

IN 4-5 Find the derivative

1. $\sin 2x + e^{x/2} + \ln|x| + x^2 + \ln e$.

2. $\arctan(x/10) + \cos(x/2) + \arcsin x^2 + \ln(x) + 7$,

3. $(\ln x)^{\ln x}$.

4. $\left| \frac{x-1}{x+1} \right| \sqrt{3x+2}$.

5. $\exp(\sin(\ln(\cos(\arctan x))))$.

6. $\int_1^e \frac{dt}{t} = ?$ 7. $\int_0^1 x^5 + 4x^4 + x - 7 \, dx = ?$

8. $\int \frac{t+t^3}{t^{1/2}} \, dt = ?$ 9. $\int_0^\pi \cos\left(\frac{x}{2}\right) \, dx = ?$

10. $\int \frac{dx}{e^x} = ?$ 11. $\int_0^4 \frac{3 \, dx}{x^2+16} = ?$

12. $\int \tan^2 x \sec^2 x \, dx = ?$

13. $\lim_{\theta \rightarrow 0} \frac{\sin 5\theta}{\sin 2\theta} = ?$

14. Show $y = e^x + e^{-x}$ is a solution to $y'' - y = 0$.

15. Find the equation of the tangent line to $y = x^x$ at $x = e$.

16. If $F(x) = \int_0^x f(s) \, ds$ and $f(x)$ is continuous, then what is $F'(x)$? why?

17. Find the area under the curve $y = \sin^2 x$ between $x = 0$ and $x = 2\pi$.

18. Discuss (i.e. where inc, dec, concavity, pts of inflection, rel mins & max's) and graph $y = x^2 e^{-x}$.

19.  Find x so to maximize θ .