1 a)

$y' = f(t, y)$ $h = t_j - t_{j-1}$ $2h = t_{j+1} - t_{j-1}$

$y(t_{n+1}) = y(t_{n-1}) + \int_{t_{n-1}}^{t_{n+1}} f(s, y(s))\,ds$ Simpson's Rule

$$\int_{t_{n-1}}^{t_{n+1}} f(s, y(s))\,ds = \frac{h}{6}\left[f(t_{n-1}, y(t_{n-1})) + 4f(t_n, y(t_n)) + f(t_{n+1}, y(t_{n+1}))\right]$$

$\boxed{-\frac{5h^5}{90} y''''(\xi_n)}$ local truncation error

global error is 1

b) $y(t_{n+1}) = y(t_{n-1}) + \int_{t_{n-1}}^{t_{n+1}} f(s, y(s))\,ds$

$$\int_{t_{n-1}}^{t_{n+1}} f(s, y(s))\,ds \simeq 2h f(t_n, y(t_n)) + O(h^3)$$

$y(t_{n+1}) \simeq y(t_{n-1}) + 2h f(t_n, y(t_n)) + O(h^3)$

So truncation error is $O(h^3)$