AP Calculus

Name_____

Integration by Substitution

Integration Day 11

Evaluate the indefinite integral

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

2. $\int \frac{e^u}{\left(1-e^u\right)^2}\, du$

3. $\int \frac{\sin\sqrt{x}}{\sqrt{x}}\, dx$

4. $\int \frac{a+bx^2}{\sqrt{3ax+bx^3}}\, dx$

5. $\int \frac{z^2}{z^3+1} dz$

6. $\int \frac{(\ln x)^2}{x} dx$

7. $\int \frac{dx}{ax+b}$

8. $\int e^{\cos t} \sin t\, dt$

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

10. $\int \frac{\sin(\ln x)}{x}\,dx$

11. $\int \frac{\cos\left(\frac{\pi}{x}\right)}{x^2}\,dx$

12. $\int \frac{2^t}{2^t+3}\,dt$

13. $\int \frac{dt}{\cos^2 t\sqrt{1+\tan t}}$

14. $\int \frac{\sin x}{1+\cos^2 x}\,dx$

15. $\int \frac{dx}{\sqrt{1-x^2}\sin^{-1} x}$

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

17 $\int \frac{1+x}{1+x^2}\,dx$

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**Answers:**

1) $-\frac{1}{3}\ln|5-3x|+C$

2) $-\frac{1}{1-e^{u}}+C$

3) $-2\cos\sqrt{x}+C$

4) $\frac{2}{3}\sqrt{3ax+bx^3}+C$

5) $\frac{1}{3}\ln|z^3+1|+C$

6) $\frac{1}{3}(\ln x)^3+C$

7) $\frac{1}{a}\ln|ax+b|+C$

8) $-e^{\cos t}+C$

9) $\frac{1}{2}(\tan^{-1}x)^2+C$

10) $-\cos(\ln x)+C$

11) $-\frac{1}{\pi}\sin\left(\frac{\pi}{x}\right)+C$

12) $\frac{1}{\ln 2}\ln|2^t+3|+C$

13) $2\sqrt{1+\tan t}+C$

14) $-\tan^{-1}(\cos x)+C$

15) $\ln|\sin^{-1}x|+C$

16) $\frac{1}{2}\tan^{-1}(x^2)+C$

17) $\tan^{-1}(x)+\frac{1}{2}\ln|1+x^2|+C$