University of Bahrain
Department of Mathematics
MATHS101: Calculus I
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Worksheet: Differentials and Linear Approximation

Students' Name: _____

1. Find the following indefinite integrals:

    1. Find the linear approximation of $f(x) = \ln(x+1)$ at $a = 0$.

    2. Use linear approximation to approximate the value of $\ln 1.03$. (Hint: Use the previous exercise)

2. Given $g(2) = -6$ and $g'(x) = \sqrt{x^2 + 7}$ for all x. Use linear approximation to estimate $g(2.05)$ and $g(1.95)$.

3. Find the differential dy of $y = e^x + 4$.

4. Find the differential dy of $y = \cos x + \sin x$.

5. Find the differential dy of $\tan y = e^x$.

6. Find the dx of

     1. $u = ax + b$.

2. $u = 1 - \cos^2 x$

7. Let $r = \dfrac{2}{q} + 10q$ and $q = 7 + \dfrac{12}{t}$. Find $\dfrac{dr}{dt}$ at $t = 3$?