• No calculators allowed.
• Show sufficient work to justify each answer.
• You have 15 minutes for this quiz.

1. (3 points) Find the equation of an exponential function, \( f(x) = ca^x \), which passes through the points \((1, 2)\) and \((3, 18)\)

\[
y = ca^x
\]

\[
2 = ca^1
\]

\[
18 = ca^3
\]

\[
c = \frac{2}{a}
\]

\[
18 = 2 \cdot a^3
\]

\[
a = 3 \text{ so } c = \frac{2}{3}
\]

\[
y = \frac{2}{3} \cdot (3^x)
\]

2. (3 points) Solve for \( x \).

\[
e^{\ln(x) + \ln(x+1)} = 2
\]

\[
e^{\ln(x)} \cdot e^{\ln(x+1)} = 2
\]

\[
x(x+1) = 2
\]

\[
x^2 + x - 2 = 0
\]

\[
(x+2)(x-1) = 0
\]

\[
x = -2, \ x = 1
\]

\[
e^{\ln(x)} \cdot e^{\ln(x+1)} = 2
\]

\[
\ln(x) + \ln(x+1) = \ln(2)
\]

\[
\ln(x) + \ln(x+1) = \ln(2)
\]

\[
\ln(x(x+1)) = \ln(2)
\]

\[
\ln(x(x+1)) = \ln(2)
\]

\[
x(x+1) = 2
\]

\[
x^2 + x - 2 = 0
\]

\[
(x+2)(x-1) = 0
\]

\[
x = -2, \ x = 1
\]

\[
x = -2 \text{ is not in the domain of } e^{\ln(x) + \ln(x+1)} \text{ so the only solution is } [x = 1]
\]
3. (2 points) Given that \( f(x) = \sqrt[3]{\ln(x - 2)} \), find an equation for \( f^{-1}(x) \).

\[
\begin{align*}
  y &= \sqrt[3]{\ln(x - 2)} \\
  y^3 &= \ln(x - 2) \\
  e^y &= x - 2 \\
  x &= e^y + 2
\end{align*}
\]

\[ f^{-1}(x) = e^x + 2 \]

4. (2 points) Find the value of the following expression.

\[
\log_5 100 - 2 \log_5 2
\]

\[
= \log_5 100 - 2 \log_5 2^2
\]

\[
= \log_5 100 - 2 \log_5 4
\]

\[
= \log_5 \left( \frac{100}{4} \right)
\]

\[
= \log_5 (25)
\]

\[= 2\]