

Name _____

- No calculators allowed.
 - Show sufficient work to justify each answer.
 - You have 12 minutes for this quiz.
1. (4 points) Determine a formula for an exponential function given that its graph goes through the points $(-3, 100)$, $(0, 20)$ and $(3, 4)$.

$$y = Ca^x$$

POINT $(0, 20) \Rightarrow 20 = Ca^0 \Rightarrow C = 20$

$$y = 20a^x$$

POINT $(3, 4) \Rightarrow 4 = 20a^3$
 $\frac{1}{5} = a^3$
 $a = \sqrt[3]{1/5}$

$$y = 20 \left(\sqrt[3]{1/5} \right)^x$$

OR $y = 20e^{x \cdot \frac{1}{3} \ln 5}$

★ OR $y = 20 \left(\frac{1}{5} \right)^{x/3}$

CHECK POINT $(-3, 100)$

AT $x = -3$, $y = 20 \left(\frac{1}{5} \right)^{-3/3} = 20 \left(\frac{1}{5} \right)^{-1}$

$= 100 \checkmark$

2. (3 points) Determine all values of x which satisfy the equation below.

$$e^{3 \ln(5x+7)} = 8$$

$$e^{\ln((5x+7)^3)} = 8$$

$$(5x+7)^3 = 8$$

$$5x+7 = \sqrt[3]{8} = 2$$

$$5x = -5$$

$$x = -1$$

3. (3 points) Given that $f(x) = \sqrt[3]{\ln(2x+5)}$, find a formula for $f^{-1}(x)$.

$$\text{let } y = f^{-1}(x)$$

$$\text{then } f(y) = x$$

$$\sqrt[3]{\ln(2y+5)} = x$$

$$\ln(2y+5) = x^3$$

$$2y+5 = e^{x^3}$$

$$2y = e^{x^3} - 5$$

$$y = \frac{e^{x^3} - 5}{2}$$

$$f^{-1}(x) = \frac{e^{x^3} - 5}{2}$$