GCSE Exam Questions

Iteration | Algebra

GCSE Exam Questions: Iteration

1)   An approximate solution to an equation is found using this iterative process:

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

Work out the values of x_2 and x_3

(3 marks)

2)   Using $x_{n+1} = 9 - \dfrac{5}{x_n^2}$ with $x_0 = 1$ find the values of:

(a) x_1

(1)

(b) x_2

(1)

(c) x_3

(1)

(3 marks)

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1

GCSE Exam Questions: Iteration

3) **(a)** Show that the equation $x^3 + 5x = 2$ can be rearranged to give

$$x = \frac{2}{5} - \frac{x^3}{5}$$

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(2)

(b) Starting with $x_0 = 0$, use the iteration formula $x_{n+1} = \frac{2}{5} - \frac{x_n^{\,3}}{5}$
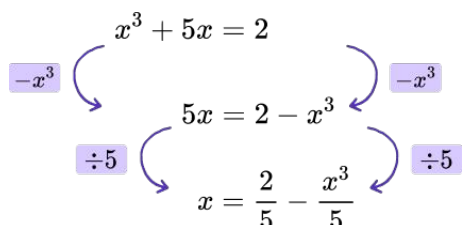
twice, to find an estimate to the solution of $x^3 + 5x = 2$

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(2)
(4 marks)

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(1)

(Total number of marks)

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GCSE Exam Questions: Iteration Answers

|	Question	Answer	Marks
1)	An approximate solution to an equation is found using this iterative process $x_{n+1} = \sqrt{x_n + 10}$ and $x_1 = 3$ Work out the values of x_2 and x_3	$x_2 = \sqrt{3 + 10}$ $x_2 = \sqrt{13} = 3.605551\ldots$ $x_3 = 3.68857\ldots$	**(1)** **(1)** **(1)**
2)	Using $x_{n+1} = 9 - \dfrac{5}{x_n^2}$ with $x_0 = 1$ find the values of		
(a)	x_1	**(a)** $x_1 = 4$	**(1)**
(b)	x_2	**(b)** $x_2 = \dfrac{139}{16} = 8.6875$	**(1)**
(c)	x_3	**(c)** $x_3 = 8.93375\ldots$	**(1)**
3) (a)	Show that the equation $x^3 + 5x = 2$ can be rearranged to give $x = \dfrac{2}{5} - \dfrac{x^3}{5}$	**(a)** For correct first step For correct second step	**(1)** **(1)**
(b)	Starting with $x_0 = 0$, use the iteration formula $x_{n+1} = \dfrac{2}{5} - \dfrac{x_n^3}{5}$ twice, to find an estimate to the solution of $x^3 + 5x = 2$	**(b)** $x_1 = \dfrac{2}{5}$ $x_2 = 0.3872$	**(1)** **(1)**

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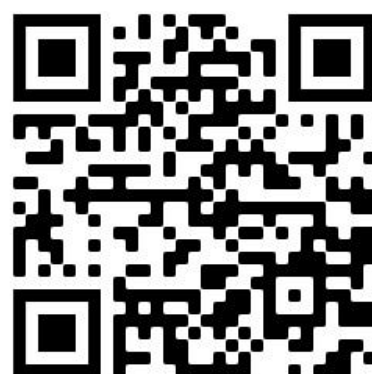
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