

Practice Final

1. $\int \frac{6x + 8}{3x^2 + 8x + 5} dx =$
2. Given $f(x) = 4x^2 + 11x - 3$, find $(f^{-1})'(12)$.
3. $\int (\cos x)3^{\sin x} dx =$
4. $\int \frac{1}{x^2 + 2x + 10} dx =$
5. $\int x^2 e^x dx =$
6. $\int \frac{3x - 13}{x^2 + 3x - 10} dx =$
7. $\lim_{x \rightarrow 0} \frac{2x - \sin x}{x} =$
8. $\lim_{x \rightarrow \pi/2} (\tan x - \sec x) =$
9. $\int_1^{\infty} 2xe^{2x^2} dx =$
10. $\int_0^3 \frac{dx}{(x-1)^{2/3}} =$
11. Determine if the following series converges:

$$\sum_{k=1}^{\infty} \frac{1}{1+k^2}.$$

12. Determine if the following series is absolutely convergent, conditionally convergent or divergent:

$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{n}{10n+1}.$$

13. Find the convergence set for the power series

$$1 + \frac{(x+1)}{2} + \frac{(x+1)^2}{2^2} + \frac{(x+1)^3}{2^3} + \dots$$

14. Find the power series centered at 0 for $f(x) = \frac{x}{1/x + 3x}$ and determine its convergence set.

15. Find the Taylor series in $(x - 2)$ of the function

$$f(x) = 1 - x + x^4.$$

16. Find the general solution of the differential equation $y'' + y' - 6y = 2x^2$. Find a particular solution satisfying $y(0) = 2$ and $y'(0) = -1$.

17. Review the problems from exam III.