Complete all questions without a calculator.

Question 1. Evaluate:

(a) $\log_2 16$

(b) $27^{-2/3}$

Question 2. Simplify:

(a) $\ln(e^{\sin x})$

(b) $e^{1+\ln x}$

Question 3. Evaluate $f(0)$ if:

(a) $f(x) = e^{2x} + 5e^x - 1$

(b) $f(x) = 2\ln(x+1) - \ln(x^2+1)$

Solutions on the next page

Question 1. Evaluate:

(a) $\log_2 16 = 4$
Solution: Since $2^4 = 16$*, that means* $\log_2 16 = 4$.

(b) $27^{-2/3} = 1/9$
Solution: First we apply the negative exponent, and

$$27^{-2/3} = \frac{1}{27^{2/3}}$$

Rewriting the exponent as a root, we see

$$27^{-2/3} = \frac{1}{\sqrt[3]{27^2}} = \frac{1}{(\sqrt[3]{27})^2} = \frac{1}{9}$$

Question 2. Simplify:

(a) $\ln(e^{\sin x}) = \sin x$
Solution: Since $\ln e^A = A$ *for any* A*,*

$$\ln(e^{\sin x}) = \sin x$$

(b) $e^{1+\ln x} = ex$
Solution: First we apply the property of exponents $x^{a+b} = x^a \cdot x^b$ *to get*

$$e^{1+\ln x} = e^1 \cdot e^{\ln x}$$

Simplifying each factor, we get

$$e^{1+\ln x} = e \cdot x = ex$$

Question 3. Evaluate $f(0)$ if:

(a) $f(x) = e^{2x} + 5e^x - 1 = 5$
Solution: Substituting and using the fact that $e^0 = 1$ *yields:*

$$f(0) = e^{2\cdot 0} + 5e^0 - 1 = 1 + 5(1) - 1 = 5$$

(b) $f(x) = 2\ln(x+1) - \ln(x^2+1) = 0$
Solution: Substituting and using the fact that $\ln 1 = 0$*:*

$$f(0) = 2\ln(0+1) - \ln(0^2+1) = 2 \cdot 0 - 0 = 0$$