University of the People

MATH 1211 Calculus 1

Unit 5 Written Assignment

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1. Find the derivative for the function **[ f(x)=2e^x-8^x ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20f%28x%29%3D2e%5Ex-8%5Ex%20)**

Let y = 2ex-8x

Thus, taking logarithm from both sides.

Lny= ln(2ex-8x)

1/y\* =

2. Find the derivative for the function **[ f(z)=z^5-e^z lnz ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20f%28z%29%3Dz%5E5-e%5Ez%20lnz%20)**

Let y = z5-ezlnz

Taking logarithm,

Lny=ln(z5-ezlnz)

And substitute Let y = z5-ezlnz

3. Find the tangent line to **[ f(x)=7^x+4e^x ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20f%28x%29%3D7%5Ex%2B4e%5Ex%20)** at **[ x=0 ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20x%3D0%20)**

Taking y=7x+4ex

Taking logarithm of two sides

Lny= ln(7x+4ex)

4. Determine if **[ G(z)=(z-6)ln z ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20G%28z%29%3D%28z-6%29ln%20z%20)** is increasing or decreasing at the following points.  
(a) z=1 (b) z=5 (c) z=20

First taking the derivative of g(z)

Thus, by product rule

G’(z) = lnz+(z-6)\*1/z = lnz+

G’(1) = ln1-5 =-5 <0, g(z) is decreasing at g(1)

G’(5)= ln5-1/5 = 1.6-0.2=1.4 >0,g(z) is increasing at g(5)

G’(20) = ln20+14/20 = 3.695 >0, g(20) is increasing at g(20)

5. Find the derivative for the function **[ f(x)=(x+1)^x ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20f%28x%29%3D%28x%2B1%29%5Ex%20)**

Let y = (x+1)x

Lny=ln(x+1)^x

Lny= xln(x+1)

Taking derivative,

6. Find the derivative for the function **[ f(x)=(x)^{x+1} ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20f%28x%29%3D%28x%29%5E%7Bx%2B1%7D%20)**

Let y = xx+1

Lny=(x+1)lnx

7. Find the derivative for the function **[ f(x)=( \sqrt{x)}^x ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20f%28x%29%3D%28%20%5Csqrt%7Bx%29%7D%5Ex%20)**

Let y = ,

Lny=

Taking derivative,

8. Find **[ \frac{dy}{dx} ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20%5Cfrac%7Bdy%7D%7Bdx%7D%20)** for **[ \sqrt{3x^2+1} (3x^4+1)^3 ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20%5Csqrt%7B3x%5E2%2B1%7D%20%283x%5E4%2B1%29%5E3%20)**

Let y ==(3x2+1)1/2(3x4+1)3

9. Find **[ \frac{dy}{dx} ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20%5Cfrac%7Bdy%7D%7Bdx%7D%20)** for **[ y=3x^{3x} ](https://my.uopeople.edu/filter/tex/displaytex.php?texexp=%20y%3D3x%5E%7B3x%7D%20)**

Taking logarithm

Lny=ln(3x3x) =ln3+lnx3x =ln3+3xlnx

Taking derivative,