Multiple choice questions - Differentiation: chain, product and quotient rules

Year: Year 13 · 10

Question 1 $\frac{d}{dx}e^{5x} =$

- ◯ **A.** $5e^{5x}$
- ◯ **B.** e^{5x}
- ◯ **C.** $5xe^{5x-1}$
- ◯ **D.** $\frac{e^{5x}}{5}$

Question 2 $\frac{d}{dx}\ln(3x) =$

- ◯ **A.** $\frac{1}{3x}$
- ◯ **B.** $\frac{1}{x}$
- ◯ **C.** $\frac{3}{x}$
- ◯ **D.** $3\ln x$

Question 3 $\frac{d}{dx}\cos 2x =$

- ◯ **A.** $2\sin 2x$
- ◯ **B.** $-\sin 2x$
- ◯ **C.** $-2\sin 2x$
- ◯ **D.** $-2\cos 2x$

Question 4 $\frac{d}{dx}(x^2\sin x) =$

- ◯ **A.** $2x\cos x$
- ◯ **B.** $x^2\cos x$
- ◯ **C.** $2x\sin x - x^2\cos x$
- ◯ **D.** $2x\sin x + x^2\cos x$

Question 5 $\frac{d}{dx}\tan x =$

- **A.** $\sec^2 x$
- **B.** $\cot x$
- **C.** $-\operatorname{cosec}^2 x$
- **D.** $\sec x \tan x$

Question 6 $\frac{d}{dx}(y^2) =$

- **A.** $2y$
- **B.** $2y\frac{dy}{dx}$
- **C.** $y\frac{dy}{dx}$
- **D.** $2\frac{dy}{dx}$

Question 7 If $x = t^2,\ y = t^3$, then $\frac{dy}{dx} =$

- **A.** $\frac{2}{3t}$
- **B.** $3t^2$
- **C.** $\frac{3t}{2}$
- **D.** $\frac{3t^2}{2}$

Question 8 $\frac{d}{dx}2^x =$

- **A.** $x2^{x-1}$
- **B.** 2^x
- **C.** $\frac{2^x}{\ln 2}$
- **D.** $2^x \ln 2$

Question 9 The normal to a curve with gradient $m = 4$ has gradient

- **A.** $-\frac{1}{4}$
- **B.** 4
- **C.** -4
- **D.** $\frac{1}{4}$

Question 10 $\frac{d}{dx}\frac{x}{x+1} =$

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

Answer grid - Differentiation: chain, product and quotient rules

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Question	Answer	Explanation
1	**A**	Chain rule.
2	**B**	3/(3x)=1/x.
3	**C**	Chain rule.
4	**D**	Product rule.
5	**A**	Standard result.
6	**B**	Implicit differentiation.
7	**C**	$3t^2/2t$.
8	**D**	a^x ln a.
9	**A**	Perpendicular.
10	**B**	$((x+1)-x)/(x+1)^2$.