

MA125 Optional Extra Credit Assignment (5 pts) - **show all work!**

Name:

1) Solve the equation:

$$\ln x^3 + \ln \sqrt[3]{x} = 4$$

2) Solve the equation:

$$\exp(3x + 5) = 4$$

3) Solve the equation

$$\ln(x + 1) = 2 + \ln(x + 2)$$

4) Solve the equation

$$3 \ln 2x - 2 = \ln 4x^2$$

5) Solve the equation

$$x^2 \ln x = 16 \ln x$$

6) Solve the equation

$$\ln(x - 2) = \ln(x + 2) + \ln 3$$

7) Suppose $P(x)$ is an exponential growth function of x ,

$$P(x) = P_0 e^{kt}, \quad k > 0, t \geq 0$$

Define

$$y = \ln(P(x))$$

Show that the graph of y is a straight line and find the slope and intercept of that line.

8) Write an expression equivalent to

$$\ln(x^2) + \ln(\sqrt{5}x^3) - 15 = \ln(\sqrt{x}) + \ln(\sqrt[3]{x^2}) \quad x > 0$$

that contains only one logarithmic term.

9) Write an expression equivalent to

$$\ln(x^2 - 1) + \ln(x^3 - 3x^2 + 3x - 1) - \ln(x - 1) \quad x > 1$$

in terms of $\ln(x + 1)$ and $\ln(x - 1)$ only. 10) Suppose $P(x)$ is an exponential decay function of x ,

$$P(x) = P_0 e^{-kt}, \quad k > 0, t \geq 0$$

Define

$$y = \ln(P(x))$$

Show that the graph of y is a straight line and find the slope and intercept of that line.