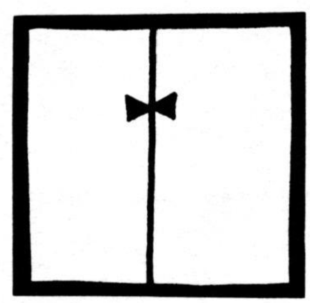
Droodle for Integration Review

Answer Key by David Pleacher

Can you name this droodle?



Back in 1953, Roger Price invented a minor art form called the Droodle, which he described as "a borkley-looking sort of drawing that doesn't make any sense until you know the correct title." The droodle above was drawn by Roger Price and published in his book called, *Droodles*.

To determine the title to this droodle, you must first solve the problems in the puzzle and find the corresponding answers. Then replace each numbered blank in the puzzle with the letter corresponding to the answer for that problem and that will give you the title.

Title:

M A N I N T U X E D O W H O

S T O O D T O O C L O S E T O

T H E F R O N T O F A N

E L E V A T O R .

Here are the choices for your answers:

A. 1

B. 0

C. 1 and 5

D. 1.204

E. $2\sqrt{2}-2$

E. $\frac{16}{3}$

E. $\frac{29}{4}$

F. $\frac{88}{3}$

H. $\frac{125}{6}$

H. $\frac{125}{6}$

I. A – B

J. B - A

K. $\pm\sqrt{66}$

L. $\pm\sqrt{58}$

M. 6.204

N. 2π

O. 8π

O. $x\ln 2x - x + C$

O. $\frac{1}{\ln x} + C$

O. $y = \frac{-1}{\ln x - 3}$

P. $\frac{\ln 2x}{x} + C$

R. $-\ln\left|\csc x + \cot x\right| + C$

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

R. $3\tan^{-1}\left(\frac{x}{3}\right) + C$

R. $\frac{\tan^7 x \sec^3 x}{21} + C$

S. $\frac{1}{2}\tan\left(x^2\right) + C$

T. $\frac{\tan^7 x}{7} + C$

T. $\frac{1}{3}\tan^{-1}\left(\frac{x}{3}\right) + C$

T. $\pi\int_0^1 \left(x^2+1\right)^6 dx$

U. $\pi\int_1^8 \left(x^2+1\right)^6 dx$

U. $2\pi\int_0^9 x\sqrt{x}\, dx$

V. $\frac{2}{5}(x+3)^{\frac{5}{2}} - 2(x+3)^{\frac{3}{2}} + C$

W. $\frac{x^4}{4} + \frac{e^{3x}}{3} + C$

W. $\frac{20}{3}\left(5x^2-4\right)^{\frac{3}{2}} + C$

X. $\frac{1}{15}\left(5x^2-4\right)^{\frac{3}{2}} + C$

Y. $\frac{e^{x^4}}{4} + \frac{e^{3x}}{3} + C$

Z. None of the above

O 1. Given $f(x)=\ln(x)$ and $g'(x)=\dfrac{f'(x)}{-\left(f(x)\right)^2}$, determine $g(x)$.

N 2. $\displaystyle\int_{-1}^{1}\frac{4}{1+x^2}\,dx=$

X 3. $\displaystyle\int x\sqrt{5x^2-4}\,dx=$

C 4. The acceleration of a particle moving along the x-axis at time *t* is given by a(t) = 4t – 12. If the velocity is 10 when t = 0 and the position is 4 when t = 0, then the particle is changing direction at *t* =

E 5. Determine the average value of the function $f(x)=\left(x-1\right)^2$ on the interval from x = 1 to x = 5.

W 6. $\displaystyle\int\left(e^{3\ln x}+e^{3x}\right)dx=$

T 7. A solid is generated when the region in the first quadrant enclosed by the graph of $y=\left(x^2+1\right)^3$, the line x = 1, the x-axis, and the y-axis is revolved about the x-axis. Its volume is found by evaluating what integral?

L 8. f $\dfrac{dy}{dx}=\dfrac{\left(3x^2+2\right)}{y}$ and y = 4 when x = 2, then when x = 3, y =

T 9. $\int \frac{dx}{9+x^2} =$

V 10. $\int x\sqrt{x+3}\,dx =$

A 11. $\int_0^{\frac{\pi}{4}} \sin x\,dx + \int_{-\frac{\pi}{4}}^{0} \cos x\,dx =$

I 12. If $\int_{30}^{100} f(x)dx = A$ and $\int_{50}^{100} f(x)dx = B$, then $\int_{30}^{50} f(x)dx =$

O 13. The volume generated by revolving about the y-axis the region enclosed by the graphs $y = 9 - x^2$ and $y = 9 - 3x$, for $0 \le x \le 2$, is

O 14. $\int \ln 2x\,dx =$

M 15. (Calculator) Find the distance traveled in the first four seconds, for a particle whose velocity is given by $v(t) = 7e^{-t^2}$, where t stands for time.

D 16. (Calculator) Determine the average value of the function $f(x) = \ln^2 x$ on the interval [2, 4].

T 17. $\int \tan^6 x \sec^2 x\,dx =$

S 18. $\int x\sec^2\left(x^2\right)dx =$

F 19. $\int_1^5 \left(x^2 - x\right)dx$

E 20. Find the area under the curve $y = 4 - x^2$ from x = -1 to x = 1 using the Trapezoidal rule with n = 4.

R 21. $\int \csc x\,dx =$

E 22. Find the area of the region between the curve y = sin(x) and the curve y = cos(x) from $x = 0$ to $x = \frac{\pi}{2}$.

H 23. Find the area of the region between the curve $x = y^2 - 4y$ and the line x = y.

U 24. Find the volume of the region that results when the region bounded by the curve $y = \sqrt{x}$, the x-axis, and the line x = 9 is revolved around the y-axis. Set up but do not evaluate the integral.

O 25. If $\frac{dy}{dx} = \frac{y^2}{x}$ and $y(1) = \frac{1}{3}$, find an equation for y in terms of x.