NC Mock

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K18-0363

Section D

Q1. $x - 2^{-x} = 0$ [0,1]   6 iterations.

iteration	a	b	f(a)	f(b)	c	f(c)
1	0	1	-1	~~0.5~~ 0.5	0.5	-0.~~207~~
2	0.5	1	-0.91421	0.5	0.~~75~~	0.155396
3	0.5	0.75	-0.91421	0.155396	0.625	-0.02342
4	0.625	0.75	-0.02342	0.155396	0.6875	0.06657
5	0.625	0.6875	-0.02342	0.06657	0.65~~625~~	0.~~21724~~
6	0.625	0.65~~625~~	-0.02342	0.01524	~~0.638375~~ 0.640625	~~-81×10^-3~~ ~~4.06×10^-3~~

~~a = 0.01524~~

~~x = 0.638375~~

$x = 0.640625$

Q2.

u	1	2	3	4	5
$f(u)$	5	14	51	124	245

a) $f'(u)$ at $u=1$ $h=1$

Five point End Point Formula:

$$f'(1) = \frac{1}{12h} [-25f(1) + 48f(2) - 36f(3) + 16f(4) - 3f(5)]$$

$$\boxed{f'(1) = -3.33}$$

b) $f'(u)$ at $u=5$

Five Point End Point Formula $h=1$

$$f'(5) = \frac{1}{12h} [-25f(5) + 48f(4) - 36f(3) + 16f(2) - 3f(1)]$$

$$\boxed{f'(5) = -150}$$

c) $f'(u)$ at $u=3$

Five Point Mid Point Formula $h=1$

$$f'(3) = \frac{1}{12h} [f(1) - 8f(2) + 8f(4) - f(5)]$$

$$\boxed{f'(3) = 53.33}$$