OM Review - XX

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https://forms.gle/CdnLMmruAkmpu8xR7

Question 1

Suppose we want to find the roots of $f(x) = x^4 - x - 10$ using Fixed Point method.

Which of these can be candidates for $g(x)$ for this:

(A) $g(x) = x^4 - 10$

(B) $g(x) = (x + 10)^{\frac{1}{4}}$

(C) $g(x) = \frac{10}{x^3 - 1}$

(D) $g(x) = \frac{(x+10)^{\frac{1}{4}}}{x}$

Assume usual notation as discussed in class.

More than one may be correct

With regard to Fixed Point method to find roots of $f(x)$, comment on the following statement:

"We are bound to find a solution with any choice of $g(x)$"

(A) True

(B) True or False depending on initial point

(C) False

Assume usual notation as discussed in class.

Question 3

We wish to find root of $f(x) = x^2 - 4$ by Newton's method. Then starting with $x_0 = 6$, the value of x_1 correct upto 2 decimal places is

(A) 3.33

(B) 1.33

(C) 2.33

(D) 4.33

(E) None of the others

Question 4

The Newton method formula for finding the square root of a real number R is

(A) None of the others

(B) $x_{n+1} = 2x_n$

(C) $x_{n+1} = \frac{x_n^2 - R}{2x_n}$

(D) $x_{n+1} = \frac{x_n^2 + R}{2x_n}$

Question 5

Complete the missing parts in the pseudo code for "Bisection Algorithm":

```
while (|a − b| < ε) {
p = (a+b)/2
if( X ){
b = p}
else {
a = p
}
```

The condition X should be:

(A) $f(p) > 0$

(B) $f(a) * f(p) < 0$

(C) $f(b) * f(p) < 0$

(D) $f(p) < 0$

(E) None of the others

Question 6

Given f is continuous and $f(a) * f(b) < 0$, what constraints must f satisfy to ensure that bisection method will be able to find a root between a and b?

(A) None of the others

(B) f must be both monotonic and convex

(C) f must be monotonic

(D) f must be convex

Question 7

Based on the convergence analysis from last class, number of iterations required to find roots of $f(x) = x^3 - x - 2$ between interval $[1, 2]$ and with $\epsilon = 0.01$ is:

(A) 9

(B) 5

(C) 3

(D) 7

(E) None of the others

Question 8

Which of these aret true for bisection method?

(A) None of the others

(B) If there are 2 roots between $[a, b]$, it will find both

(C) It is guaranteed to find exact solution

(D) It takes slope of f into account

Assume usual notation as discussed in class.

More than one may be correct