

Calc 1 Worksheet #23
Box Method/Most Complicated Rule

Learn: Most Complicated Rule

Examples:

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| 1. $\int 28(7x-2)^{-5} dx$ g: $\square(7x-2)^{-4} \Rightarrow c: -4\square(7x-2)^{-5}(7)dx = 28(7x-2)^{-5} dx$ if $\square = -1 \therefore$ A: $-(7x-2)^{-4} + c$ |
| 2. $\int x^3(x^4-1)^2$ g: $\square(x^4-1)^3 \Rightarrow c: 3\square(x^4-1)^2(4x^3)dx = x^3(x^4-1)^2 dx$ 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:

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|-------------------------------------|----------------------------------|---------------------------------------|--------------------------------------|
| 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. $\int x(x^2-1)^4 dx$ | 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. $\int \cos x(e^{\sin x}) dx$ | 15. $\int (2x-1)^4 dx$ | 16. $\int \frac{dx}{1-x}$ |
| 17. $\int \frac{x}{1-x^2} dx$ | 18. $\int x(x^2+1)^9 dx$ | 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:

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|----------------------------------|---------------------------------------|---------------------------------------|--------------------------------|
| 1. $\frac{(x+2)^5}{5} + C$ | 2. $\frac{-(1-x)^{10}}{10} + C$ | 3. $\frac{1}{4-x} + C$ | 4. $\ln x+2 + C$ |
| 5. $\frac{1}{2}\ln 2x-1 + C$ | 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. $-\ln 1-x + C$ |
| 17. $-\frac{1}{2}\ln 1-x^2 + C$ | 18. $\frac{(x^2+1)^{10}}{20} + C$ | 19. $-\frac{\sqrt{(1-x^2)^3}}{3} + C$ | 20. $\sqrt{x^2+4} + C$ |
| 21. $\frac{1}{3}\ln x^3+1 + C$ | 22. $\frac{2\sqrt{(x^3+1)^3}}{9} + C$ | 23. $\ln(1+\sin x) + C$ | 24. $\ln(1+e^x) + C$ |

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