MAC2311
Broward College Practice 13

Find the linearization L(x) of f(x) at x = a.

1) $f(x) = 2x^2 + 4x - 1$, $a = 4$ 1) ______________

2) $f(x) = \sqrt{6x + 4}$, $a = 0$ 2) ______________

Find a linearization at a suitably chosen integer near a at which the given function and its derivative are easy to evaluate.

3) $f(x) = -5x^2 - 4x + 2$, $a = 1.1$ 3) ______________

Use the linear approximation $(1 + x)^k \approx 1 + kx$, as specified.

4) Find an approximation for the function $f(x) = (1 - x)^5$ for values of x near zero. 4) ______________

5) Find an approximation for the function $f(x) = \dfrac{3}{1 - x}$ for values of x near zero. 5) ______________

6) Estimate $(1.0003)^{50}$. 6) ______________

7) Estimate $\sqrt[3]{1.009}$. 7) ______________

Find dy.

8) $y = 6x^2 + 9x - 3$ 8) ______________

The function f(x) changes value when x changes from x_0 to $x_0 + dx$. Find the approximation error $|\triangle f - df|$.

9) $f(x) = x^2$, $x_0 = 6$, $dx = 0.06$ 9) ______________

Write a differential formula that estimates the given change in volume or surface area.

10) The change in the surface area $S = 4\pi r^2$ of a sphere when the radius changes from r_0 to $r_0 + dr$ 10) ______________

Solve the problem.

11) A cube 5 inches on an edge is given a protective coating 0.1 inches thick. About how much coating should a production manager order for 900 cubes? 11) ______________

12) $A = \pi r^2$, where r is the radius, in centimeters. By approximately how much does the area of a circle decrease when the radius is decreased from 4.0 cm to 3.8 cm? (Use 3.14 for π.) 12) ______________

13) $V = \dfrac{4}{3}\pi r^3$, where r is the radius, in centimeters. By approximately how much does the volume of a sphere increase when the radius is increased from 1.0 cm to 1.2 cm? (Use 3.14 for π.) 13) ______________

14) The diameter of a tree was 10 in. During the following year, the circumference increased 2 in. About how much did the tree's diameter increase? (Leave your answer in terms of π.) 14) ______________

Answer Key
Testname: PRACTICE13

1) $L(x) = 20x - 33$
2) $L(x) = \frac{3}{2}x + 2$
3) $L(x) = 7 - 14x$
4) $f(x) \approx 1 - 5x$
5) $f(x) \approx 3 + 3x$
6) 1.015
7) 1.003
8) $(12x + 9)\ dx$
9) 0.0036
10) $dS = 8\pi r_0\ dr$
11) About 13,500 $in.^3$
12) 5.0 cm^2
13) 2.5 cm^3
14) $\frac{2}{\pi}$ in.