

(b) Show that $q = \sqrt[3]{2 + 18 \ln 3 - q}$.

[2]

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(c) Show by calculation that the value of q lies between 2.5 and 3.0.

[2]

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(d) Use an iterative formula, based on the equation in (b), to find the value of q correct to 4 significant figures. Give the result of each iteration to 6 significant figures. [3]

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(a) By sketching a suitable pair of graphs, show that the equation

$$\sqrt{x} = e^x - 3$$

has only one root.

[2]

(b) Show by calculation that this root lies between 1 and 2.

[2]



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- (c) Show that, if a sequence of values given by the iterative formula

$$x_{n+1} = \ln(3 + \sqrt{x_n})$$

converges, then it converges to the root of the equation in (a).

[1]

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- (d) Use the iterative formula to calculate the root correct to 2 decimal places. Give the result of each iteration to 4 decimal places. [3]

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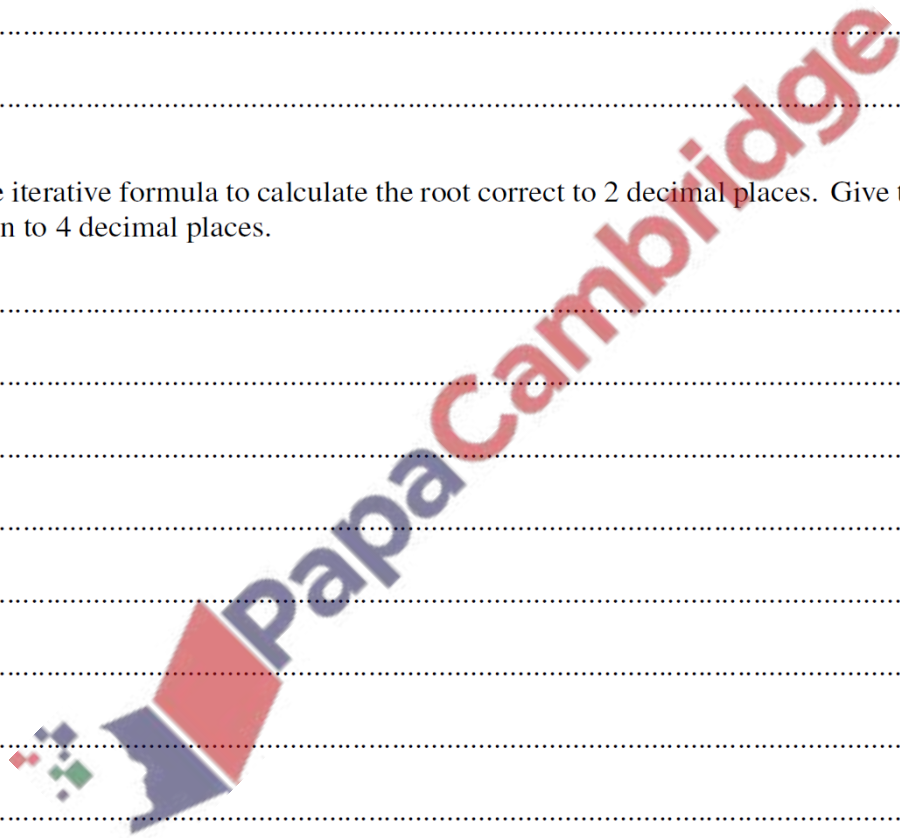
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(a) By sketching a suitable pair of graphs, show that the equation

$$\cot x = 2 - \cos x$$

has one root in the interval $0 < x \leq \frac{1}{2}\pi$.

[2]

(b) Show by calculation that this root lies between 0.6 and 0.8.

[2]

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