Multiple choice questions - Integration techniques and differential equations

Year: Year 13 · 10

Question 1 $\int e^{2x}dx =$

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

Question 2 $\int \frac{1}{3x}dx =$

- **A.** $\ln|3x| + c$
- **B.** $\frac{1}{3}\ln|x| + c$
- **C.** $3\ln|x| + c$
- **D.** $-\frac{1}{3x^2} + c$

Question 3 $\int \sin 3x\,dx =$

- **A.** $\frac{1}{3}\cos 3x + c$
- **B.** $-3\cos 3x + c$
- **C.** $-\frac{1}{3}\cos 3x + c$
- **D.** $3\cos 3x + c$

Question 4 To integrate $x\sin x$ you should use

- **A.** substitution
- **B.** partial fractions
- **C.** the reverse chain rule
- **D.** integration by parts

Question 5 $\int \tan x\,dx =$

- **A.** $-\ln|\cos x| + c$
- **B.** $\ln|\cos x| + c$
- **C.** $\sec^2 x + c$
- **D.** $\ln|\sin x| + c$

Question 6 With $u = x^2 + 1$, $2x\,dx$ becomes

- **A.** u

- ◯ **B.** du
- ◯ **C.** $2\,du$
- ◯ **D.** dx

Question 7 The solution of $\frac{dy}{dx} = ky$ is

- ◯ **A.** $y = kx + c$
- ◯ **B.** $y = Ae^x + k$
- ◯ **C.** $y = Ae^{kx}$
- ◯ **D.** $y = \frac{k}{2}y^2$

Question 8 The general solution of a differential equation contains

- ◯ **A.** no constant
- ◯ **B.** two answers only
- ◯ **C.** a negative sign
- ◯ **D.** an arbitrary constant

Question 9 $\int_0^{\pi} \sin x\,dx =$

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

Question 10 For $\int x \ln x\,dx$ by parts, a good choice is

- ◯ **A.** $u = x$
- ◯ **B.** $u = \ln x$
- ◯ **C.** $u = 1$
- ◯ **D.** $v' = \ln x$

Answer grid - Integration techniques and differential equations

Year: Year 13

Question	Answer	Explanation
1	**A**	Reverse chain rule.
2	**B**	Factor out 1/3.
3	**C**	Minus sign.
4	**D**	Product of unrelated functions.
5	**A**	f'/f with f=cos x.
6	**B**	du = 2x dx.
7	**C**	Exponential.
8	**D**	Constant of integration.
9	**A**	[-cos x]_0^π = 1+1.
10	**B**	LATE: log first.