Multiple choice questions - Integration and the fundamental theorem of calculus

Year: University Year 1 · 10

Question 1 $\int \frac{1}{x} dx =$

- ◯ **A.** $\ln x$
- ◯ **B.** $\ln |x| + C$
- ◯ **C.** $-1/x^2$
- ◯ **D.** x^0

Question 2 $\int_0^1 x\, dx =$

- ◯ **A.** 1
- ◯ **B.** $1/2$
- ◯ **C.** $1/3$
- ◯ **D.** 0

Question 3 $\int x e^x dx =$

- ◯ **A.** $x e^x$
- ◯ **B.** $(x-1)e^x + C$
- ◯ **C.** $(x+1)e^x + C$
- ◯ **D.** $\frac{x^2}{2} e^x$

Question 4 $\int_1^\infty x^{-1.5} dx =$

- ◯ **A.** 1
- ◯ **B.** 2
- ◯ **C.** ∞
- ◯ **D.** $1/2$

Question 5 $\frac{d}{dx} \int_0^x e^{-t^2} dt =$

- ◯ **A.** e^{-x^2}
- ◯ **B.** $-2x e^{-x^2}$
- ◯ **C.** 0
- ◯ **D.** $\int e^{-x^2}$

Question 6 $\int \frac{dx}{1+x^2} =$

- ◯ **A.** $\ln(1+x^2)$
- ◯ **B.** $\arctan x + C$
- ◯ **C.** $\arcsin x$
- ◯ **D.** $\frac{1}{x}$

Question 7 In $\int x \ln x \, dx$ by parts we choose $u =$

- ◯ **A.** x
- ◯ **B.** $\ln x$
- ◯ **C.** $x \ln x$
- ◯ **D.** 1

Question 8 $\int_0^{\pi} \sin x \, dx =$

- ◯ **A.** 0
- ◯ **B.** 1
- ◯ **C.** 2
- ◯ **D.** π

Question 9 $\int_1^{\infty} \frac{dx}{x}$

- ◯ **A.** converges to 1
- ◯ **B.** converges to e
- ◯ **C.** diverges
- ◯ **D.** equals 0

Question 10 The volume of revolution about the x-axis is

- ◯ **A.** $\int y \, dx$
- ◯ **B.** $\pi \int y^2 dx$
- ◯ **C.** $2\pi \int y \, dx$
- ◯ **D.** $\pi \int y \, dx$

Answer grid - Integration and the fundamental theorem of calculus

Year: University Year 1

Question	Answer	Explanation
1	**B**	Include the modulus and constant.
2	**B**	$\frac{x^2}{2}$ from 0 to 1.
3	**B**	Integration by parts.
4	**B**	$\frac{1}{p-1} = 2$.
5	**A**	FTC part 1.
6	**B**	Standard integral.
7	**B**	Logs simplify on differentiating.
8	**C**	$[-\cos x]_0^{\pi} = 2$.
9	**C**	$\ln R \to \infty$.
10	**B**	Sum of discs of area πy^2.