Midpoint $\quad y_{i+\frac{1}{2}} = y_i + \frac{h}{2} f(t_{i+\frac{1}{2}}, y_{i+\frac{1}{2}})$

$y_{i+\frac{1}{2}} = 3 + \frac{1}{2}\left(3e^0 - \frac{7\times 3}{4}\right) = \frac{15}{8}$

$y_{i+1} = 3 + 3e^{1/2} - \frac{7\times 15/8}{4} = 3\sqrt{e} - \frac{9}{32}$

$= 4.665$

$y_{i+\frac{1}{2}} = 4.665 + \frac{1}{2}\left(3e - \frac{7\times 4.665}{4}\right) = 12.327$

$y_2 = 4.665 + 3e^{1.5} - \frac{7\times 4.665}{4} = 9.954$

$y_{i+\frac{1}{2}} = 9.954 + \frac{1}{2}\left(3e^2 - \frac{7}{4}\times 9.954\right)$

$= 12.3278$

$y_3 = 9.954 + \left(3e^{2.5} - \frac{7\times 12.3278}{8}\right)$

$= 16.47$

Euler

$$y(1) = 3 + \left(3e^0 - \frac{7 \times 3}{4}\right)$$
$$= 0.75$$

$$y(2) = 0.75 + \left(3e - \frac{7 \times 0.75}{4}\right)$$
$$= 7.592$$

$$y(3) = 7.592 + \left(3e^2 - \frac{7 \times 7.592}{4}\right)$$
$$= 16.473$$

Heun.

$$y^0 = y_i + h f(t_i, y_i) \qquad y_{i+1} = y_i + h\left(f(t_i, y_i) + f(t_{i+1}, y_{i+1})\right)$$

$$y_0 = 3 + \left(3e^0 - \frac{7 \times 3}{4}\right) = 0.75$$
$$y_1 = 3 + \left(3e^0 - \frac{7 \times 3}{4}\right) + \left(3e^1 - \frac{7 \times 0.75}{4}\right)$$
$$= 5.296$$

$$y_0 = 5.296 + \left(3e^1 - \frac{7 \times 5.296}{4}\right) = 4.18$$
$$y_2 = 5.296 + \left(3e^1 - \frac{7 \times 5.296}{4} + 3e^2 - \frac{7 \times 4.18}{4}\right)$$
$$= 12.163$$
$$y_0 = 12.163 + \left(3e^2 - \frac{7 \times 12.163}{4}\right) = 13.044$$
$$y_3 = 12.163 + \left(3e^2 - \frac{7 \times 12.163}{4} + \left(3e^3 - \frac{7 \times 13.044}{4}\right)\right)$$
$$= 31.318$$