MODIFIED EULER'S ONE-STEP METHOD:

EX

ONE FINDS

k_1, k_2

THEN,

$$\mu_{n+1} = \mu_n + \frac{h}{2}(k_1 + k_2)$$

$$= \mu_n + \frac{h}{2}(\mu_n(1+h) + \mu_n)$$

$$\boxed{\mu_{n+1} = \mu_n\left(1 + h + \frac{h^2}{2}\right)}$$

NOW ONE CAN APPROX μ_{n+1}

PROOF

$$k_1 = 2\mu_n$$

$$k_2 = \mu_n(1 + 2h)$$

NOW, $\mu_{n+1} = \mu_n + \frac{h}{2}(k_1 + k_2)$

$$\mu_{n+1} = \mu_n + \frac{h}{2}(2\mu_n + \mu_n(1+2h))$$

$$= \mu_n + h\mu_n + \frac{h}{2}\mu_n(1+2h)$$

$$= \mu_n + h\mu_n + \frac{h}{2}\mu_n + \mu_n h^2$$

$$= \mu_n\left(1 + h + \frac{h}{2} + h^2\right)$$ ✓