

GCSE AQA Math 8300

Notation Vocabulary & Manipulation

Mark Scheme

"We will help you to achieve A Star "



M1.(x - 3)(x + 3)

Substitutes any value for x into both expressions but not x = 0

$$(x - 3)(x + 5)$$

Sets up a correct equation in b

$$(b =) 2 \text{ or } x^2 + 2x - 15$$

M2.

(a)
$$(c+4)(c+1)$$
 or $3(c+1)$
Correct factorisation

$$\frac{(c+4)(c+1)}{3(c+1)} = \frac{c+4}{3}$$

c + 4

Must be a fraction and completed to 3

Correctly converts to a common denominator

e.g. 1
$$\frac{2(c+4)}{6} + \frac{3-2c}{6}$$

e.g. 2
$$\frac{6(c+4)}{18} + \frac{3(3-2c)}{18}$$
$$M2 \quad \frac{2c}{6} + \frac{8}{6} + \frac{3}{6} + \frac{2c}{6}$$

(b) Correctly expands their brackets (must have common denominator)

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$$\frac{2c+8+3-2c}{6} \text{ or }$$

$$\frac{2c+8}{6} + \frac{3-2c}{6}$$
Allow M1 if their first line of working is
$$\frac{2c+4+3-2c}{6} \text{ or } \frac{2c+4}{6} + \frac{3-2c}{6}$$

$$\frac{11}{6}$$
 or $1\frac{5}{6}$ or 1.833(....).

$$\frac{33}{18}A0 \quad \frac{5.5}{3}A0 \quad \frac{8+3}{6}A0$$

Alternative method

Correctly converts to a common denominator

e.g.
$$\frac{6(c^2+5c+4)}{6(3c+3)} + \frac{(3-2c)(3c+3)}{6(3c+3)}$$

oe

May also expand the denominator

Correctly expands their brackets (must have common denominator)

$$\frac{6c^{2} + 30c + 24 + 9c + 9 - 6c^{2} - 6c}{6(3c + 3)} \text{ or }$$

$$\frac{6c^{2} + 30c + 24}{6(3c + 3)} + \frac{9c + 9 - 6c^{2} - 6c}{6(3c + 3)}$$
oe
May also expand the denominator

$$\frac{11}{6} \text{ or } 1\frac{5}{6} \text{ or } 1.833(....).$$
$$\frac{33}{18} \text{A0} \quad \frac{5.5}{3} \text{A0} \quad \frac{8+3}{6} \text{A0}$$

M3. $C^2 = 16 \text{ or } c = 4 \text{ or } c = -4$

$$3x^2 + 3cx + cx + c^2 (= 3x^2 - dx + 16)$$

 $3x^2 + 12x + 4x + 16 \text{ or } 3x^2 - 12x - 4x + 16 \text{ oe}$



c = 4 and c = -4 or 4c = -d or 16 = -d or -16 = -doe

c = 4 and d = -16 or c = -4 and d = 16One pair of answers orall four answers seen but not paired

c = 4 and d = -16 and c = -4 and d = 16Both pairs of answers must be correctly paired SC3 for one correct pair or both correct pairs or all four answers seen but not paired from **no** working

M4.

Alternative method 1

 $\begin{array}{l} x-5 \text{ or } x-7 & \text{ or } \\ x+5 \text{ or } x+7 & \\ & \\ Any \ letter \end{array}$

x + x - 5 + x - 7 or 3x - 12

3x - 12 = 3(x - 4) or 3x + 12 = 3(x + 4)Strand (ii) Correct algebra throughout and showing that their total is a multiple of 3

Alternative method 2 x + 5 or x - 2 or x - 5 or x + 2Any letter

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x + x + 5 + x - 2 or 3x + 3

3x + 3 = 3(x + 1) or 3x - 3 = 3(x - 1)

> Strand (ii) Correct algebra throughout and showing that their total is a multiple of 3

Alternative method 3

x - 7 or $x - 2$	
<i>x</i> + 7 or <i>x</i> + 2	or

x + x + 7 + x + 2

3x + 9 = 3(x + 3) or 3x + 93x - 9 = 3(x - 3)

> Strand (ii) Correct algebra throughout and showing that their total is a multiple of 3

M5.(a) (C =) 15x + 20yor (C =) 5(3x + 4y)Accept 0.15x + 0.2yB1 for one correct term Do not ignore further work Do not accept x15 + y20

> (b) 150 × 15 or 90 × 20 150 ÷ 5 and 90 ÷ 5
> or 150 × 0.15 or 90 × 0.20 150 ÷ 5 or 90 ÷ 5 or 15 ÷ 5 or 20 ÷ 5

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150 x 15 and 90 x 20 or 150 x 0.15 and 90 x 0.20 or 15 ÷ 5 and 20 ÷ 5 or 2250 and 1800 or 4050 or 30 and 18 or 22.5 and 18 or 40.5 or 3 and 4 4050 ÷ 5 or 810 30 × 15 and 18 × 20 or 450 and 360 or 810 or 40.50 ÷ 5 or 8.10 or 120 and 72 150 × 3 and 90 × 4 or 450 and 360 or 810 or 12 and 16 4050 - 810 or 40.50 - 8.10 or 4050 ÷ 5 × 4 or $40.50 \div 5 \times 4$ 150 × 12 + 90 × 16 or 1800 + 1440 or 3240

32.40

M6.(a) 2*a* + 6 + 5*a* - 5

or 7a + c or na + 1

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Allow one error

7*a* + 1 Do not accept further work

(b) $5c^{6}d^{5}$

B1 for two correct terms

(c)
$$\frac{2(x-3)}{x+3}$$
 or $\frac{2x-6}{x+3}$
B1 for $\frac{2(x-3)^2}{(x-3)(x+3)}$ or $\frac{8(x-3)}{4(x+3)}$ or $\frac{2(x-3)}{1(x+3)}$

Do not accept further work

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M7.Sight of correct common denominator

oe eg $2x^2$

eg 2*x*

any common multiple of 2 and x

 $\frac{11}{2x} - \frac{6}{2x}$

$$\begin{array}{c} \frac{11x}{2x^2} - \frac{6x}{2x^2} \end{array}$$

 $\frac{5}{2x}$



M8.(a) 9*x* + 6*y*

B1 for each term Do not ignore fw

(b) 4*x* + 12

Do not ignore fw

(c) x(x-5)Do not ignore fw

M9.*n* + 18

or 18 ÷ 2 or 9

or 45 × 2

Tries two numbers with a difference of 18 or tries two numbers with a sum of 90

n + n + 18 or n + 9or 45 - 9 or 45 + 9or their 90 - 18 (= 72)or their 90 + 18 (= 108)oe Different trial

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n + n + 18 = 90 or n + 9 = 45or 45 - 9 and 45 + 9or their $72 \div 2$

.

or their 108 ÷ 2

oe 3rd trial

Amy 36

36 and 54 in any order

Chris 54

M10

- (a) $216 \div 4 = 54 \text{ or } 4 \times 54 = 216$ or $216 \div 54 = 4$
- (b) x 5 or x + 8

x + x - 5 + x + 8 = 54oe eg all multiplied by 4 condone one error or omission.

3x = 51 or x + 1 = 18Simplifying their linear equation

x = 17

£68



ft their 17 × 4 where their 17 is a number of hours.

Alternative 1 (hours) Two numbers (hours) with a difference of 5 or 8 seen

A set of 3 numbers fitting x, x - 5 and x + 8 $x \neq 54$

Their 3 numbers tested against 54 Dep on previous M1 Total must be seen

17

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ft their 17 × 4 where their 17 is a number of hours.

Alternative 2 (money)

Two amounts with a difference of 20 or 32 seen

A set of 3 amounts fitting x, x - 20 and x + 32

Their 3 amounts tested against 216 Dep on previous M1 Totals must be seen

An improved set of three numbers (closer to total of 216) Totals must be seen

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Alternative 3 (combined hours and money) Two numbers (hours) with a difference of 5 or 8 seen



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$x \neq 54$

Their hours each multiplied by 4 and total tested against 216 Dep on previous M1 Totals must be seen

An improved set of three numbers (closer to total of 216) Totals must be seen

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M11(a) 4*x*

(b) y^{3}

(c) *b* + *a*

M12.(Bag B =) 3*n* oe

Accept other letter used

(Bag C =) n + 14 oe

Accept other letter used

their 3n = their n + 14

Consistent use of letter on both sides



With B2 awarded SC1 correct answer without B2 awarded

M13.

7

 $6C(C^2 + 5)$ or $3(C^2 + 5)$

$$\frac{6c\left(c^2+5\right)}{3\left(c^2+5\right)}$$

This mark implies first M1

2c and multiple of 2 so even

oe statement Must see method

M14.

(a) $(n-6)^2$ could be zero (so she is wrong) or The sixth term is 1 oe

(b) 1

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[3]

[4]

M15.

Alternative method 1 $4x^2 + 6xy + 6xy + 9y^2$ For more information please visit https://www.exampaperspractice.co.uk



or
$$4x^2 - 6xy - 6xy + 9y^2$$

Four terms, three correct with a term in x^2 and a term in y^2
or $4x^2 \pm 12xy + ay^2$ with $a \neq 0$
or $bx^2 \pm 12xy + 9y^2$ with $b \neq 0$

$$4x^2 + 12xy + 9y^2 - (4x^2 - 12xy + 9y^2)$$

or $4x^2 + 12xy + 9y^2 - 4x^2 + 12xy - 9y^2$ oe allow one error, which may be missing brackets

24xy = 360

oe

xy = 15 (and 15 is a multiple of 5)

Alternative method 2

(2x + 3y + 2x - 3y)(2x + 3y - (2x - 3y))

or

(2x + 3y + 2x - 3y)(2x + 3y - 2x + 3y)allow one error, which may be missing brackets

their $4x \times \text{their } 6y$

Correct simplification of both of their brackets and intention to multiply

24xy = 360

oe

xy = 15 (and 15 is a multiple of 5)

Additional Guidance

Missing brackets in Alt 1 for second method mark may be recovered for M3 or M3A1