Definite integration

6 questions | 12 marks

Equivalent correct methods earn the corresponding marks.

1. Evaluate $\int_1^e 1/x\,dx$. [2 marks]

Use ln x on the positive interval.

Subtract ln 1 from ln e.

Answer: 1.

2. Evaluate $\int_0^\pi \sin x\,dx$. [2 marks]

Use antiderivative -cos x.

The endpoint difference is 1-(-1).

Answer: 2.

3. Evaluate $\int_1^2 (2x+1)\,dx$. [2 marks]

Use x squared+x.

Subtract 2 from 6.

Answer: 4.

4. If $\int_2^5 f(x)\,dx = 7$, find $\int_5^2 f(x)\,dx$. [2 marks]

Reversing limits changes the sign.

Answer: -7.

5. Explain why ordinary endpoint subtraction is invalid for $\int_{-1}^{1} x^{-2}\,dx$. [2 marks]

The continuity condition fails.

Treating the two endpoints alone would overlook the singularity.

Answer: The integrand is undefined at x=0 inside the interval.

6. Evaluate $\int_{-1}^{1} (x^2 + 2)\,dx$. [2 marks]

The integrand is even, so double the integral from 0 to 1.

$2[1/3 + 2] = 14/3$.

Answer: 14/3.