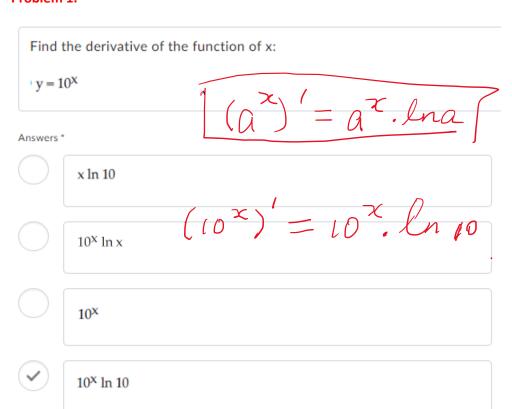
# **Answer Key to Topic #6 Assignment**

# Problem 1.



## Problem 2.

Find the derivative of the following function:

$$y = t^5 - e$$

This is a power function !

Answers \*

$$(+5-e)'=(5-e).e^{5-e}$$

$$(5-e)t^4-e$$

# Problem 3.

Find the derivative of the following function:

$$y=2^{\ln(6t)}$$

Problem 4. Composite exponential functions  $2\ln 6t$   $2\ln 6t$  2

Find the derivative of the following function:

$$y = 3\sqrt{t}$$

$$= 3\sqrt{t \ln 3}$$

$$= 3\sqrt{t}$$

$$\frac{\ln 3\sqrt{t}}{2\sqrt{t}}$$

$$= 3\sqrt{t} \ln 3$$

$$= 3\sqrt{t}$$

$$= 3\sqrt{t} \ln 3$$

$$\frac{\ln 3}{2\sqrt{t}} \sqrt{t}$$

$$= \frac{\ln 3}{2\sqrt{t}} \sqrt{t}$$

$$= \frac{2\sqrt{t}}{2\sqrt{t}}$$

# Problem 5.

Find the derivative of the following function:

$$y = \log_4 \left( \frac{x^2}{6\sqrt{x+1}} \right)$$

[Hint: simplify the expression before taking the derivative]

log(x2) - log (6.(x+1) = ) Answers = 2 log 4 - log 6 - log (x+1) = 2 log 4x - log 4b - 1 log (>641) [10g x] = 2[log x] -[log 6] -= [log (x+1)]  $= \frac{2 \cdot \frac{1}{x \ln 4} - 0}{\frac{2}{x \ln 4}} - \frac{1}{2(x+1) \ln 4}$ 

# Problem 6.

Find the derivative of the following function.

 $y = (\pi + 3)^x$ This is a power function !

Answers \*

$$\pi + \ln(3)3^{x} \left[ \left( \frac{7}{11} + 3 \right)^{x} \right]' = \left( \frac{7}{11} + 3 \right)^{x} \left[ \left( \frac{7}{11} + 3 \right)^{x} \right] \left( \frac{7}{11} + \frac{1}{11} \right)^{x} \left( \frac{7}{11} + \frac{1}{11} \right)^{x} \left( \frac{7}{11} + \frac{1}{11} \right)^{x} \right]$$

$$\ln(x)(\pi+3)^x$$

$$x(\pi+3)^{x-1}$$

$$(\pi+3)^x \ln(\pi+3)$$

### Problem 7.

Find the derivative of the following function:

$$y = x^e + e^x$$

Answers \*



$$x^{e} + xe^{x-1} = \begin{bmatrix} x^{e} \end{bmatrix}' + \begin{bmatrix} e^{x} \end{bmatrix}'$$

$$ex^{e-1} + e^x = ex^{(e-1)} + e^x$$

$$x^e + e^x$$

$$ex^{e-1} + xe^{x-1}$$

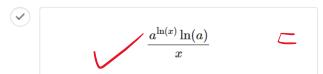
# Problem 8.

Use logarithmic differentiation to find the derivative of the following function.

$$y = a^{\ln x}$$

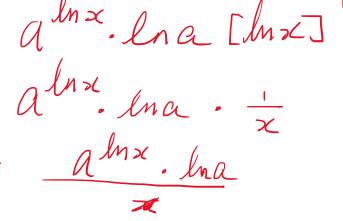
Answers \*

$$\frac{a^{\ln(x)}}{x}$$



$$(\ln(x)-1)a^{\ln(x)}$$

 $x^{lna}$ 



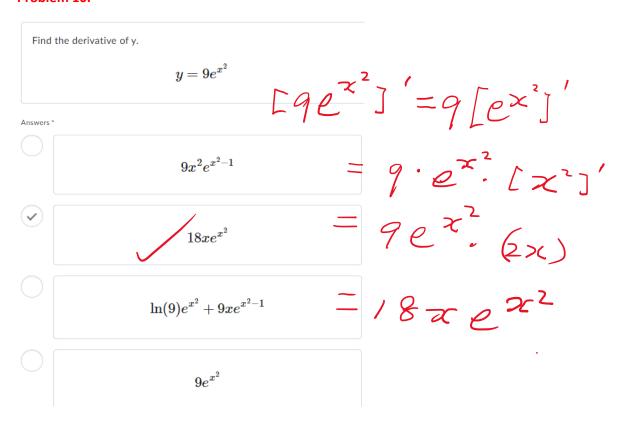
# Problem 9.

Use logarithmic differentiation to find the derivative of y with respect to the independent variable.

 $y=a^{6x+9}$  This is a composite exponential for a>0 and  $a\neq 1$ .

Answers\*  $(6x+8)a^{6x+9} \qquad \begin{bmatrix} a & 6x+9 \end{bmatrix}$   $= a & 6x+9 \end{bmatrix}$ 

# Problem 10.



#### Problem 11.

