Jeopardy Answers
Math 213
Spring, 2006

Basic Integrals

\$100 $\displaystyle\int yx^2\,dx = \frac{1}{3}yx^3 + C$

\$200 $\displaystyle\int \frac{x}{3\sqrt[3]{y^2}}\,dy = xy^{\frac{1}{3}} + C$

\$300 $\displaystyle\int \frac{3x^3 - 4x^2 + 2y^3}{x}\,dx = x^3 - 2x^2 + 2y^3\ln|x| + C$

\$400 $\displaystyle\int 5\mathrm{e}^{-2y}\,dx = 5\mathrm{e}^{-2y}x + C$

\$500 $\displaystyle\int \sin(xy) + \cos(xy^2)\,dx = -\frac{1}{y}\cos(xy) + \frac{1}{y^2}\sin(xy^2) + C$

Substitution

\$100 $\displaystyle\int y^3(y^4 + 3x)^{16}\,dy = \frac{1}{68}(y^4 + 3x)^{17} + C$

\$200 $\displaystyle\int \frac{1}{\sqrt{1 + xy^2}}\,dx = \frac{2}{y^2}\sqrt{1 + xy^2} + C$

\$300 $\displaystyle\int x\sqrt{x - 5y}\,dx = \frac{2}{5}(x - 5y)^{\frac{5}{2}} + \frac{10}{3}y(x - 5y)^{\frac{3}{2}} + C$

\$400 **Daily Double!**
$\displaystyle\int \sin^3(yx)\sqrt{\cos(yx)}\,dx = -\frac{2}{3y}\cos^{\frac{3}{2}}(yx)) - \frac{2}{7}\cos^{\frac{7}{2}}(yx)) + C$

\$500 $\displaystyle\int \frac{\mathrm{e}^{2x}}{1 + \mathrm{e}^x}\,dx = e^x - \ln(1 + e^x) + C$

Integration by Parts

\$100 $\displaystyle\int xye^x\,dx = xye^x - ye^x + C$

\$200 $\displaystyle\int y^3 + x^3\ln(x)\,dx = y^3x + \frac{x^4}{4}\ln(x) - \frac{x^4}{16} + C$

\$300 $\displaystyle\int (x - 2y)\cos(x + y)\,dy = (x - 2y)\sin(x + y) - 2\cos(x + y) + C.$

\$400 $\displaystyle\int x^2\sin(yx)\,dx = -\frac{x^2}{y}\cos(yx) + \frac{2x}{y^2}\sin(yx) + \frac{2}{y^3}\cos(yx) + C$

\$500 $\int y^2 \cos(y+x)\sin(-3x)\,dx = \frac{9y^2}{24}\cos(y+x)\cos(-3x) - \frac{y^2}{8}\sin(-3x)\sin(y+x) + C$

Definite Integrals

\$100 $\int_1^2 x + y^2\ dy = x + \frac{7}{3}$

\$200 $\int_0^1 (x+y)\sin(y)\,dx = \frac{1}{2}y + y\sin(y)$

\$300 $\int_e^{e^2} \frac{1}{x\ln x}\,dx = ln(2)$

\$400 $\int_{\frac{\pi}{3}}^{\pi} y\cos(x)\ dx = -\frac{\sqrt{3}}{2}y$

\$500 **Daily Double!**

$\int_0^1 x^2(1+yx^3)^3\,dx = \frac{1}{3y}\left(\frac{(1+y)^4}{4} - \frac{1}{4}\right)$

Final Jeopardy

$\int \sin^5(yx)\cos(yx)\ dy = \frac{1}{6x}\sin^6(xy)$