I. Differentiate each of the following:

1. $\tan^{-1}(e^x)$ that is $Arctan(e^x)$

2. $\sin^{-1}(1+x^2)$ that is $Arcsin(1+x^2))$

3. e^{x^3+x}

II. Integrate each of the following:

1. $\int \sin^3 x \cos^2 x \, dx$

2. $\int \sec x \, dx$

3. $\int \sin^2 x \, dx$

4. $\int \tan^3 x \, dx$

5. $\int x \sin(x) \, dx$

6. $\int \frac{xdx}{(x^2+9)}$

7. $\int \frac{dx}{(x^2+9)}$

8. $\int \frac{1}{\sqrt{9-x^2}}\, dx$

9. $\int \frac{x}{\sqrt{9-x^2}}\, dx$

10. $\int \frac{(\ln(x)}{x}\, dx$

11. $\int \ln x\, dx$

12. $\int xe^x\, dx$

13. $\int xe^{x^2}\, dx$

III. Discuss the graphs of the following as to where the function is inc/decr and con up/down find zero and assymptotes.

1. $f(x) = xe^x$