AQA GCSE Maths - Numerical Methods (H)

Mark schemes

Q1.

$x_2 = 2$ and $x_3 = 3.5$

M1

$x_4 = 3.83(6...)$ and $x_5 = 3.86(4...)$

M1

3.87

A1

[3]

Q2.

Correctly evaluated trial

such that root < trial ≤ 6

> *e.g. 6^3 – 20 × 6 = 96 Too big*
>
> *Obtains 5 < x < 6 or better (need not be stated)*

M1

Improved trial

> *5 < Trial < 1st trial e.g. 5.5^3 – 3 × 5.5 = 56.(375) or 56.4 Too small 5.1 → 30.(6...) or 30.7 5.2 → 36.(6...)*
> *5.3 → 42.(8...) or 42.9*
> *5.4 → 49.(4...) or 46.5*
> *5.5 → 56.(3...) or 56.4*

M1

Obtains 5.5 ≤ x ≤ 5.6
or better

or Two correct trials [5.55, 5.65] which
bracket 60

> *5.6 → 63.(6...)*
> *5.7 → 71.(1...) or 71.2*
> *5.8 → 79.(1...)*
> *5.9 → 87.(3...) or 87.4*
> *5.55 → 59.(95)*
> *5.56 → 60.(6...) or 60.7*

A1

Tests 5.55 and concludes 5.6

> *Using 2 dp to ensure 1 dp*
> *Strand (ii)*

or Two correct trials [5.55, 5.65] which
bracket 60 and 5.6 for final answer

A1

[4]

(b)   –0.381966

$$\text{ft their } -\frac{25}{64}$$

                                                                                        B1ft

                                                                                          [3]

Q6.
(a)   Valid explanation
e.g.1 3 or 3.4 labelled in correct place on the *x*-axis and marking on graph corresponding to *V* = 50

e.g. 2 3 labelled in correct place on the *x*-axis and markings on graph

corresponding to *x* = 3 and *x* = 4

oe
B1 Partial explanation

e.g.1 Marking on graph corresponding to V = 50

e.g.2 Markings on graph corresponding to x = 3 and x = 4

SC1 Marking on graph corresponding to 40 < V < 80 (not 50)
with 3 or value between 3 and 4 labelled in correct place on
the x-axis

                                                                                          B2

(b)   Two correct trials [3.25, 3.35] which bracket 50 and 3.3 as the answer
B2 Two correct trials [3.25, 3.35] which bracket 50 and 3.3
not the answer
or
Two correct trials [3.3, 3.4] which bracket 50 and 3.3 as the
answer
B1 One correct trial 3 < x < 4

                                                                                          B3

                                                                                          [5]

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Q3.

$x^2 = 0.25$

oe

M1

0.3218... or 0.3222...

oe

A1

0.32

ft their 3 dp value or better

B1ft

[3]

Q4.

2.2 ➔ 28(.248) (and too small)

or Trial evaluated correctly for

If equation has been rearranged to equal 0

2.2➔ –(1.752)

2.2 < trial < root

If equation has been rearranged to 0 =

2.2➔ +(1.752)

B1

2.3 ➔ 30.5(67) (and too big)

or Trial evaluated correctly for

If equation has been rearranged to equal 0

2.3➔ +(0.567)

root < trial < 2.3

If equation has been rearranged to 0 =

2.3➔ –(0.567)

Note: Root is x = 2.276...

B1

[2]

Q5.

(a) $-\dfrac{1}{2}$ or –0.5

B1

$-\dfrac{25}{64}$ or –0.390625

ft their $-\dfrac{1}{2}$

B1ft