DO NOW

Find the indefinite integral.

$$\int \frac{4x}{\sqrt{2x^2+1}}\,dx$$

Page 1

ANSWERS: pg 340; evens

2. $u = x^3 + 1$, $du = 3x^2dx$

8. $\frac{1}{4}(x^2 - 9)^4 + C$

10. $\frac{3}{4}(1 - 2x^2)^{4/3} + C$

12. $\frac{1}{15}(x^3 + 5)^5 + C$

14. $\frac{1}{24}(4x^2 + 3)^3 + C$

16. $\frac{1}{6}(t^4 + 5)^{3/2} + C$

18. $\frac{2}{9}(u^3 + 5)^{3/2} + C$

20. $\frac{-1}{4(1 + x^4)} + C$

22. $\frac{1}{3(9 - x^3)} + C$

24. $\frac{\sqrt{1 + x^4}}{2} + C$

Page 2

5.5 Integration by Substitution- Day 2

Examples: Find the indefinite integral.

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

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

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

$-\frac{1}{2}\ln|u| + C$

$-\frac{1}{2}\ln|1-2x| + C$

$u = 1-2x$

$du = -2dx$

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

Page 3

2. $\int (x^2 + 1)^2 dx$

$\int (x^4+2x^2+1)\,dx$

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

$u = x^2 + 1$

$du = 2x\,dx$

↑ NO GOOD !!

*No u-substitution

Page 4

3. $\int 5x^2\sqrt{1 - x^3}\,dx$

$5\int u^{1/2}\cdot\frac{du}{-3}$

$-\frac{5}{3}\int u^{1/2}du$

$-\frac{5}{3}\cdot\frac{2}{3}u^{3/2} + C$

$-\frac{10}{9}(1-x^3)^{3/2} + C$

$u = 1-x^3$

$du = -3x^2dx$

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

Page 5

4. $\int 5\cos 5x\,dx$

$\int \cos u\,du$

$\sin u + C$

$\sin 5x + C$

$u = 5x$

$du = 5dx$

Page 6

5. $\int x \sin(2x^2)dx$

$u = 2x^2$

$du = 4x\,dx$

$\frac{du}{4} = x\,dx$

$\int \sin u \frac{du}{4}$

$\frac{1}{4}\int \sin u\, du$

$-\frac{1}{4}\cos u + C$

$\boxed{-\frac{1}{4}\cos(2x^2) + C}$

Page 7

6. $\int (\sin^2 3x \cos 3x)dx$

$u = \sin 3x$

$du = 3\cos 3x\,dx$

$\frac{du}{3} = \cos 3x\,dx$

$\int (\sin 3x)^2 \cos 3x\,dx$

$\int u^2 \frac{du}{3}$

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

$\frac{1}{3}\cdot\frac{1}{3}u^3 + C$

$\boxed{\frac{1}{9}\sin^3 3x + C}$

Page 8

7. $\int 2x\, e^{x^2-5}dx$

$u = x^2 - 5$

$du = 2x\,dx$

$\int e^u du$

$e^u + C$

$\boxed{e^{x^2-5} + C}$

Page 9

8. $\int e^{\cos x}\sin x\, dx$

$u = \cos x$

$du = -\sin x\,dx$

$-du = \sin x\,dx$

$\int e^u \cdot -du$

$-\int e^u du$

$-e^u + C$

$\boxed{-e^{\cos x} + C}$

Page 10

HOMEWORK

pg 340 - 341; 3 - 6, 25 - 34, 47 - 78

Page 11