

Solving Equations using Iteration

Question Paper

Level	GCSE
Subject	Maths
Exam Board	Edexcel GCSE
Topic	Solving Equations using Iteration
Grade Level	Grade 7
Booklet	Question Paper

Time Allowed: 35 minutes

Score: /29

Percentage: /100

Grade Boundaries:

1. The equation $x^3 + 7x - 2 = 55$ has a solution between 3 and 4.

Use trial and improvement to find this solution.
Give your answer to 1 decimal place.

2. Use trial and improvement to solve $x^3 - x^2 = 85$

Give your answer to 1 decimal place.

3. Use trial and improvement to solve $x^3 + 5x = 70$

Give your answer to 1 decimal place.

4. An approximate solution to an equation is found using this iterative process:

$$x_{n+1} = \sqrt{(x_n) + 10} \quad \text{and} \quad x_1 = 3$$

a) Work out the values of x_2 and x_3

..... (2)

b) Work out the solution to 3 decimal places

..... (1)

5. An approximate solution to an equation is found using this iterative process:

$$x_{n+1} = \frac{(x_n)^3 - 3}{8} \quad \text{and} \quad x_1 = -1$$

a) Work out the values of x_2 and x_3

..... (2)

b) Work out the solution to 6 decimal places

..... (1)

6. A sequence is defined by the term-to-term rule:

$$U_{n+1} = U_n^2 - 8U_n + 17$$

a) Given that $U_1 = 4$, find U_2 and U_3

..... (2)

b) Given instead that $U_1 = 2$, find U_2 , U_3 and U_{100}

..... (3)

7.(a) Show that the equation $x^3 + 4x = 1$ has a solution between $x=0$ and $x=1$

..... (2)

(b) Show that the equation $x^3 + 4x = 1$ can be rearranged to give $x = \frac{1}{4} - \frac{x^3}{4}$

..... (1)

(c) Starting with $x_0 = 0$, use the iteration formula $x_{n+1} = \frac{1}{4} - \frac{x_n^3}{4}$ twice, to find an estimate to the solution of $x^3 + 4x = 1$

..... (3)