Magnet Analysis 1A Name_____
Rose

Anti-differentiation by the Method of Substitution

$\frac{d}{dx}\left[\sin\left(x^2\right)\right] =$

So… $\int \cos\left(x^2\right) 2x\,dx =$

$\frac{d}{dx}\left[\sqrt{5x^3+1}\right] =$

So… $\int \frac{x^2}{\sqrt{5x^3+1}}\,dx =$

$\frac{d}{dx}\left[F\left(g\left(x\right)\right)\right] =$

Make the change of variable substitution, $u = g\left(x\right)$

So… $\int F'\left(g\left(x\right)\right)g'\left(x\right)dx =$

1. $\int x^3 \cos\left(x^4+2\right) dx =$

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

3. $\int \sqrt{2x+1}\, dx =$

Method #1 Method #2 Method #3

4. $\int \frac{x}{\sqrt{1-4x^2}} dx =$

5. $\int \cos(5x) dx =$

6. $\int \tan x\, dx =$

7. $\int \cos^3 x\, dx$

8. $\int \frac{x^2}{x^3+5} dx$

9. $\int \frac{x^2+2}{x^2+1}dx$

10. $\int \frac{\ln x}{x}dx$

11. $\int \frac{dx}{x\sqrt{\ln x}}$

12. $\int \cos x \cos(\sin x)dx$

13. $\int \frac{e^x}{e^x+1}dx$

14. $\int \frac{\arctan x}{1+x^2}dx$

15. $\int 5^x \, dx$

16. $\int \tan^2 x \sec^2 x \, dx$

17. $\int \frac{10\sqrt{x}}{\left(1+x^{3/2}\right)^2}$

18. $\int \sin(10x) e^{\sin^2(5x)} dx$

19. $\int \frac{x^3+1}{x^2+4} dx$

20. $\int \frac{1}{\sqrt{1-4x^2}}\,dx$

21. $\int \frac{x^4}{x^2+1}\,dx$

22. $\int \frac{1}{x\sqrt{x^2-16}}\,dx$

23. $\int \frac{2}{\sqrt{-x^2+4x}}\,dx$

24. $\int \frac{1}{x\sqrt{x^4-4}}\,dx$

25. $\int \frac{dx}{x^2-4x+7}$

26. $\int \frac{dx}{3x^2+12x+25}$

Other Trigonometric Anti-differentiation Techniques

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

28. $\int \cos^4 x \, dx$

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

30. $\int \csc x \, dx$

“Miscellaneous Substitution”

31. $\int \frac{1}{1+\sqrt{3x}}\,dx$

32. $\int \frac{\sqrt[3]{x}}{\sqrt[3]{x}-1}\,dx$

33. $\int \frac{\sqrt{x-2}}{x+1}\,dx$

34. $\int \frac{dx}{\sqrt{x}(1+x)}$