Homework Math 140, Lectures 20-21.
Will be quizzed Monday December 2

Problem 1 *(page 273) Find all antiderivatives of the functions.*

1. $f(x) = x - 3$.
2. $f(x) = \frac{1}{2}x^2 - 2x + 6$.
3. $f(x) = \frac{1}{2} + \frac{3}{4}x^2 - \frac{4}{5}x^3$.
4. $f(x) = 8x^9 - 3x^6 + 12x^3$.
5. $f(x) = (x+1)(2x-1)$.
6. $f(x) = x(2-x)^2$.
7. $f(x) = 7x^{2/5} + 8x^{-4/5}$.
8. $f(x) = x^{3.4} - 2x^{\sqrt{2}-1}$.
9. $f(x) = \sqrt{2}$.
10. $f(x) = \pi^2$.
11. $f(x) = \frac{10}{x^9}$.
12. $f(x) = \frac{5-4x^3+2x^6}{x^6}$.
13. $g(t) = \frac{1+t+t^2}{\sqrt{t}}$.
14. $f(x) = 3\cos t - 4\sin t$.
15. $f(\theta) = 2\sin\theta - \sec^2\theta$.
16. $f(\theta) = 6\theta^2 - 7\sec^2\theta$.
17. $f(t) = 2\sec t\tan t + \frac{1}{2}t^{-1/2}$.
18. $f(x) = 2\sqrt{x} + 6\cos x$.

Problem 2 *Verify by differentiation that the formula is correct.*

1. $\displaystyle\int \frac{1}{x^2\sqrt{1+x^2}}dx = -\frac{\sqrt{1+x^2}}{x} + C.$
2. $\displaystyle\int cos^2x\ dx = \frac{1}{2}x + \frac{1}{4}\sin(2x) + C.$
3. $\displaystyle\int \cos^3 x\ dx = \sin x - \frac{1}{3}\sin^3(x) + C.$
4. $\displaystyle\int \frac{x}{\sqrt{a+bx}}dx = \frac{2}{3b^2}(bx-2a)\sqrt{a+bx} + C$

Problem 3 *Evaluate the definite integral.*

1. $\displaystyle\int_{-2}^{3}(x^2-3)dx.$
2. $\displaystyle\int_{1}^{2}(4x^3-3x^2+2x)dx.$
3. $\displaystyle\int_{-2}^{0}\left(\frac{1}{2}t^4+\frac{1}{4}t^3-t\right)dt.$
4. $\displaystyle\int_{0}^{3}(1+6w^2-10w^4)dw.$
5. $\displaystyle\int_{0}^{2}(2x-3)(4x^2+1)dx.$
6. $\displaystyle\int_{-1}^{1}t(1-t)^2dt.$
7. $\displaystyle\int_{0}^{\pi}(4\sin\theta-3\cos\theta)d\theta.$
8. $\displaystyle\int_{1}^{2}\left(\frac{1}{x^2}-\frac{4}{x^3}\right)dx.$
9. $\displaystyle\int_{1}^{4}\left(\frac{4+6u}{\sqrt{u}}\right)du.$
10. $\displaystyle\int_{1}^{2}\left(x+\frac{1}{x}\right)^2dx.$
11. $\displaystyle\int_{1}^{4}\sqrt{\frac{5}{x}}dx.$
12. $\displaystyle\int_{1}^{9}\frac{3x-2}{\sqrt{x}}dx.$
13. $\displaystyle\int_{1}^{4}\sqrt{t}(1+t)dt.$
14. $\displaystyle\int_{\frac{\pi}{4}}^{\frac{\pi}{4}}\csc^2\theta\ d\theta.$
15. $\displaystyle\int_{0}^{\frac{\pi}{4}}\frac{1+\cos^2\theta}{\cos^2\theta}d\theta.$
16. $\displaystyle\int_{0}^{\frac{\pi}{3}}\frac{\sin\theta+\sin\theta\tan^2\theta}{\sec^2\theta}d\theta.$
17. $\displaystyle\int_{0}^{1}\frac{1+\sqrt[3]{x}}{\sqrt{x}}dx.$
18. $\displaystyle\int_{1}^{8}\frac{x-1}{\sqrt[3]{x^2}}dx.$
19. $\displaystyle\int_{0}^{1}(\sqrt[4]{x^5}+\sqrt[5]{x^4})dx.$
20. $\displaystyle\int_{0}^{1}(1+x^2)^3dx.$
21. $\displaystyle\int_{2}^{5}|x-3|dx.$

22. $\int_0^2 |2x-1|dx.$

23. $\int_{-1}^2 (x-2|x|)dx.$

24. $\int_0^{\frac{3\pi}{2}} |\sin x|dx.$