Assignment 06

1. $\int_0^2 e^{0.5x} + \sin x \, dx$

$$= \left[\frac{e^{0.5x}}{0.5} - \cos x\right]_0^2$$

$$= 4.8527$$

2.

$$I_1(f) = \frac{2-0}{2}[f(0) + f(2)]$$

$$= \frac{2}{2}[1 + 3.6276)$$

$$= 4.6276$$

$$\text{Relative Error} = \left|\frac{4.8527 - 4.6276}{4.8527}\right| \times 100\%$$

$$= 4.6286\%$$

3. $h = \frac{2-0}{4} = \frac{2}{4} = 0.5$

	$f(x_i)$	
$x_0 = 0$	1	
$x_1 = 0.5$	1.7635	×2
$x_2 = 1$	2.4902	
$x_3 = 1.5$	3.1145	
$x_4 = 2$	3.6276	

$$I_{1,m} = \frac{0.5}{2}\left[1 + 2\times 1.7635 + 2\times 2.4902 + 2\times 3.1145 + 3.6276\right]$$

$$= 4.8410$$

$$\text{Relative error} = \left|\frac{4.8527 - 4.8410}{4.8527}\right| \times 100$$

$$0.2411\%$$

$= 4.0410$

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$$I_2(f) = \frac{2-0}{6}\left[1 + 4 \times 2.4902 + 3.6276\right]$$

$$= 4.8628$$

$n = 2$

$node = 3$

$x_0 = 0$

$x_1 = \frac{2+0}{2} = 1$

$x_2 = 2$

$$\text{Relative Error} = \left|\frac{4.8628 - 4.8527}{4.8527}\right| \times 100\%$$

$$= 0.2081\%$$