APCalculusAB
Friday,January4,2013

Anyquestionsontheexam?
Unit21MMM

GooverHW...youwillbeputtingproblemsontheboard

RetakesbynextFriday.LetmeknowwhichonebyTODAY.

Find $f'(x)$ for each:

1. $f(x)=x^2$
2. $f(x)=x^2+3$
3. $f(x)=x^2+e$
4. $f(x)=x^2-\sqrt{7}$

$f'(x)=2x$

Integration/Antidifferentiation

"inverse" of differentiation

Ex. $\int 2x\,dx = x^2+C$ ← constant of integration

Ex. $\int 3x^2\,dx = x^3+C$

$\frac{3x^{2+1}}{3}$ $\quad 3x^{3-2}$

Ex. $\int x^5\,dx = \frac{x^{5+1}}{6}+C$

$= \frac{1}{6}x^6+C$

1. $\int -9\,dx$ 2. $\int -5x\,dx$ 3. $\int (6+2x)\,dx$

4. $\int x^7\,dx$ 5. $\int (x^4+x^3-x^2)\,dx$ 6. $\int (3x^3-4x^2)\,dx$ Daniel

7. $\int \left(\frac{2}{3}x^5-\frac{5}{2}x+\frac{1}{2}\right)dx$ Adrian 8. $\int \left(\frac{3}{\sqrt[4]{x}}\right)dx$ Chelsea 9. $\int \left(2-\frac{1}{x^5}+\frac{7}{x^3}\right)dx$ Jonny

10. $\int 5\sqrt{x}\,dx$ Albert 11. $\int 5\left(\sqrt[3]{x}\right)dx$ 12. $\int \left(x^{3/4}-\frac{1}{x^{3/4}}\right)dx$ Madison

$\int (3x^3-4x^2)dx = \frac{3x^4}{4} - \frac{4x^3}{3} + C$

$\int \left(\frac{2}{3}x^5-\frac{5}{2}x+\frac{1}{2}\right)dx$

$\frac{2}{3}\cdot\frac{x^6}{6}-\frac{5}{2}\cdot\frac{x^2}{2}+\frac{1}{2}\cdot\frac{x}{1}$

$\frac{x^6}{9}-\frac{5x^2}{4}+\frac{x}{2}+C$

$\int \frac{3}{x^4}dx = \int 3x^{-4}dx = \frac{3x^{-3}}{-3} = \frac{-1}{x^3}+C$

$\int \left(2-\frac{1}{x^5}+\frac{7}{x^3}\right)dx = \int (2-x^{-5}+7x^{-3})dx$

$= 2x + \frac{x^{-4}}{-4} + \frac{7x^{-2}}{-2} + C$

$= 2x + \frac{1}{4x^4} - \frac{7}{2x^2} + C$

$\int 5\sqrt{x}\,dx = \int 5x^{1/2}\,dx$

$= \frac{5x^{3/2}}{3/2} + C$

$\int \left(x^{3/4}-\frac{1}{x^{3/4}}\right)dx$

$\int (x^{3/4}-x^{-3/4})dx$

$\frac{x^{7/4}}{7/4} - \frac{x^{1/4}}{1/4} + C$

$\frac{4x^{7/4}}{7} - 4x^{1/4} + C$

Evaluate:

① $\int (t^4 + t - 2)\,dt$

② $\int \left(\frac{3}{5}x^4 + \frac{4}{3}x^2 - \frac{x}{3}\right)dx$

③ $\int \frac{1}{x^3}\,dx$

④ $\int \left(3\sqrt{y} - 2\sqrt[3]{y}\right)dy$

16) $\int (2x-3)^2\,dx$ 17) $\int \frac{x^2+3x+1}{x^4}\,dx$ 18) $\int \frac{(2x-5)(3x+2)}{\sqrt{x}}\,dx$

expand

$$\int (4x^2-12x+9)\,dx$$

$$= \frac{4x^3}{3} - \frac{12x^2}{2} + 9x + C$$

$$= \frac{4x^3}{3} - 6x^2 + 9x + C$$

Divide

$$\int (x^{-2}+3x^{-3}+x^{-4})\,dx$$

$$= \frac{x^{-1}}{-1} + \frac{3x^{-2}}{-2} + \frac{x^{-3}}{-3} + C$$

$$= -\frac{1}{x} - \frac{3}{2x^2} - \frac{1}{3x^3} + C$$

$$\int \frac{(2x-5)(3x+2)}{\sqrt{x}}\,dx$$

$$= \int \frac{6x^2-11x-10}{x^{1/2}}\,dx$$

$$= \int (6x^{3/2}-11x^{1/2}-10x^{-1/2})\,dx$$

$$= \frac{6x^{5/2}}{5/2} - \frac{11x^{3/2}}{3/2} - \frac{10x^{1/2}}{1/2} + C$$

$$= \frac{12x^{5/2}}{5} - \frac{22x^{3/2}}{3} - 20x^{1/2} + C$$

$$\frac{d}{dx}[\sin x] = \cos x$$

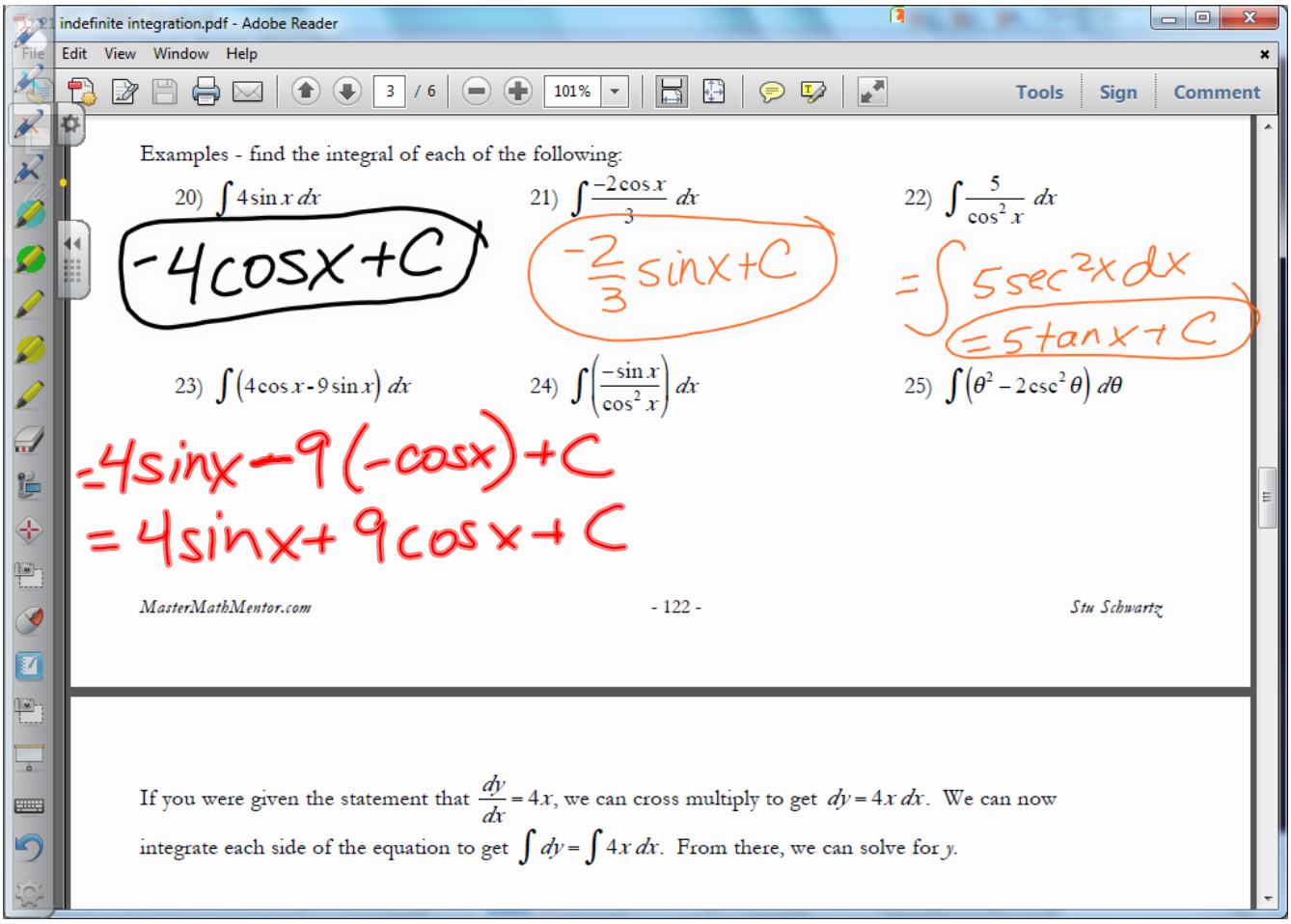
$$\int \cos x\,dx = \sin x + C$$

$$\frac{d}{dx}[\cos x] = -\sin x$$

$$\int \sin x\,dx = -\cos x + C$$

$$\frac{d}{dx}[\tan x] = \sec^2 x$$

$$\int \sec^2 x\,dx = \tan x + C$$



$-4\cos x + C$

$-\frac{2}{3}\sin x + C$

$= \int 5\sec^2 x\,dx$

$= 5\tan x + C$

$= -4\sin x - 9(-\cos x) + C$

$= 4\sin x + 9\cos x + C$

$$\int \frac{-\sin x}{\cos^2 x}\,dx$$

$$= \int \left[\frac{\sin x}{\cos x}\cdot\frac{1}{\cos x}\right]dx$$

$$= \int (-\tan x \cdot \sec x)\,dx$$

$$= -\sec x + C$$

13. $\int 3\sqrt[3]{x^2}\,dx$

14. $\int (x-5)^2\,dx$

15. $\int 4(3x-2)^3\,dx$

16. $\int \frac{x^3-4x-1}{2x^3}\,dx$

17. $\int t^2(3+t)^2\,dt$

18. $\int \frac{(3x-2)^2}{\sqrt{x}}\,dx$

19. $\int \frac{3\cos x}{5}\,dx$

20. $\int (1-6\cos x)\,dx$

21. $\int \left(\frac{1}{x^2}-\sin x\right)dx$

22. $\int (\sec^2 t+\cos t+1)\,dt$

23. $\int (\sin^2 x+\cos^2 x)\,dx$

24. $\int \frac{\sin x}{1-\sin^2 x}\,dx$