Warm Up

$\frac{1+2e^3}{9} \approx 4.575$

Evaluate each of the following:

$$\int e^{2t}\sqrt{1+e^{2t}}\,dt$$

$$\frac{1}{2}\int (1+e^{2t})^{1/2} e^{2t}(2)\,dt$$

$$= \frac{1}{3}(1+e^{2t})^{3/2} + C$$

$$\int_1^e x^2 \ln x\,dx$$

$u = \ln x \quad dv = x^2 dx$

$du = \frac{1}{x}dx \quad v = \frac{x^3}{3}$

$$= \frac{x^3 \ln x}{3} - \int \frac{x^3}{3}\left(\frac{1}{x}\right)dx$$

$$= \frac{x^3 \ln x}{3} - \frac{1}{3}\int x^2\,dx$$

$$= \frac{x^3 \ln x}{3} - \frac{1}{3}\left(\frac{x^3}{3}\right)\Bigg|_1^e$$

$$= \left(\frac{e^3 \ln e}{3} - \frac{e^3}{9}\right) - \left(0 - \frac{1}{9}\right)$$

$$= \frac{e^3}{3} - \frac{e^3}{9} + \frac{1}{9}$$

$$= \frac{3e^3 - e^3 + 1}{9}$$

$$= \frac{2e^3+1}{9} \approx 4.575$$

This one requires a clever strategy...see if you can figure it out??

$$\int e^x \cos x dx$$

$$\int e^x \cos x dx = \frac{1}{2}(e^x \sin x + e^x \cos x) + C$$

$u = e^x \quad dv = \cos x dx$

$du = e^x dx \quad v = \sin x$

$$\int e^x \cos x dx = e^x \sin x - \int e^x \sin x dx$$

$u = e^x \quad dv = \sin x dx$

$du = e^x dx \quad v = -\cos x$

$$\int e^x \cos x dx = e^x \sin x - \left[-e^x \cos x + \int e^x \cos x dx\right]$$

$$\int e^x \cos x dx + \int e^x \cos x dx = e^x \sin x + e^x \cos x$$

$$\frac{2\int e^x \cos x dx}{2} = \frac{e^x \sin x + e^x \cos x}{2}$$

$$\int_0^{1/2} \arcsin x\,dx = \ ?.$$

$\frac{\pi}{12}+\frac{\sqrt{3}}{2}-1$

$u=\sin^{-1}x \qquad dv=dx$

$du=\frac{1}{\sqrt{1-x^2}}dx \qquad v=x$

$= x\sin^{-1}x - \int \frac{x}{\sqrt{1-x^2}}dx$

$u\cdot dv$

chain Rule!

$= x\sin^{-1}x - \frac{-1}{2}\int \frac{-2x}{\sqrt{1-x^2}}dx$

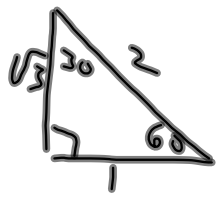
$= x\sin^{-1}x + (1-x^2)^{1/2}\Big|_0^{1/2}$

$\frac{1}{2}\int (1-x^2)^{-\frac{1}{2}}(-2x)dx$

$= (1-x^2)^{1/2}$

$= \left[\frac{1}{2}\sin^{-1}\left(\frac{1}{2}\right) + \left(1-\left(\frac{1}{2}\right)^2\right)^{1/2}\right] - \left[0 + (1)^{1/2}\right]$

$=$



$= \frac{1}{2}\left(\frac{\pi}{6}\right)+\sqrt{\frac{3}{4}} - 1$

$= \frac{\pi}{12}+\frac{\sqrt{3}}{2}-1$

Practice...

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#3 – 24 (odd numbers)

Bonus

$$\int \frac{12t^2 + 36}{\sqrt[5]{3t + 2}}\, dt$$

Answer....NOT A CHANCE I move this box today!!!