AQA GCSE Maths - Sequences (F)

Mark schemes

Q1.

    (a)   3 or 35 or 291 seen

              or 8 × their 3 + 11

M1

              35 chosen

A1

    (b)   Subtract 11 and divide by 8

                      accept – or ÷ for words subtract and divide but not / for divide

B1

        Additional Guidance

        Do not accept use of algebra e.g. $(x - 11)/8$

B0

[3]

Q2.

    (a) $2n + 2$

B1

    (b)   Yes and valid reason

                  eg 2(n + 1)

                  2n + 2 is a multiple of 2

                  2n + 2 is divisible by 2

                  It is the 2 times table

                  It is a multiple of 2

                  It starts even and then add 2 each time

B1

        Additional Guidance

        Even + even = even

B1

        Even + 2 = even

B1

        Because you add 2 all the time

B0

[2]

Q3.

    $(b =) 2a - 4$

              oe

M1

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(c =) $2b - 4$ or $2(2a - 4) - 4$

                 oe

                                                   M1

(c =) $4a - 8 - 4$
or
(c =) $2a - 4 + 2a - 4 - 4$

                 SC1 for substitution of value for a and checked in c

                 eg $a = 10,$ $b = 16,$ $c = 28$ and $4 × 7 = 28$

                                                   A1

Clear and logical algebraic solution

                 Strand (ii)

                 Must have both M marks

                 Do not award for a numerical verification

                                                   Q1

                                                       [4]

Q4.

(a) $8 × 5 - 2 × 4^2$ (=) 8

                 B1 $8 × 5 - 2 × 4^2$ or 8

                                                   B2

(b)   19

                                                   B1

(c) $2n^2 + 2n - 2n^2$ or $2n(n + 1 - n)$

                                                   B1

                                                       [4]

Q5.

30

                                                   B1

37

                 ft   their 30 + 7

                                               B1 ft

                                                       [2]

Q6.

(a)   17 and 21

                                                   B1

(b) $4n + 1$

                 oe

                 B1 $4n$ (± k)

                                                   B2

Additional Guidance

$4 × n + 1$ is B2

$4 × n$ (+ k)   is B1

(c) $4n + 1 = 53$ or $4n = 52$

M1

13

A1

Alternative method 1

$(53 − 1) ÷ 4$

oe
eg 1+ 4 + 4 + 4 + 4 + 4 + 4 + 4
+ 4 + 4 + 4 + 4 + 4 + 4 (= 53)

M1

13

A1

Alternative method 2

Counts up in 4s to within 4 of 53

oe
allow one error or omission

M1

13

A1

Additional Guidance

5, 9, 13, 17, 21, 25, 29, 33, 37, 41, 45, 49

Answer 12   is M1A0

5, 9, 13, 17, 25, 29, 33, 37, 41, 45, 49

Answer 12   is M1A0

5, 9, 13, 17, 21, 24, 28, 32, 36, 40, 44, 48

Answer 12   is M1A0

[5]

Q7.

$52 – 6n$ or $– 6n + 52$

B1 $– 6n + k$ where k is any value, including zero (ie no
constant), other than 52
Do not accept $–n6$ but $– n6 + 52$ is B1

B2

Additional Guidance

If $52 – 6n$ seen in script and 16 (next term) given on answer line allow B2

Allow any letter used, eg $52 – 6x$

Accept equivalent expressions such as $46 - 6(n - 1)$

Allow × signs, eg $-6 × n + 52$, $n × -6 + 52$

$46 - n - 5(n + 1)$

B1

$52 - 6n = 0$

B1

[2]

Q8.

(a) **Alternative method 1**

$43 - 28$ or 15 seen

M1

$15 - 13 (= 2)$
or 2, 13 and 15

A1

Alternative method 2

$x + 2y = 28$ and $2x + 3y = 43$
oe equations

M1

Solves equations correctly obtaining $x = 2$

A1

Additional Guidance

If setting up two equations, they must be correct

(b) $b - a$
Second term

M1

$2b - a$

oe
Fourth term

M1dep

$3b - a$

A1

[5]

Q9.

Lists at least three terms from first sequence between 20 and 40
eg 21, 23, 25, ...

M1

Lists at least three terms from second sequence between 20 and 40
eg 20, 23, 26,...

23   29   35

SC2 for any two correct with at most one incorrect
SC1 for any one correct with at most two incorrect

A1

[3]

Q10.

(third term =) $4a$
or (fourth term =) $8a$
or $7a$ (= 63)
or $15a$

M1

a = 63 ÷ 7 or a = 9
or 8 × 9
or 15 × 9

seen or implied

M1

135

M1

Additional Guidance

a = 9 is implied by second term 18 or third term 36 or fourth term 72, not from an incorrect sequence

[3]

Q11.

(a) $8n - 3$

B1

(b)   **Alternative method 1**

$x + 6$

oe

B1

$4x + 9$

oe

B1

their $(x + 6) + 2x + 7$ + their $(4x + 9) = 57$
or $7x + 22 = 57$

oe

M1

5

SC2 11, 17, 29

A1

Alternative method 2

$x + 6$

    oe

B1

$4x + 9$

    oe

B1

their $(x + 6) = 11$
or $2x + 7 = 17$
or their $(4x + 9) = 29$

    oe

M1

5

    SC2 11, 17, 29

A1

Additional Guidance

$(2x + 7 + 5) ÷ 2$ or $(2x + 12) ÷ 2$ are oe for $x + 6$

B1

$2(2x + 7) – 5$ or $4x + 14 – 5$ are oe for $4x + 9$

B1

[5]

Q12.

2, 6, 18, 54, 162

B1

[1]

Q13.

$8n − 3$

B1

[1]

Q14.

(a)   51

B1

(b) $123 − 2$ or 121

or 11^2 seen

M1

11

A1

Additional Guidance
$11 × 11 + 2 (= 123)$ or $11^2 + 2 (= 123)$ embedded answer with or without an incorrect answer

$\sqrt{123} = 11.09, 11$ or $\sqrt{123} = 11$

M0A0

T & I follow scheme

[3]

Q15.

   (a)   6, 9, 12, 15
          or difference of 3
          or $3n$ or $2n$ seen

          M1

          $(n +) 2n + 3$
          or $3n + 3$ or $3(n + 1)$
          or $3 \times 100 + 3$
                oe

          M1dep

          303

          A1

   (b)   × 2   + 3

          B1

[4]

Q16.

   + 8, + 12, + 16 seen or implied
   or 40 + 20

          M1

   60

          A1

[2]

Q17.

   $4n - 1$

          B1

[1]

Q18.

   $2n - 12$

          B1

[1]

Q19.

   (a)   21

          B1

   (b)   8

          B1

(c)   34 × 2

            Correct scaling

or 14 × 5

or 42 × 8 ÷ 5

or 42 × 1.6

M1

[67, 70]

A1

(d)   8 + 21

            Correct scaling

or 8 + 8 + 13

or 8 + 8 + 8 + 5

or 18 × 8 ÷ 5

or 18 × 1.6

or 18 ÷ 3 × 5

or 34 − 5

M1

[28, 30]

A1

[6]

Q20.

(a)   −5 and 4

B1

(b)   3

            ft provided at least one negative answer
            in (a)

B1ft

−1 next then all positive
            oe
            ft provided at least one negative answer
            in (a)

B1ft

Additional Guidance

If both terms are negative in (a) then must circle 'more than 4' in (b)
3 must follow −5 and 4 or be correct for their answers in (a)

[3]

Q21.

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3 6 9 …
or 23 + 12
or $1.5n^2$…

M1

35

A1

Additional Guidance

Answer line blank with 35 as next term in sequence

M1A1

Answer line has attempt at term to term rule or nth term but 35 seen

M1A0

35 seen on dotted line in sequence but a different answer given e.g. 50

M1A0

[2]