Taylor Series Example

Consider the function $f(x) = e^{\frac{x}{2}}$.

(a) Determine the degree three Taylor polynomial, p_3, for f centered at $a = 0$.

(b) Use your work in (a) to determine a general order n Taylor polynomial, p_n for f.

(c) Use p_3 to approximate a value for $e^{0.2}$.

SOLUTION:

Find the derivatives of $f(x)$ and evaluate them at 0.

$f(x) =$ $\qquad$ $f(0) =$

$f'(x) =$ $\qquad$ $f'(0) =$

$f''(x) =$ $\qquad$ $f''(0) =$

$f'''(x) =$ $\qquad$ $f'''(0) =$

$\vdots$ $\qquad$ $\vdots$

$f^{(k)}(x) =$ $\qquad$ $f^{(k)}(0) =$