Linear Approximations and Differentials

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

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

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

A) $L(x) = 2x - 1$ B) $L(x) = 6x + 3$ C) $L(x) = 6x - 1$ D) $L(x) = 2x + 3$

2) $f(x) = \sqrt[3]{x}$, $a = 27$ 2) _____

A) $L(x) = \frac{1}{27}x + 1$ B) $L(x) = \frac{1}{9}x + 6$

C) $L(x) = \frac{1}{9}x + 1$ D) $L(x) = \frac{1}{27}x + 2$

3) $f(x) = \sqrt{4x + 49}$, $a = 0$ 3) _____

A) $L(x) = \frac{2}{7}x + 7$ B) $L(x) = \frac{2}{7}x - 7$ C) $L(x) = \frac{4}{7}x + 7$ D) $L(x) = \frac{4}{7}x - 7$

4) $f(x) = \tan x$, $a = \pi$ 4) _____

A) $L(x) = 3x - \pi$ B) $L(x) = x - 3\pi$ C) $L(x) = x - \pi$ D) $L(x) = x + \pi$

5) $f(x) = \sin x$, $a = 0$ 5) _____

A) $L(x) = -x$ B) $L(x) = x$ C) $L(x) = 3x + 1$ D) $L(x) = 0$

Use Linear Approximation to calculate the given number.

6) $\sqrt{64.25}$ 6) _____

Give your answer as a decimal. Round to 5 decimal places if necessary.

A) 8.01563 B) 9.00000 C) 7.00000 D) 10.00000

7) $\sqrt{16.3}$ 7) _____

Give your answer as a decimal. Round to 4 decimal places if necessary.

A) 3.9625 B) 4.0750 C) 4.0375 D) 4.3000

8) $\sqrt[3]{1.006}$ 8) _____

Give your answer as a decimal.

A) 2.002 B) 1.006 C) 1.02 D) 1.002

Solve the problem.

9) $A = \pi r^2$, where r is the radius, in centimeters. By approximately how much does the area of a circle decrease when the radius is decreased from 2.0 cm to 1.8 cm? (Use 3.14 for π.) 9) _____

A) 2.5 cm^2 B) 2.3 cm^2 C) 1.3 cm^2 D) 2.7 cm^2

10) $V = \frac{4}{3}\pi r^3$, where r is the radius, in centimeters. By approximately how much does the volume of a sphere increase when the radius is increased from 3.0 cm to 3.2 cm? (Use 3.14 for π.) 10) _____

A) 22.8 cm^3 B) 22.4 cm^3 C) 22.6 cm^3 D) 1.5 cm^3

Answer Key
Testname: LINEAR APPROXIMATIONS AND DIFFERENTIALS

1) A
2) D
3) A
4) C
5) B
6) A
7) C
8) D
9) A
10) C