

§4.5: LINEAR APPROXIMATIONS

1.] Let $f(x) = 12 - x^2$.

a.) Find the equation of the tangent line to the curve defined by $y = f(x)$ at the point $a = 2$. Denote this line by $L(x)$.

b.) Using $L(x)$, compute $L(2.1)$ to approximate the value of $f(2.1)$.

c.) Find the actual value of $f(2.1)$ (use a calculator).

d.) Compute the percent error in this approximation using the formula: $100 \times \frac{|L(2.1) - f(2.1)|}{|f(2.1)|}$

2.] Let $f(x) = e^x$. Use the linear approximation $L(x)$ at the point $a = 0$ to approximate the value of $f(0.5)$.

3.] Approximate the value of $\sqrt{146}$ using the linear approximation for $f(x) = \sqrt{x}$ at the point $a = 144$.

4.] Approximate the value of $\sqrt[3]{65}$ using a linear approximation.