# Lecture Nineteen Practice

Practice problems

**Abstract.** *Practice problems for Lecture Nineteen Content*

**Problem. 1 :** Compute the differential of the function $y = -\dfrac{5}{(x+3)^2}$ .

$$dy = \boxed{\phantom{xxxxxxxxxxxxxxxxx}} \; \boxed{?}$$

**Problem. 2 :** Compute $dy$ using the function $y = -\dfrac{4}{x-2}$ as $x$ goes from 3 to 2.9.

$$dy = \boxed{\phantom{xxxxxxxxxxxxxxxxx}} \; \boxed{?}$$

**Problem. 3 :** Compute $dy$ using the function $y = 4\,x^2$ as $x$ goes from $-1$ to $-1.1$.

$$dy = \boxed{\phantom{xxx}} \; \boxed{?}$$

**Problem. 4 :** Compute $\Delta y$ using the function $y = 5\,x^3$ as $x$ goes from -2 to 1.

$$\Delta y = \boxed{\phantom{xxx}} \; \boxed{?}$$

**Problem.** 5 : Compute the differential of the function $y = \cos(x + 1)$.

$$dy = \boxed{\phantom{xxxxxxxxxxxxxxxxxxxx}} \quad \boxed{?}$$

**Problem.** 6 : Compute $dy$ and $\Delta y$ of the function $y = \sqrt{x - 4}$ as $x$ goes from 5 to 5.2.

$$dy = \boxed{\phantom{xxxx}} \quad \boxed{?}$$

$$\Delta y = \boxed{\phantom{xxxxxxxxxxxxxxxxxxxx}} \quad \boxed{?}$$

**Problem.** 7 : Find the linear approximation of the function $f(x) = \sqrt{x + 3}$ at $a = 22$ and use it to approximate the numbers $(24.9)^{\frac{1}{2}}$ and $(25.01)^{\frac{1}{2}}$.

$$L(x) = \boxed{\phantom{xxxxxxxxxxxxxxxxxxxx}} \quad \boxed{?}$$

**Problem.** 8 : Find the linear approximation of the function $f(x) = \sqrt{x - 3}$ at $a = 4$ and use it to approximate the numbers $(0.900)^{\frac{1}{2}}$ and $(1.010)^{\frac{1}{2}}$.

$$L(x) = \boxed{\phantom{xxxxxxxxxxxxxxxxxxxx}} \quad \boxed{?}$$

**Problem.** 9 : Approximate $e^{0.2}$ by letting $f(x) = e^x$ and $a = 0$.

$$e^{0.2} \approx \boxed{\phantom{xxxx}} \quad \boxed{?}$$