Week 7 Worksheet

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Differentiate the following functions:

1. $y = -5e^{3x+2}$
2. $y = 4e^{2x^2-4}$
3. $y = \frac{x^2}{e^x}$
4. $y = 4^{-5x+2}$
5. $y = 3 \cdot 4^{x^2+2}$
6. $y = \frac{x^2 e^{2x}}{x+e^{3x}}$
7. $y = \ln(4x)$
8. $y = \ln|4x^2 - 9x|$
9. $y = \ln\sqrt{x+6}$
10. $y = \ln|\ln x|$
11. $y = \log_3(x^2+2x)^{3/2}$
12. $y = \frac{\ln(t^2+1)+t}{\ln(t^2+1)+1}$
13. $y = (x^2+1)^{5x}$
14. $y = \log_2(x^2+x+1)$
15. $y = \frac{2x^{3/2}}{\ln(2x^{3/2}+1)}$
16. $y = x^{\ln x}$
17. (Challenge) Prove that the only positive integers a, b such that $a^b = b^a$ and $a \neq b$ are 2 and 4. (Hint: Re-write so it looks like $f(a) = f(b)$, then think about when f is increasing and decreasing.)