Natural logarithms

6 questions | 13 marks

Equivalent correct methods earn the corresponding marks.

1. Evaluate $\ln(e^{\frac{7}{2}})$. [2 marks]

Natural logarithm and exponential are inverse operations.

Answer: $\frac{7}{2}$

2. Simplify $e^{2\ln 5}$. [2 marks]

$2\ln 5 = \ln 25$ and $e^{\ln 25} = 25$.

Answer: 25

3. Solve $\ln(x+4) = 2$. [2 marks]

$x + 4 = e^2$. The resulting input is positive.

Answer: $x = e^2 - 4$

4. Solve $2\ln x = \ln(3x+4)$. [3 marks]

Domain $x > 0$. Combine to $\ln(x^2) = \ln(3x+4)$. Then $(x-4)(x+1) = 0$; reject -1.

Answer: $x = 4$

5. Order $\ln(\frac{1}{2})$, 0, $\ln 2$ and 1 from least to greatest. [2 marks]

$\frac{1}{2} < 1 < 2 < e$, and $\ln x$ is increasing.

Answer: $\ln(\frac{1}{2}) < 0 < \ln 2 < 1$

6. Simplify $\ln(2e^3)$ exactly. [2 marks]

Use the product law and $\ln(e^3) = 3$.

Answer: $\ln 2 + 3$