



ACHIEVE ACADEMY

GCSE Maths — Higher Tier

Iteration · Practice Booklet

NAME: _____

CLASS: _____

DATE: _____

☐ Developing

☒ Secure

☐ Greater Depth

Answer every question in the working space provided. Method marks are available for correct working even if the final answer is wrong. Check the time allowed with your tutor before you start.

Iteration

Total marks available: 106

● Iteration

Q1

[3 marks]

Show that the equation $4x^3 - 6x - 11 = 0$ has a root between $x = 1$ and $x = 2$.

Q2

[3 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{6x_n + 9}$, with $x_1 = 3.8$. Find the values of x_2 and x_3 , giving your answers to 3 decimal places.

Q3

[3 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{(5x_n + 5)}$, with $x_1 = 3.8$. Find the values of x_2 and x_3 , giving your answers to 3 decimal places.

Q4

[3 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{(7x_n)}$, with $x_1 = 3.2$. Find the values of x_2 and x_3 , giving your answers to 3 decimal places.

Q5

[3 marks]

Show that the equation $2x^3 - 5x - 4 = 0$ has a root between $x = 1$ and $x = 2$.

Q6

[3 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{(x_n + 8)}$, with $x_1 = 2.0$. Find the values of x_2 and x_3 , giving your answers to 3 decimal places.

Q7

[3 marks]

Show that the equation $5x^3 - 9x - 9 = 0$ has a root between $x = 1$ and $x = 2$.

Q8

[3 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{(5x_n - 5)}$, with $x_1 = 2.3$. Find the values of x_2 and x_3 , giving your answers to 3 decimal places.

Q9

[3 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{(3x_n + 15)}$, with $x_1 = 3.3$. Find the values of x_2 and x_3 , giving your answers to 3 decimal places.

Q10

[3 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{(2x_n - 8)}$, with $x_1 = 2.1$. Find the values of x_2 and x_3 , giving your answers to 3 decimal places.

Q11

[4 marks]

A sequence is defined by the iteration formula $x_{n+1} = 16 \div (x_n + 7)$, with $x_1 = 1$. Find the values of x_2 , x_3 and x_4 , giving your answers to 3 decimal places.

Q12

[3 marks]

The equation $4x^3 - 2x - 2 = 0$ can be rearranged into the form $x = \sqrt[3]{(px + q)}$ for constants p and q . Find the values of p and q .

Q13

[4 marks]

A sequence is defined by the iteration formula $x_{n+1} = 9 \div (x_n + 1)$, with $x_1 = 1$. Find the values of x_2 , x_3 and x_4 , giving your answers to 3 decimal places.

Q14

[4 marks]

A sequence is defined by the iteration formula $x_{n+1} = 6 \div (x_n + 3)$, with $x_1 = 3$. Find the values of x_2 , x_3 and x_4 , giving your answers to 3 decimal places.

Q15

[3 marks]

The equation $3x^3 - 2x - 14 = 0$ can be rearranged into the form $x = \sqrt[3]{(px + q)}$ for constants p and q . Find the values of p and q .

Q16

[3 marks]

The equation $2x^3 - 6x - 2 = 0$ can be rearranged into the form $x = \sqrt[3]{(px + q)}$ for constants p and q . Find the values of p and q .

Q17

[4 marks]

A sequence is defined by the iteration formula $x_{n+1} = 5 \div (x_n + 1)$, with $x_1 = 2$. Find the values of x_2 , x_3 and x_4 , giving your answers to 3 decimal places.

Q18

[4 marks]

A sequence is defined by the iteration formula $x_{n+1} = 15 \div (x_n + 5)$, with $x_1 = 3$. Find the values of x_2 , x_3 and x_4 , giving your answers to 3 decimal places.

Q19

[4 marks]

A sequence is defined by the iteration formula $x_{n+1} = 7 \div (x_n + 3)$, with $x_1 = 5$. Find the values of x_2 , x_3 and x_4 , giving your answers to 3 decimal places.

Q20

[3 marks]

The equation $3x^3 - 11x - 8 = 0$ can be rearranged into the form $x = \sqrt[3]{(px + q)}$ for constants p and q . Find the values of p and q .

Q21

[4 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{(5x_n + 1)}$, with $x_1 = 2.3$. Find the values of x_2 , x_3 and x_4 , giving your answers to 3 decimal places.

Q22

[4 marks]

The equation $x^3 - 2x = 0$ has a root that can be found using the iteration formula $x_{n+1} = \sqrt[3]{2x_n}$, with $x_1 = 2$. Use this iteration formula to find the root correct to 2 decimal places.

Q23

[4 marks]

The equation $x^3 - x + 1 = 0$ has a root that can be found using the iteration formula $x_{n+1} = \sqrt[3]{x_n - 1}$, with $x_1 = 1$. Use this iteration formula to find the root correct to 2 decimal places.

Q24

[4 marks]

The equation $x^3 - x - 8 = 0$ has a root that can be found using the iteration formula $x_{n+1} = \sqrt[3]{(x_n + 8)}$, with $x_1 = 1$. Use this iteration formula to find the root correct to 2 decimal places.

Q25

[4 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{x_n + 1}$, with $x_1 = 1.05$. Find the values of x_2 , x_3 and x_4 , giving your answers to 3 decimal places.

Q26

[4 marks]

The equation $x^3 - x - 5 = 0$ has a root that can be found using the iteration formula $x_{n+1} = \sqrt[3]{(x_n + 5)}$, with $x_1 = 1$. Use this iteration formula to find the root correct to 2 decimal places.

Q27

[4 marks]

The equation $x^3 - 5x - 9 = 0$ has a root that can be found using the iteration formula $x_{n+1} = \sqrt[3]{5x_n + 9}$, with $x_1 = 1$. Use this iteration formula to find the root correct to 2 decimal places.

Q28

[4 marks]

The equation $x^3 - 5x - 7 = 0$ has a root that can be found using the iteration formula $x_{n+1} = \sqrt[3]{5x_n + 7}$, with $x_1 = 3$. Use this iteration formula to find the root correct to 2 decimal places.

Q29

[4 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{6x_n - 9}$, with $x_1 = 1.23$. Find the values of x_2 , x_3 and x_4 , giving your answers to 3 decimal places.

Q30

[4 marks]

A sequence is defined by the iteration formula $x_{n+1} = \sqrt[3]{(x_n - 9)}$, with $x_1 = 1.95$. Find the values of x_2 , x_3 and x_4 , giving your answers to 3 decimal places.