

Mock Test Differentiation, A.P and G.P

1. If $y = \left[\log(x + \sqrt{x^2 + a^2}) \right]^2$, find $\frac{dy}{dx}$
2. If $y = \frac{\sin x}{\cos^2 x} + \log\left(\frac{1 + \sin x}{\cos x}\right)$ show that $\frac{dy}{dx} = 2 \sec^3 x$
3. If $x^m y^n = (x + y)^{m+n}$ show that $\frac{dy}{dx} = \frac{y}{x}$
4. If $y = (\sin x)^{\tan x}$, find $\frac{dy}{dx}$
5. A differentiable function f is defined $\forall x > 0$ and satisfies $f(x^2) = x^3, \forall x > 0$ then $f'(16)$ is equal to
 (a) 64 (b) 16 (c) 32 (d) none of these
6. If a, b and c are three unequal numbers such that they are in A.P and $b-a, c-b, a$ are in G.P then $a:b:c$ is
 (a) 1:2:3 (b) 1:3:4 (c) 1:4:3 (d) 4:1:2
7. If $\ln 2, \ln(2^x - 1)$ and $\ln(2^x + 3)$ are in A.P, find the value of x
8. Find the sum to n terms of the series $\frac{1}{2} + \frac{3}{4} + \frac{7}{8} + \frac{15}{16} + \dots$
9. If $a_1, a_2, a_3, \dots, a_n$ are in A.P with common difference $d \neq 0$, then show that

$$\sin d [\cos eca_1 \cos eca_2 + \cos eca_2 \cos eca_3 + \dots + \cos eca_{n-1} \cos eca_n] = \cot a_1 - \cot a_n$$
10. If $\log_x a, a^{\frac{x}{2}}$ and $\log_b x$ are in G.P show that $x = \log_a (\log_b a)$
11. Find three numbers a, b, c between 2 and 18 such that (i) their sum is 25 (ii) the numbers $2, a, b$ are in A.P and (iii) the numbers b, c and 18 are in G.P

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Best of luck!



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