

SUBSTITUTION WORKSHEET

MATH 3 / FALL 2012

1. $\frac{1}{7}e^{7x} + C$ $[u = 7x]$
2. $2\sin(x/2) + C$ $[u = x/2]$
3. $\frac{1}{2}e^{x^2} + C$ $[u = x^2]$
4. $\frac{1}{3}(1 - x^2)^{3/2} + C$ $[u = 1 - x^2]$
5. $\frac{1}{2}(\ln x)^2 + C$ $[u = \ln x]$
6. $\frac{1}{2}\ln(1 + x^2) + C$ $[u = 1 + x^2]$
7. $\frac{1}{8}\cos^4(2x) + C$ $[u = \cos(2x)]$
8. $\ln(1 + e^x) + C$ $[u = 1 + e^x]$
9. $\frac{1}{6}\sec^2(3x) + C$ $[u = \sec(3x) \text{ or } u = \tan(3x)]$
10. $\frac{1}{8}(x^2 + 5x)^8 + C$ $[u = x^2 + 5x]$
11. $-\frac{1}{11}(3 - x)^{11} + C$ $[u = 3 - x]$
12. $\frac{14}{3}(7x + 9)^{3/2} + C$ $[u = 7x + 9]$
13. $\frac{1}{4}(1 + x^6)^{2/3} + C$ $[u = 1 + x^6]$
14. $\frac{1}{5}e^{5x+2} + C$ $[u = 5x + 2]$
15. $-\cos(\ln x) + C$ $[u = \ln x]$
16. $3\ln(\ln x) + \ln x + C$ $[u = \ln x]$
17. $\frac{1}{5}e^{-\cos(5x)} + C$ $[u = \cos(5x)]$
18. $\frac{1}{7}(x - 1)^7 + \frac{2}{3}(x - 1)^6 + C$ $[u = x - 1]$
19. $\frac{8}{3}(4 - x)^{3/2} - \frac{2}{5}(4 - x)^{5/2} + C$ $[u = 4 - x]$
20. $x - \frac{7}{2}\ln|2x - 3| + C$ $[u = 2x - 3]$
21. $\frac{1}{2}x^2 + 6x + 8\ln|x + 2| + C$ $[u = 2x - 3]$
22. $C + \frac{18}{5}\ln x + \frac{3}{10}(\ln x)^2 - \frac{4}{15}(\ln x)^3 - \frac{1}{20}(\ln x)^4$ $[u = \ln x]$

23. $\frac{4}{5}(4 - \sqrt{x})^{5/2} - \frac{16}{3}(4 - \sqrt{x})^{3/2} + C$ $[u = 4 - \sqrt{x}]$
24. $\frac{1}{5} \ln |\sec(5x)| + C$ $[\text{Use } \tan(5x) = \sin(5x)/\cos(5x); u = \cos(5x)]$
25. $\frac{1}{3} \cos^3(x) - \cos(x) + C$ $[\text{Use } \sin^2(x) = 1 - \cos^2(x); u = \cos(x)]$
26. $\frac{2}{3}(5 + \tan(x))^{3/2} + C$ $[u = 5 + \tan(x)]$
27. $\frac{1}{2}(\ln \sin(x))^2 + C$ $[u = \ln \sin(x)]$
28. $\sin(e^x) + C$ $[u = e^x]$
29. $\frac{1}{5} \sec^5(x) + C$ $[u = \sec(x)]$
30. $\ln \sqrt{x^2 - 10x + 9} + C$ $[u = x^2 - 10x + 9]$