#Abraham Sherman

Homework #2

4.6
#6

$$\int \sqrt{1+10x}\, dx$$

$1 + 10x = u$

$10\,dx = du$

$dx = \frac{du}{10}$

$$= \frac{1}{10}\int u^{1/2}\, du$$

$$= \frac{1}{10}\left(\frac{u^{3/2}}{3/2}\right) + C$$

$$= \frac{1}{15}\cdot(1+10x)^{3/2} + C$$

# PURPLE PARROTS

8) $\int_0^2 \frac{e^{2x} - 2e^{3x}}{e^{3x}}\,dx = F(2) - F(0)$

$\int_0^2 e^{-x} - 2\,dx$ Let $u = -x$

$\int_0^2 e^{u}(-du) - \int_0^2 2\,dx$ $\frac{du}{dx} = -1$

$du = -dx$

$dx = -du$

$-e^{u} - 2x\Big]_0^2$

$-e^{-x} - 2x\Big]_0^2$

$= (-e^{-2} - 2(2)) - (-e^{0} - 2(0))$

$= (-e^{-2} - 4) - (-1)$

$= -e^{-2} - 4 + 1$

$= -e^{-2} - 3$

$= -3.135335283$

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Part Wells Spring Project

$\int e^x \sqrt{e^x + 4}\, dx = \int \sqrt{u}\, du$

$e^x \quad e^x \quad dx$

$\int u^{1/2}\, du$

$e^x + 4$

$\frac{u^{3/2}}{3/2} + C$

$e^x$

$u = e^x + 4$

$du = e^x dx$

$\frac{2(e^x+4)^{3/2}}{3} + C$

Double Helix

4.6 #14

$$\int \frac{\cos(1/x)}{x^2}\,dx$$

$u = \frac{1}{x}$

$du = \frac{-dx}{x^2}$

$-du = \frac{dx}{x^2}$

$= -\int \cos u\,du$

$= -(\sin u) + C$

$= -\sin\left(\frac{1}{x}\right) + C$

# Deutsche Produktion

Section 4.6 / 22

$\int x^2 \sec^2(x^3)\,dx$

$u = x^3$

$du = 3x^2\,dx$

$\frac{du}{3} = x^2\,dx$

$\frac{1}{3}\int \sec^2(u)\,du$

$\frac{1}{3}\tan(u)\,du$

$\frac{1}{3}\tan(x^3) + C$

INVESMENT BANKERS 4.6; #24

(a)

$$\int \frac{x^2}{1+x^6}\,dx$$

$$\frac{1}{3}\int \frac{1}{u^2+1}\,du$$

$$u = x^3$$

$$du = 3x^2\,dx$$

$$\frac{1}{3}\tan^{-1}u + c$$

$$\frac{1}{3}\tan^{-1}(x^3) + c$$

(b)

$$\int \frac{x^5}{1+x^6}\,dx$$

$$\frac{1}{6}\int \frac{1}{u}\,du$$

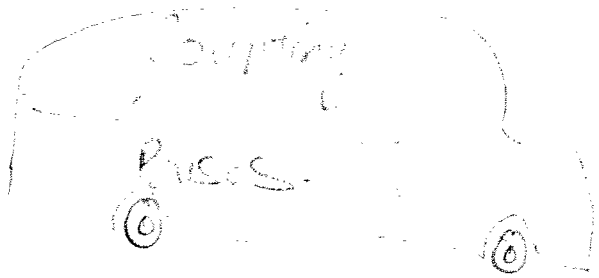
$$u = x^6 + 1$$

$$du = 6x^5\,dx$$

$$\frac{1}{6}\log u + c$$

$$\frac{1}{6}\log(x^6+1) + C$$

4.6.36.



$$\int_0^2 \frac{e^x}{1+e^x}\,dx$$

given $u = 1 + e^x \Rightarrow du = e^x\,dx$ (1)

so: at $x = 0 \Rightarrow u = 1 + e^0 = 2$

$x = 2 \Rightarrow u = 1 + e^2$ (2)

From (1) and (2) we have

$$\int_0^2 \frac{e^x}{1+e^x}\,dx = \int_2^{1+e^2} \frac{1}{u}\,du = \ln|u| \Big|_2^{1+e^2}$$

$$= \ln|1+e^x| \Big|_0^2$$

$$= \ln|1+e^2| - \ln|1+e^0|$$

$$\approx \ln|8.41| - \ln|2|$$

$$= 1.4133\ldots$$

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BGK

$u = v^2 + 4$

$du = v$

$$\int \frac{v}{v^2+4}\,dv = \frac{1}{2} \int \frac{1}{(v^2+4)}$$

$$\frac{1}{2}\int \frac{1}{u}\,du$$

$$\frac{1}{2}\ln(u) + C$$

$$\frac{1}{2}\ln(v^2+4) + C = \ln\frac{(x^2+4)}{2} + C$$