CALCULUS AB NAME _____

WORKSHEET #1 ON SUBSTITUTION PERIOD _____

Work the following problems neatly on notebook paper. Show *u* and *du* for each problem.

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

2. $\int (2x+3)^{11}\, dx$

3. $\int \sqrt{5x-1}\, dx$

4. $\int \sqrt[3]{6x+1}\, dx$

5. $\int 5(3-4x)^{2/3}\, dx$

6. $\int \frac{dx}{(8x-1)^3}$

7. $\int x(x^2+2)^6\, dx$

8. $\int 6x^2\sqrt{3x^3-1}\, dx$

9. $\int \left(1+\frac{1}{x}\right)^3 \left(\frac{1}{x^2}\right) dx$

10. $\int x^{1/3}\left(x^{4/3}+9\right)^8\, dx$

11. $\frac{2}{3}\int \sqrt{4-\frac{3}{5}x}\, dx$

12. $\int (3x+15)\sqrt{x^2+10x+4}\, dx$

13. $\int \sin 5x\, dx$

14. $\int \cos\frac{x}{2}\, dx$

15. $\int \frac{1}{3}\sec^2 8x\, dx$

16. $\int \sin 4x \cos 4x\, dx$

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

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

19. $\int \sqrt{\cos 6x}\sin 6x\, dx$

20. $\int \frac{\sin x}{(4-\cos x)^3}\, dx$

21. $\int e^{6x}\, dx$

22. $\int 4e^{-2x}\, dx$

23. $\int \sin x \cdot e^{\cos x}\, dx$

24. $\int \frac{e^{\tan x}}{\cos^2 x}\, dx$

25. $\int e^x\sqrt{4-e^x}\, dx$

26. $\int \frac{e^x+e^{-x}}{e^x-e^{-x}}\, dx$

27. $\int \frac{e^{-x}}{4+e^{-x}}\, dx$

28. $\int \frac{2}{x+2}\, dx$

29. $\int \frac{5}{4-3x}\, dx$

30. $\int \frac{x}{x^2-1}\, dx$

31. $\int \frac{x^2}{5-x^3}\, dx$

32. $\int \frac{2x-5}{x^2-5x-1}\, dx$

33. $\int \frac{x}{\sqrt[3]{x^2+1}}\, dx$

34. $\int \frac{(\ln x)^5}{x}\, dx$

35. $\int \frac{5}{x\ln x}\, dx$

36. $\int \frac{\sin\theta}{4-3\cos\theta}\, d\theta$

HINTS

9. Let $u = 1 + 1/x$.
16. Let $u = \sin 4x$ or let $u = \cos 4x$.
17. Let $u = \cos x$.
18. Let $u = \tan x$.
19. Let $u = \cos 6x$.
26. Let $u = e^x - e^{-x}$.
27. Let $u = 4 + e^{-x}$.
34. Let $u = \ln x$.
35. Let $u = \ln x$.

ANSWERS

1. $\dfrac{2(x-2)^{3/2}}{3} + C$
2. $\dfrac{(2x+3)^{12}}{24} + C$
3. $\dfrac{2(5x-1)^{3/2}}{15} + C$
4. $\dfrac{(6x+1)^{4/3}}{8} + C$
5. $\dfrac{-3(3-4x)^{5/3}}{4} + C$
6. $\dfrac{-1}{16(8x-1)^2} + C$
7. $\dfrac{(x^2+2)^7}{14} + C$
8. $\dfrac{4(3x^3-1)^{3/2}}{9} + C$
9. $\dfrac{-\left(1+\frac{1}{x}\right)^4}{4} + C$
10. $\dfrac{(x^{4/3}+9)^9}{12} + C$
11. $\dfrac{-20\left(4-\frac{3}{5}x\right)^{3/2}}{27} + C$
12. $(x^2+10x+4)^{3/2} + C$
13. $-\dfrac{\cos 5x}{5} + C$
14. $2\sin\dfrac{x}{2} + C$
15. $\dfrac{\tan 8x}{24} + C$
16. $\dfrac{\sin^2 4x}{8} + C$ or $\dfrac{-\cos^2 4x}{8} + C$
17. $\dfrac{-\cos^4 x}{4} + C$
18. $\dfrac{\tan^2 x}{2} + C$
19. $\dfrac{-(\cos 6x)^{3/2}}{9} + C$
20. $\dfrac{-1}{2(4-\cos x)^2} + C$
21. $\dfrac{e^{6x}}{6} + C$
22. $-2e^{-2x} + C$
23. $-e^{\cos x} + C$
24. $e^{\tan x} + C$
25. $\dfrac{-2(4-e^x)^{3/2}}{3} + C$
26. $\ln|e^x - e^{-x}| + C$
27. $-\ln(4+e^{-x}) + C$
28. $2\ln|x+2| + C$
29. $-\dfrac{5}{3}\ln|4-3x| + C$
30. $\dfrac{1}{2}\ln|x^2-1| + C$
31. $-\dfrac{1}{3}\ln|5-x^3| + C$
32. $\ln|x^2-5x-1| + C$
33. $\dfrac{3}{4}(x^2+1)^{2/3} + C$
34. $\dfrac{(\ln x)^6}{6} + C$
35. $5\ln(\ln x) + C$
36. $\dfrac{\ln|4-3\cos\theta|}{3} + C$