Math 208

Worksheet 11.8-9-10

Dr. O.

Find the linear approximating polynomial for the function centered at a (Taylor series of order 1).

1) $f(x) = \sqrt{5x + 4}$, $a = 0$ 1) _____

A) $L(x) = \frac{5}{4}x - 2$ B) $L(x) = \frac{5}{2}x - 2$ C) $L(x) = \frac{5}{2}x + 2$ D) $L(x) = \frac{5}{4}x + 2$

2) $f(x) = \sqrt[3]{x}$, $a = 8$ 2) _____

A) $L(x) = \frac{1}{4}x + 4$ B) $L(x) = \frac{1}{12}x + \frac{4}{3}$ C) $L(x) = \frac{1}{4}x + \frac{2}{3}$ D) $L(x) = \frac{1}{12}x + \frac{2}{3}$

Find the Taylor polynomial of order 3 centered at 0.

3) $f(x) = \frac{1}{x + 3}$ 3) _____

4) $f(x) = e^{-2x}$ 4) _____

Find the Taylor polynomial of order 3 generated by f at a.

5) $f(x) = x^2 + x + 1$, $a = 4$ 5) _____

Find the first four nonzero terms in the Maclaurin series for the function.

6) $f(x) = \sin x \cos x$ 6) _____

A) $x + \frac{1}{3}x^3 - \frac{2}{15}x^5 + \frac{4}{315}x^7 + \ldots$ B) $x - \frac{1}{6}x^3 + \frac{1}{30}x^5 - \frac{2}{315}x^7 + \ldots$

C) $1 + x - \frac{1}{2}x^2 - \frac{1}{6}x^3 + \ldots$ D) $x - \frac{2}{3}x^3 + \frac{2}{15}x^5 - \frac{4}{315}x^7 + \ldots$

Use Taylor series to evaluate the limit.

7) $\lim_{x \to 0} \frac{e^{-3x} - 1}{x}$ 7) _____

A) 1 B) 0 C) -3 D) 3

8) $\lim_{x \to 0} \frac{1 + \ln(1 + 3x^2) - \cos 3x}{x^2}$ 8) _____

A) $\frac{21}{2}$ B) $\frac{15}{2}$ C) $\frac{9}{2}$ D) $\frac{3}{2}$

Solve the problem.

9) Use a Taylor series to estimate the integral's value to within an error of magnitude less than 10^{-3}. 9) _____

$$\int_0^{0.2} \sqrt{1 + x^3}\,dx$$

A) 0.2105 B) 0.2002 C) 0.1105 D) .6845