Lab 3

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① tolerence = $10e^{-5}$
root = 0.61906
iterations = 4
Starting value = 0

iterations = 3
Starting value = 0.5

root = 1.51213
iterations = 3
Starting value = 1.5

② Root close to 4.5 = 4.4936139
tolerence = 10e-7
iterations = 3

Root close to 7.7 = 7.725251 83
tolerance = 10e-7
iterations = 4

③ $x_0 = 4.51$
$x_1 = 4.5$

tolerence = 10e-5
iterations = 3

root = 4.49309

$x_0 = 7.69$
$x_1 = 7.7$

tolerence = 10e-7
iterations = 5

root = 7.72525

④ ~~$2x^2 + 6e^{-x} - 4 = 0$~~

~~$-\ln\left(\frac{4 - 2x^2}{6}\right) = x$~~

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(4) Forming a converging function

$$f(x) = 2x^2 + 6e^{-x} - 4 = 0.$$

$$\therefore g_1(x) = -\ln\left(\frac{4 - 2x^2}{6}\right)$$

$$g_2(x) = \sqrt{\frac{4 - 6e^{-x}}{2}}$$

$$|g_1'(x)| = \left|\frac{-6}{4 - 2x^2}\right|$$

$$|g_2'(x)| = \left|\frac{3e^{-x}}{\sqrt{2}\sqrt{4 - 6e^{-x}}}\right|$$

tolerence = 10e-7

Using $g_1(x)$	Using $g_2(x)$
$x_0 = 0.5$	$x_0 = 0.5$
root = 0.615373	root = 0.8308 + i 810e-7
iterations = 83	iterations = 47
$x_0 = 0.7$	$x_0 = 0.7$
root = 0.61538	root = 0.838079
iterations = 82	iterations = 44