

Box Method / Most Complicated Rule

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Name: _____ Date: _____ Score: _____

Use the Most Complicated Rule (u-substitution) to integrate each problem. Show all work.

Calc 1 Worksheet #23 Box Method/Most Complicated Rule

Learn: Most Complicated Rule

Examples:

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

2. $\int x^3(x^4-1)^2 dx$ 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;

$\square(2\sin t)^{-2} \Rightarrow c: -2\square(2\sin t)^{-3}(2\cos t)dt \Rightarrow -4\square(2\sin t)^{-3}(\cos t)dt = 6\cos t(2\sin t)^{-3} dt$ 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. $\int x(x^2-1)^4 dx$	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. $\int \frac{e^x}{1+e^x} dx$

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Answer key — for instructor use only.

Answers:

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. $\ln(1+e^x) + C$