HIGHER

7.10 Iteration: 30-minute Pack

EDEXCEL 1MA1 · Calculator allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 $f(x) = x^3 - 3x - 17$. The equation $f(x) = 0$ has a root between $x = 2$ and $x = 3$. By evaluating $f(2.5)$, decide whether the root is between 2 and 2.5 or between 2.5 and 3.

(Total for Question 1 is 3 marks)

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2 $x_0 = 2$ and $x_{n+1} = 2 + 6/x_n$. Work out the value of x_3. Give your answer correct to 3 decimal places.

(Total for Question 2 is 3 marks)

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3 $f(x) = x^3 + 3x - 1$. Show that the equation $f(x) = 0$ has a root between $x = 0$ and $x = 1$.

(Total for Question 3 is 3 marks)

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4 $f(x) = x^3 + 7x - 39$. The equation $f(x) = 0$ has a root between $x = 2$ and $x = 3$. By evaluating $f(2.5)$, decide whether the root is between 2 and 2.5 or between 2.5 and 3.

(Total for Question 4 is 3 marks)

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5 A sequence is defined by $x_0 = 3$ and $x_{n+1} = \sqrt{3x_n + 2}$. Work out x_1 and x_2. Give your answers correct to 3 decimal places.

(Total for Question 5 is 3 marks)

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6 $f(x) = x^3 - 2x - 18$. Show that the equation $f(x) = 0$ has a root between $x = 2$ and $x = 3$.

(Total for Question 6 is 3 marks)

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7 $x_0 = 3$ and $x_{n+1} = \sqrt{x_n + 8}$. Work out the value of x_3. Give your answer correct to 3 decimal places.

(Total for Question 7 is 3 marks)

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8 $f(x) = x^3 - 3x - 23$. Show that the equation $f(x) = 0$ has a root between $x = 3$ and $x = 4$.

(Total for Question 8 is 3 marks)

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Mark scheme · 7.10 Iteration: 30-minute Pack

Question 1

substitutes x = 2.5	**M1**
f(2.5) = -8.875	**A1**
correct interval 2.5 to 3 with a reason	**B1**

Answer: f(2.5) = -8.875, root between 2.5 and 3

Question 2

x_1 found correctly	**M1**
x_2 found correctly using x_1	**M1**
x_3 = 3.875	**A1**

Answer: x_3 = 3.875

Question 3

f(0) evaluated	**M1**
f(1) evaluated	**M1**
values with a correct reason (change of sign) and conclusion	**A1**

Answer: f(0) = -1, f(1) = 3, a change of sign

Question 4

substitutes x = 2.5	**M1**
f(2.5) = -5.875	**A1**
correct interval 2.5 to 3 with a reason	**B1**

Answer: f(2.5) = -5.875, root between 2.5 and 3

Question 5

substitutes x_0 = 3	**M1**
x_1 = 3.317	**A1**
x_2 = 3.457	**A1**

Answer: x_1 = 3.317, x_2 = 3.457

Question 6

f(2) evaluated	**M1**
f(3) evaluated	**M1**
values with a correct reason (change of sign) and conclusion	**A1**

Answer: f(2) = -14, f(3) = 3, a change of sign

Question 7

x_1 found correctly	**M1**
x_2 found correctly using x_1	**M1**
x_3 = 3.371	**A1**

Answer: x_3 = 3.371

Question 8

f(3) evaluated	**M1**
f(4) evaluated	**M1**
values with a correct reason (change of sign) and conclusion	**A1**

Answer: f(3) = -5, f(4) = 29, a change of sign

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