Calc 1 Worksheet #23
Box Method/Most Complicated Rule

Learn: Most Complicated Rule

Examples:

1. $\int 28(7x-2)^{-5}dx$ g: $\square(7x-2)^{-4} \Rightarrow c: -4\square(7x-2)^{-5}(7)dx = 28(7x-2)^{-5}\text{dx}$ *if* $\square = -1 \therefore$ A: $-(7x-2)^{-4}+\text{c}$
2. $\int x^3(x^4-1)^2$ g: $\square(x^4-1)^3 \Rightarrow c: 3\square(x^4-1)^2\left(4x^3\right)dx = x^3(x^4-1)^2dx$ if $\square = \frac{1}{12} \therefore$ A: $\frac{1}{12}(x^4-1)^3+c$
3. $\int 6\cos t(2\sin t)^{-3}dt$ g; $\square(2\sin t)^{-2} \Rightarrow c: -2\square(2\sin t)^{-3}(2\cos t)dt \Rightarrow -4\square(2\sin t)^{-3}(\cos t)dt = 6\cos t(2t\sin t)^{-3}dt$ if $\square = \frac{-3}{2} \therefore$ A: $\frac{-3}{2}(2\sin t)^{-2}+c$

Problems:

1. $\int (x+2)^4\ dx$	2. $\int (1-x)^9\ dx$	3. $\int \frac{dx}{(4-x)^2}$	4. $\int \frac{dx}{x+2}$
5. $\int \frac{dx}{2x-1}$	6. $\int \frac{dx}{(3x+2)^2}$	7. $\int x\left(x^2-1\right)^4\ dx$	8. $\int \frac{x}{1+x^2}\ dx$
9. $\int \frac{x}{\sqrt{1-x^2}}\ dx$	10. $\int x\sqrt{x^2-1}\ dx$	11. $\int xe^{x^2}\ dx$	12. $\int x\sin x^2\ dx$
13. $\int e^x\cos e^x\ dx$	14. $\int \cos x\left(e^{\sin x}\right)dx$	15. $\int (2x-1)^4\ dx$	16. $\int \frac{dx}{1-x}$
17. $\int \frac{x}{1-x^2}\ dx$	18. $\int x\left(x^2+1\right)^9\ dx$	19. $\int x\sqrt{1-x^2}\ dx$	20. $\int \frac{x}{\sqrt{x^2+4}}\ dx$
21. $\int \frac{x^2}{x^3+1}\ dx$	22. $\int x^2\sqrt{x^3+1}\ dx$	23. $\int \frac{\cos x}{1+\sin x}\ dx$	24. $\int \frac{e^x}{1+e^x}\ dx$

Answers:

1. $\frac{(x+2)^5}{5}+C$	2. $\frac{-(1-x)^{10}}{10}+C$	3. $\frac{1}{4-x}+C$	4. $\ln\lvert x+2\rvert+C$
5. $\frac{1}{2}\ln\lvert 2x-1\rvert+C$	6. $-\frac{1}{3(3x+2)}+C$	7. $\frac{(x^2-1)^5}{10}+C$	8. $\frac{1}{2}\ln(1+x^2)+C$
9. $-\sqrt{1-x^2}+C$	10. $\frac{\sqrt{(x^2-1)^3}}{3}+C$	11. $\frac{e^{x^2}}{2}+C$	12. $\frac{-\cos x^2}{2}+C$
13. $\sin e^x+C$	14. $e^{\sin x}+C$	15. $\frac{(2x-1)^5}{10}+C$	16. $-\ln\lvert 1-x\rvert+C$
17. $-\frac{1}{2}\ln\lvert 1-x^2\rvert+C$	18. $\frac{(x^2+1)^{10}}{20}+C$	19. $-\frac{\sqrt{(1-x^2)^3}}{3}+C$	20. $\sqrt{x^2+4}+C$
21. $\frac{1}{3}\ln\lvert x^3+1\rvert+C$	22. $\frac{2\sqrt{(x^3+1)^3}}{9}+C$	23. $\ln\left(1+\sin x\right)+\text{C}$	24. $\ln(1+e^x)+C$

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