EXAM PAPERS PRACTICE

GCSE OCR Math J560

Iteration

Question Paper

"We will help you to achieve A Star "

Question 1

Explain the relationship between the values of x_1, x_2 and x_3 and the equation $x^3 + 2x^2 + 4 = 0$

[2 marks]

Question 2

(b) Show that the equation $x^3 + x = 7$ can be rearranged to give $x = \sqrt[3]{7 - x}$

[1 mark]

Question 3

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

[2 marks]

Question 4

(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 for the solution of $x^3 + 4x = 1$

[3 marks]

Question 5

The number of slugs in a garden t days from now is p_t where

$p_0 = 100$

$p_{t+1} = 1.06p_t$

Work out the number of slugs in the garden 3 days from now.

[3 marks]

Question 6

Using $x_{n+1} = -2 - \frac{4}{x_n^2}$

with $x_0 = -2.5$

(a) find the values of x_1, x_2 and x_3

[3 marks]

Question 7

(a) Show that the equation $x^3 + x = 7$ has a solution between 1 and 2

[2 marks]

Question 8

(c) Starting with $x_0 = 2$,
use the iteration formula $x_{n+1} = \sqrt[3]{7 - x_n}$ three times to find an estimate for a solution of $x^3 + x = 7$

[3 marks]

Question 9

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

[1 mark]

Question 10

The number of bees in a beehive at the start of year n is P_n.
The number of bees in the beehive at the start of the following year is given by

$$P_{n+1} = 1.05(P_n - 250)$$

At the start of 2015 there were 9500 bees in the beehive.

How many bees will there be in the beehive at the start of 2018?

[3 marks]

Question 11

(b) Show that the equation $x^3 + 7x - 5 = 0$ can be arranged to give $x = \dfrac{5}{x^2 + 7}$

[2 marks]

Question 12

(d) By substituting your answer to part (c) into $x^3 + 7x - 5$,
comment on the accuracy of your estimate for the solution to $x^3 + 7x - 5 = 0$

[2 marks]

Question 13

(b) Using

$$x_{n+1} = 3 + \frac{3}{x_n^2} \quad \text{with } x_0 = 3.2,$$

find the values of x_1, x_2 and x_3

[3 marks]

Question 14

$$f(x) = x^4 - 8x^2 + 2$$

(a) Show that the equation $f(x) = 0$ can be written as $x = \sqrt{ax^4 + b}, x > 0$, where a and b are constants to be found.

Let $x_0 = 1.5$.

[2 marks]

Question 15

$$f(x) = x^3 - 2x - 5.$$

(a) Show that there is a root a of $f(x) = 0$ for x in the interval $[2,3]$.

[2 marks]