A Level Maths

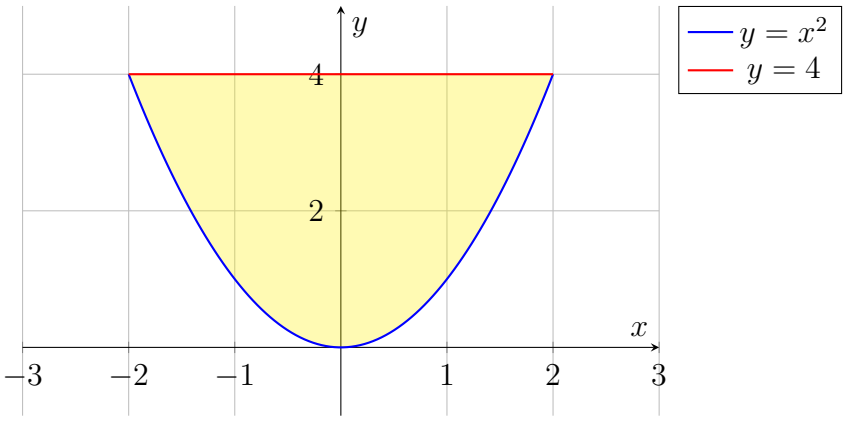
Topic: Area Under Curves

Instructions

Answer all questions. Show complete working. Use definite integrals where appropriate.

Practice Questions

1. Find the area under the curve $y = x^2 + 3$ between $x = 1$ and $x = 4$.
2. Calculate the area bounded by the curve $y = \sin x$, the x-axis, and the lines $x = 0$ and $x = \pi$.
3. Determine the total area enclosed between $y = x^2$ and $y = 4$.



4. A curve is defined by $y = 3x^3$. Find the area under the curve from $x = 0$ to $x = 2$.
5. The region between $y = 2x$ and $y = x^2$ is bounded between their points of intersection. Find the area of this region.
6. Calculate the area under the curve $y = \ln x$ from $x = 1$ to $x = e$.

7. Evaluate the area under the curve $y = 5e^x$ between $x = 0$ and $x = 1$.
8. The curve $y = \frac{1}{x}$ is bounded between $x = 1$ and $x = 4$. Find the area under the curve.

Multiple-Choice Questions

1. The area under $y = 3x^2$ from $x = 0$ to $x = 2$ is:
   A. 6
   B. 8
   C. 12
   D. 16
2. Which integral gives the area under $y = \cos x$ from $x = 0$ to $x = \frac{\pi}{2}$?
   A. $\int_0^{\pi} \cos x \, dx$
   B. $\int_0^{\frac{\pi}{2}} \cos x \, dx$
   C. $\int_0^{\frac{\pi}{2}} \sin x \, dx$
   D. $\int_{\frac{\pi}{2}}^{0} \cos x \, dx$
3. $\int_1^e \ln x \, dx =$
   A. 1
   B. e
   C. $e - 1$
   D. $e \ln e - 1$
4. The area between $y = x$ and $y = x^2$ from $x = 0$ to $x = 1$ is:
   A. $\frac{1}{6}$
   B. $\frac{1}{3}$
   C. $\frac{1}{2}$
   D. $\frac{2}{3}$
5. The area under $y = 1/x$ from $x = 1$ to $x = 4$ is:
   A. 2
   B. $\ln 4$
   C. $\ln(4) - 1$
   D. $\ln(4) + 1$