

**Calculus I
Worksheet 18**

1. $y = \frac{2-x}{3x+1}$	2. $y = \ln \frac{e^x}{e^x-1}$
3. $y = \frac{e^{\ln x}}{x}$	4. $y = \cos^2 x$
5. $y = x^{\ln x}$	6. $y = x(\ln^3 x)$
7. $x = t - \sin t$ and $y = 1 - \cos t$	8. $y = 3^{2x}$
9. $y = x^2 \ln x$	10. $y = \sqrt{5-2x}$
11. $y = \frac{x-3}{2-5x}$	12. $y = \sqrt{x^2+2x-5}$

13. If $y = \sqrt{x^2+1}$, then find the derivative of y^2 with respect to x^2 .	14. If $y = x^2 + x$, then the derivative of y with respect to $\frac{1}{1-x}$ is ??
15. If $y = \sin x$, then find the derivative of y with respect to $\tan x$.	16. If $y = \sqrt{x^3+2x+1}$, then find the derivative of y^2 with respect to $\cos x$.
17. If $f(x) = \ln x$, then find $f^{iv}(x)$. Note: $f^{iv}(x)$ is the 4 th derivative of $f(x)$.	18. If $f(x) = x^4 - 4x^2$, then $f^{(iv)}(2) =$
19. If $y = e^{-x^2}$, then $y''(0)$ equals ??	20. Write the equation of the line tangent to $y = 4x^2 + 3$ at $(2, 19)$

Answers:

1. $\frac{-7}{(3x+1)^2}$	2. $\frac{-1}{e^x-1} = \frac{1}{1-e^x}$	3. 0	4. $-2 \cos x \sin x = -\sin 2x$
5. $x^{\ln x} \cdot \frac{2 \ln x}{x}$	6. $3 \ln^2 x + \ln^3 x$	7. $\frac{\sin t}{1-\cos t}$	8. $2 \ln 3 \cdot 3^{2x}$
9. $2x \ln x + x = x(2 \ln x + 1)$	10. $\frac{-1}{\sqrt{5-2x}}$	11. $\frac{-13}{(2-5x)^2}$	12. $\frac{x+1}{\sqrt{x^2+2x-5}}$
13. 1	14. $(2x+1)(1-x^2)$	15. $\cos^3 x$	16. $\frac{-3x^2-2}{\sin x}$
17. $-6x^{-4}$	18. 24	19. -2	20. $y - 19 = 16(x - 2)$