)

19 Make x the subject of the formula $y = 2x + 4$

A9

.....
(Total for Question 19 is 2 marks)

19 Make x the subject of the formula $y = 2x + 4$

A9

$$\begin{aligned} y &= 2x + 4 \\ y - 4 &= 2x \\ \frac{y-4}{2} &= x \end{aligned}$$

✓

$$\left. \begin{aligned} x &\rightarrow \textcircled{\times 2} \rightarrow \textcircled{+4} \rightarrow y \\ x &\leftarrow \textcircled{\div 2} \leftarrow \textcircled{-4} \leftarrow y \end{aligned} \right\}$$
$$x = \frac{y-4}{2}$$

✓

(Total for Question 19 is 2 marks)

12 $T = \frac{q}{2} + 5$

A9 Here is Spencer's method to make q the subject of the formula.

$$2 \times T = q + 5$$

$$q = 2T - 5$$

What mistake did Spencer make in the first line of his method?

(Total for Question 12 is 1 mark)

12 $T = \frac{q}{2} + 5$

A9 Here is Spencer's method to make q the subject of the formula.

$$2 \times T = q + 5 \quad \leftarrow$$

$$q = 2T - 5$$

$$T = \frac{q}{2} + 5$$

$$T - 5 = \frac{q}{2}$$

$$2(T - 5) = q \quad \checkmark$$

What mistake did Spencer make in the first line of his method?

he has multiplied by 2 before he has subtracted 5. This is the wrong order.
x2 needs to be multiplied by everything

(Total for Question 12 is 1 mark)

10 Make k the subject of the formula $y = \sqrt{2m - k}$

A9

(Total for Question 10 is 2 marks)

10 Make k the subject of the formula $y = \sqrt{2m - k}$

A9

$$y^2 = 2m - k$$

$$y^2 - 2m = -k$$

$$-y^2 + 2m = k \quad \checkmark$$

$$2m - y^2 = k \quad \checkmark$$

(Total for Question 10 is 2 marks)

30 (a) Make q the subject of $p = 6q + 7$

A9

30 (a) Make q the subject of $p = 6q + 7$

A9

$$q =$$

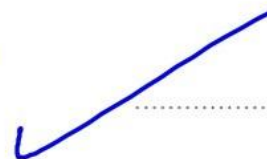
$$p = 6q + 7$$

$$p - 7 = 6q$$

$$\frac{p-7}{6} = q$$

$$q \Rightarrow (\times 6) \Rightarrow (+7) \Rightarrow p$$

$$q = \frac{p-7}{6}$$



(2)

AQA

28

Rearrange

$$y = \frac{x}{3} + 9$$

to make x the subject.

A9a/b

[2 marks]

Answer

28

Rearrange

$$y = \frac{x}{3} + 9$$

to make x the subject.

A9a/b

[2 marks]

$$y - 9 = \frac{x}{3}$$

$$3(y - 9) = x$$

Answer

$$x = 3(y - 9)$$

27 (a) Rearrange $v = u + at$ to make t the subject of the formula.

[2 marks]

A9a/b

Answer _____

27 (a) Rearrange $v = u + at$ to make t the subject of the formula.

[2 marks]

A9a/b

$$v = \textcircled{u} + at$$

$$t =$$

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

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

Answer

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

21

Rearrange $e = 2f$ to make f the subject.

Circle your answer.

A9a/b

[1 mark]

$$f = 2e$$

$$f = \frac{2}{e}$$

$$f = e - 2$$

$$f = \frac{e}{2}$$

21

Rearrange $e = 2f$ to make f the subject.

A9a/b

Circle your answer.

[1 mark]

$$f = 2e$$

$$f = \frac{2}{e}$$

$$f = e - 2$$

$$f = \frac{e}{2}$$

$$e = 2f$$

$$\frac{e}{2} = f \quad \text{or} \quad f = \frac{e}{2}$$

3 Rearrange $2x = \frac{y}{w}$ to make w the subject.

Circle your answer.

[1 mark]

$$w = \frac{2y}{x}$$

$$w = \frac{2x}{y}$$

$$w = \frac{y}{2x}$$

$$w = \frac{x}{2y}$$

3 Rearrange $2x = \frac{y}{w}$ to make w the subject.

A9a/b Circle your answer.

[1 mark]

$$w = \frac{2y}{x}$$

$$w = \frac{2x}{y}$$

$$w = \frac{y}{2x}$$

$$w = \frac{x}{2y}$$

$$2x = \frac{y}{w}$$

$$2xw = y$$

$$w = \frac{y}{2x}$$

19 In a chess club, there are x boys and y girls.

19 (a) If 5 more boys and 8 more girls join, there would be half as many boys as girls.

A16 Show that $y = 2x + 2$

A9

[2 marks]

19

In a chess club, there are x boys and y girls.

19 (a)

If 5 more boys and 8 more girls join, there would be half as many boys as girls.

A16

Show that $y = 2x + 2$

A9

[2 marks]

$$\begin{array}{ccc} \text{Boys} & & \text{Girls} \\ 2(x+5) & = & y+8 \end{array}$$

$$2x+10 = \overset{\leftarrow}{y+8}$$

$$2x+10-8 = y$$

$$2x+2 = y \quad \dots \quad y = 2x+2 \checkmark$$

24 (a) $a + b = 0$

A9

Which of these is equal to b ?

Circle your answer.

[1 mark]

0

$\frac{1}{a}$

a

$-a$

24 (b) $c \times d = 1$

A9 Which of these is equal to d ?
Circle your answer.

[1 mark]

1

$\frac{1}{c}$

c

$-c$

24 (a) $a + b = 0$

A9

Which of these is equal to b ?

Circle your answer.

[1 mark]

0

$\frac{1}{a}$

a

$-a$

$a + b = 0$

$b = 0 - a$

$b = -a$

24 (b) $c \times d = 1$

A9 Which of these is equal to d ?
Circle your answer.

[1 mark]

1 $\frac{1}{c}$ c $-c$

$\div$

$c \times d = 1$

$d = \frac{1}{c}$

27 Rearrange $x = 2y - 6$ to make y the subject.

A9

[2 marks]

Answer _____

27

A9

Rearrange $x = 2y - 6$ to make y the subject.

[2 marks]

$$2y - 6 = x$$

$$2y = x + 6$$

$$y = \frac{x+6}{2}$$

$$y \rightarrow \textcircled{\times 2} \rightarrow \textcircled{-6} \rightarrow x$$

$$y \leftarrow \textcircled{\div 2} \leftarrow \textcircled{+6} \leftarrow x$$

$$\frac{x+6}{2}$$

Answer $y = \frac{x+6}{2}$

8

Rearrange $y = 3x - 2$ to make x the subject.

A9

Circle your answer.

[1 mark]

$$x = \frac{y}{3} - 2$$

$$x = \frac{y+2}{3}$$

$$x = \frac{y-2}{3}$$

$$x = \frac{y}{3} + 2$$

8

Rearrange $y = 3x - 2$ to make x the subject.

A9

Circle your answer.

[1 mark]

$$x = \frac{y}{3} - 2 \quad x = \frac{y+2}{3} \quad x = \frac{y-2}{3} \quad x = \frac{y}{3} + 2$$

$$x \rightarrow (\times 3) \rightarrow (-2) \rightarrow y$$

$$x \leftarrow (\div 3) \leftarrow (+2) \leftarrow y$$

$$x = \frac{y+2}{3}$$

18 (a) Write $x(3x - 9) = 4$ in the form $ax^2 + bx + c = 0$ where a , b and c are integers.

[1 mark]

A9

Answer _____

18 (b) Solve $x(3x - 9) = 4$

Give your answers to 2 decimal places.

A45

[2 marks]

Answer

18 (a) Write $x(3x - 9) = 4$ in the form $ax^2 + bx + c = 0$ where a , b and c are integers.

[1 mark]

A9

$$3x^2 - 9x = 4$$

$$3x^2 - 9x - 4 = 0$$



Answer _____

18 (b) Solve $x(3x - 9) = 4$

Give your answers to 2 decimal places.

A45

$$\begin{array}{l} 4ac \\ 4 \times 3 \times -4 \\ -48 \end{array}$$

[2 marks]

$$3x^2 - 9x - 4 = 0$$

$$a = 3$$

$$b = -9$$

$$c = -4$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{9 \pm \sqrt{81 - 48}}{6}$$

$$x = \frac{9 \pm \sqrt{129}}{6}$$



Answer

$$3.39$$

$$-0.39 \checkmark$$

26

Given that $a \times 60 = b$ work out the value of $\frac{4b}{a}$

A9

[2 marks]

Answer _____

26

A9

Given that $a \times 60 = b$ work out the value of $\frac{4b}{a}$

[2 marks]

$$60 = \frac{b}{a}$$

$$\frac{b}{a} = 60 \quad \xrightarrow{\times 4} \quad \frac{4b}{a} = 240$$

240

Answer

9 (a) Rearrange $m = p + 2$ to make p the subject.

[1 mark]

A9

Answer

9 (a) Rearrange $m = p + 2$ to make p the subject.

[1 mark]

A9

$$m = p + 2$$

Answer

$$m - 2 = p$$

or

$$p = m - 2$$

15

Rearrange $y = \sqrt{w^3}$ to make w the subject.

A9

Circle your answer.

[1 mark]

$$w = y^6$$

$$w = \sqrt[3]{y^2}$$

$$w = \sqrt{y^3}$$

$$w = y^5$$

15

Rearrange $y = \sqrt{w^3}$ to make w the subject.

A9

Circle your answer.

[1 mark]

$$w = y^6$$

$$w = \sqrt[3]{y^2}$$

$$w = \sqrt{y^3}$$

$$w = y^5$$

$$\begin{aligned} y &= \sqrt{w^3} \\ y^2 &= w^3 \\ \sqrt[3]{y^2} &= w \end{aligned}$$

28

A9

Rearrange $c = \frac{d+2}{3}$ to make d the subject.

[2 marks]

Answer _____

28

A9

Rearrange $c = \frac{d+2}{3}$ to make d the subject.

[2 marks]

$$\frac{d+2}{3} = c$$

$$d+2 = 3c$$

Answer $d = 3c - 2$

15

A9

Rearrange $a = \frac{b}{c} + 5$ to make c the subject.

[3 marks]

Answer _____

15
A9

Rearrange $a = \frac{b}{c} + 5$ to make c the subject.

[3 marks]

$$\frac{b}{c} + 5 = a$$

$$\frac{b}{c} = a - 5$$

$$b = c(a - 5)$$

$$\frac{b}{a - 5} = c$$

Answer _____

23

A9

Rearrange $y = \frac{1}{\sqrt{x+1}}$ to make x the subject.

[3 marks]

Answer _____

23

A9

Rearrange $y = \frac{1}{\sqrt{x+1}}$ to make x the subject.

[3 marks]

$$y(\sqrt{x+1}) = 1$$

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

$$x+1 = \frac{1}{y^2}$$

$$x = \frac{1}{y^2} - 1$$

Answer _____

25

A9

Rearrange $g = 3h - 1$ to make h the subject.

[2 marks]

Answer _____

25

A9

Rearrange $g = 3h - 1$ to make h the subject.

[2 marks]

$$3h - 1 = g$$

$$3h = g + 1$$

$$h = \frac{g+1}{3}$$

Answer