CALCULUS AB   NAME _____
WORKSHEET #2 ON SUBSTITUTION   PERIOD _____

Work the following problems neatly on notebook paper.

Evaluate each indefinite integral. Show *u* and *du* for each problem.

1. $\int (x+2)\sqrt{x-2}\,dx$

2. $\int \dfrac{x^2}{\sqrt{x-4}}\,dx$

3. $\int x^2\sqrt{1-x}\,dx$

Evaluate each definite integral. Show *u* and *du* for each problem. Change the limits of integration and evaluate each integral in terms of *u*. Do not switch back to *x*.

4. $\int_{-1}^{1} x(x^2+1)^3\,dx$

5. $\int_{1}^{2} 2x^2\sqrt{x^3+1}\,dx$

6. $\int_{0}^{4} \dfrac{1}{\sqrt{2x+1}}\,dx$

7. $\int_{0}^{3} \sqrt{x+1}\,dx$

8. $\int_{-\pi/4}^{0} \tan x \sec^2 x\,dx$

9. $\int_{-1/3}^{2} \dfrac{dx}{3x+2}$

10. $\int_{3/2}^{3} \dfrac{dx}{4x-5}$

11. $\int_{2}^{5} \dfrac{dx}{2x-3}$

12. $\int_{-1}^{3} \dfrac{x}{x^2+1}\,dx$

13. $\int_{0}^{2} \dfrac{e^x}{3+e^x}\,dx$

14. $\int_{0}^{\pi/2} \cos\left(\dfrac{2x}{3}\right)\,dx$

15. $\int_{1}^{9} \dfrac{e^{\sqrt{x}}}{2\sqrt{x}}\,dx$

16. $\int_{1}^{e^3} \dfrac{1}{x}\,dx$

17. $\int_{0}^{4} \dfrac{4}{2x+1}\,dx$

18. $\int_{1}^{e} \dfrac{(1+\ln x)^3}{x}\,dx$

19. $\int_{0}^{\pi/2} \dfrac{1-\sin x}{x+\cos x}\,dx$

20. $\int_{0}^{1/2} e^{-2x}\,dx$

ANSWERS

1. $\dfrac{2(x-2)^{5/2}}{5} + \dfrac{8(x-2)^{3/2}}{3} + C$

2. $\dfrac{2(x-4)^{5/2}}{5} + \dfrac{16(x-4)^{3/2}}{3} + 32(x-4)^{1/2} + C$

3. $-\dfrac{2}{105}(1-x)^{3/2}(15x^2 + 12x + 8) + C$

4. 0

5. $12 - \dfrac{8}{9}\sqrt{2}$

6. 2

7. $14/3$

8. $-1/2$

9. $\dfrac{\ln 8}{3}$

10. $\dfrac{\ln 7}{4}$

11. $\dfrac{\ln 7}{2}$

12. $\dfrac{\ln 5}{2}$

13. $\ln\left(\dfrac{3+e^2}{4}\right)$

14. $\dfrac{3\sqrt{3}}{4}$

15. $e^3 - e$

16. 3

17. $4\ln 3$

18. $15/4$

19. $\ln\left(\dfrac{\pi}{2}\right)$

20. $\dfrac{1}{2}\left(1 - \dfrac{1}{e}\right)$