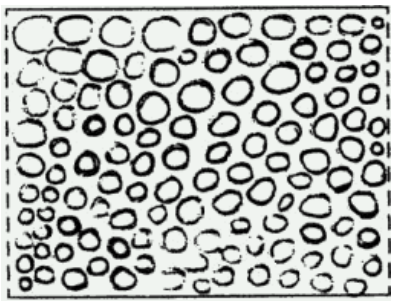
A Droodle for Integration Techniques

by David H. Pleacher in the *Virginia Mathematics Teacher* Fall 1991

Directions:
Solve each of the integration problems and locate the letters of the corresponding answer. Then in the spaces below, write the letter that corresponds to each number. This will give you the titles of the droodle (this droodle is from a book called *Droodles* by Roger Price).



Title 1: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

10 23 14 23 20 6 21 11 6 19 5 8

___ ___ ___ .

13 23 14

Title 2: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

20 1 16 11 8 7 25 12 26 6 5 3

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ .

4 3 12 20 20 11 6 2 12 24

Title 3: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

25 6 3 11 13 4 20 23 3 12

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ -

25 13 23 4 12 8 8 23 26 8 6 5

___ ___ ___ ___ .

24 5 8 4

Title 4: ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

25 13 23 4 25 20 23 3 12 8

___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___.

12 1 10 11 6 23 1 5 23 13 12 3 17

Problems

_____1. $\int_{-1}^{8} \frac{|x|}{x}\,dx$

_____2. $\int \sqrt{\sin x}\ \cos x\ dx$

_____3. $\int_{-3}^{3} (x - \sin x)\ dx$

_____4. $\int_{0}^{1} \frac{e^x + 3}{e^x}\,dx$

_____5. $\int_{1}^{e} \frac{dx}{x}$

_____6. $\int_{0}^{2} \frac{x}{x^2 + 2}\,dx$

_____7. $\int_{0}^{\ln 3} e^{2x}dx$

_____8. $\int_{0}^{\pi/2} e^{\cos x} \sin x\,dx$

_____9. $\int_{1/3}^{0} (3x - 1)^5\ dx$

_____10. $\int_{0}^{1} (x+1)e^{x^2+2x}\ dx$

_____11. $\int_{0}^{\pi/4} \tan^2 x\ dx$

_____12. $\int_{0}^{1/2} \frac{2x\,dx}{\sqrt{1 - x^2}}$

_____13. $\int \frac{5}{1 + x^2}\,dx$

_____14. $\int_{1}^{2} \frac{x - 4}{x^2}\,dx$

_____15. $\int \frac{\ln x}{x}\,dx$

_____16. $\int \tan x\,dx$

_____17. $\int x \ln x\ dx$

_____18. $\int e^x \cos x\,dx$

_____19. $\int \sec x\,dx$

_____20. $\int \ln x\ dx$

_____21. $\int \frac{x^3-2x+3}{x^2-2x-3}\,dx$

_____22. $\int \frac{x}{x+2}\,dx$

_____23. $\int x^2 e^x\,dx$

_____24. $\int \sqrt[3]{\sin x}\,\cos x\ dx$

_____25. $\int \frac{dx}{x^2+4x}$

_____26. $\int \frac{x^2-x+2}{x^2-1}\,dx$

Answers

A. $2-\sqrt{3}$

B. $\frac{e^3-1}{2}$

C. $\ln\sqrt{3}$

D. $\frac{1}{4}x^2(2\ln x-1)+C$

E. 1

F. $x\ln|x|-x+C$

G. 4

H. $\frac{1}{2}x^2+2x-\ln|x+1|+6\ln|x-3|+C$

I. $1-\frac{\pi}{4}$

J. $\frac{2}{3}(\sin x)^{\frac{3}{2}}+C$

K. $\ln|\sec x+\tan x|+C$

L. 7

M. $\frac{3}{4}(\sin x)^{\frac{4}{3}}+C$

N. $-1+e$

O. $(x^2-2x+2)e^x+C$

P. $5\tan^{-1}x+C$

Q. $\frac{1}{2}(\ln|x|)^2+C$

R. 0

S. $\frac{1}{4}\ln\left|\frac{x}{x+4}\right|+C$

T. $4-\frac{3}{e}$

U. $x+\ln\left|\frac{x-1}{(x+1)^2}\right|+C$

V. $\frac{1}{18}$

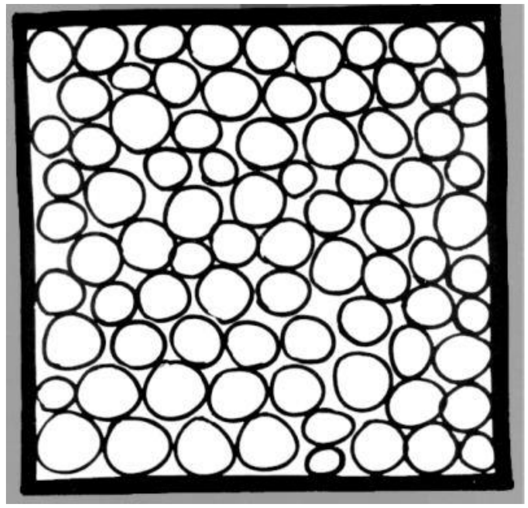
W. $x-2\ln|x+2|+C$

X. $\ln 2-2$

Y. $\ln|\sec x|+C$

Z. $\frac{1}{2}e^x(\sin x+\cos x)+C$

Here are some other titles for this Droodle from Roger Price:



Title 5: __ __ __ __ __ - __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __

6 1 23 25 5 - 26 13 23 20 4 21 5 20 1 12 7 26 25 5 17 12 4

__ __ __ __ __ __ '__ __ __ __ __ __ __ __ __ __

6 26 25 4 5 3 ' 25 1 12 25 4 25 4 12 8 17

Title 6: __

4 3 12 6 16 25 1 5 20 4 10 19 13 23 7 23 25 4 11 6 16 13 12 3 12 17 5

Title 7: __ __ __ __ __ __ __ __ __ __ - __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __

9 5 3 19 6 1 23 25 5 - 26 13 23 20 20 3 5 6 16 1 5 6 21 12 24 13

Title 8: __

7 23 13 21 5 3 21 23 26 25 11 8 7 17 5 9 5 1 23 13 24 5 8 4

Title 9: __

5 14 13 1 23 25 11 23 8 11 8 12 13 11 18 18 12 20 12 6 4 23 3 19

Title 10: __ __ - __ __ - __

17 23 - 11 4 - 19 23 26 3 25 5 1 20 25 22 11 25 25 6 21 5 5 25 5 16 11 4

Title 11: 52 - __ __ __ __ __ __ __ __ __ __ __ __ __ __

3 11 8 7 20 1 5 12 6 11 3 6 26 25

Title 12: __

23 26 4 25 11 17 5 22 23 3 1 17 12 25 25 5 5 8 10 19 12 24 12 8

__ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __ __

1 11 9 11 8 7 11 8 12 25 12 1 4 25 21 12 16 5 3