MTH 162 Homework 8

Do the first eight problems. Due: Mar 19, 2014 (Wednesday). Hand in to me during the class.

Compulsory:

Ex 6.1

3–26 ▪ Evaluate the integral.

9. $\int \ln(2x + 1)\, dx$ **12.** $\int \sin^{-1}x\, dx$

27–30 ▪ First make a substitution and then use integration by parts to evaluate the integral.

27. $\int \cos\sqrt{x}\, dx$ **30.** $\int_1^4 e^{\sqrt{x}}\, dx$

Ex. 6.2

1–36 ▪ Evaluate the integral.

1. $\int \sin^2x\, \cos^3x\, dx$ **24.** $\int \tan^5x\, \sec^3x\, dx$

(You may need: (sec x)'= sec x tan x)

39–41 ▪ Evaluate the integral using the indicated trigonometric substitution.

39. $\int \frac{dx}{x^2\sqrt{4 - x^2}}$ $x = 2\sin\theta$

42–60 Evaluate the integral.

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

(You may need: (sec x)'= sec x tan x)

Recommended: (These types of questions may also appear in the exams)

3–26 ▪ Evaluate the integral.

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

4. $\int y e^{0.2y} \, dy$

5. $\int te^{-3t} \, dt$

6. $\int (x - 1) \sin \pi x \, dx$

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

8. $\int t^2 \sin \beta t \, dt$

9. $\int \ln(2x + 1) \, dx$

10. $\int p^5 \ln p \, dp$

11. $\int \arctan 4t \, dt$

12. $\int \sin^{-1} x \, dx$

13. $\int e^{2\theta} \sin 3\theta \, d\theta$

14. $\int e^{-\theta} \cos 2\theta \, d\theta$

15. $\int \frac{xe^{2x}}{(1 + 2x)^2} \, dx$

16. $\int t^3 e^t \, dt$

17. $\int_0^{1/2} x \cos \pi x \, dx$

18. $\int_0^1 (x^2 + 1)e^{-x} \, dx$

19. $\int_1^3 r^3 \ln r \, dr$

20. $\int_4^9 \frac{\ln y}{\sqrt{y}} \, dy$

21. $\int_0^1 t \cosh t \, dt$

22. $\int_1^{\sqrt{3}} \arctan(1/x) \, dx$

23. $\int_0^{1/2} \cos^{-1}x\,dx$

24. $\int_0^1 \frac{r^3}{\sqrt{4+r^2}}\,dr$

25. $\int_1^2 (\ln x)^2\,dx$

26. $\int_0^t e^s \sin(t-s)\,ds$

27–30 ▪ First make a substitution and then use integration by parts to evaluate the integral.

27. $\int \cos\sqrt{x}\,dx$

28. $\int t^3 e^{-t^2}\,dt$

29. $\int_{\sqrt{\pi/2}}^{\sqrt{\pi}} \theta^3 \cos(\theta^2)\,d\theta$

30. $\int_1^4 e^{\sqrt{x}}\,dx$

Ex 6.2

1–36 ▪ Evaluate the integral.

1. $\int \sin^2x\,\cos^3x\,dx$

2. $\int \sin^3\theta\,\cos^4\theta\,d\theta$

3. $\int_0^{\pi/2} \sin^7\theta\,\cos^5\theta\,d\theta$

4. $\int_0^{\pi/2} \sin^5x\,dx$

15. $\int \frac{1-\sin x}{\cos x}\,dx$

16. $\int \cos^2x\,\sin 2x\,dx$

17. $\int \tan x\,\sec^3x\,dx$

18. $\int \tan^2\theta\,\sec^4\theta\,d\theta$

19. $\int \tan^2x\,dx$

20. $\int (\tan^2x + \tan^4x)\,dx$

21. $\int \tan^4x\,\sec^6x\,dx$

22. $\int_0^{\pi/4} \sec^4\theta\,\tan^4\theta\,d\theta$

23. $\int_0^{\pi/3} \tan^5 x \sec^4 x \, dx$

24. $\int \tan^5 x \sec^3 x \, dx$

25. $\int \tan^3 x \sec x \, dx$

26. $\int_0^{\pi/4} \tan^4 t \, dt$

27. $\int \tan^5 x \, dx$

28. $\int \tan^2 x \sec x \, dx$

29. $\int_{\pi/6}^{\pi/2} \cot^2 x \, dx$

30. $\int_{\pi/4}^{\pi/2} \cot^3 x \, dx$

31. $\int_{\pi/4}^{\pi/2} \cot^5 \phi \csc^3 \phi \, d\phi$

32. $\int \csc^4 x \cot^6 x \, dx$

33. $\int \csc x \, dx$

34. $\int \dfrac{1 - \tan^2 x}{\sec^2 x} \, dx$

35. $\int_0^{\pi/6} \sqrt{1 + \cos 2x} \, dx$

36. $\int \dfrac{dx}{\cos x - 1}$

42–60 Evaluate the integral.

42. $\int_0^1 x^3 \sqrt{1 - x^2} \, dx$

43. $\int_{\sqrt{2}}^2 \dfrac{1}{t^3 \sqrt{t^2 - 1}} \, dt$

44. $\int_0^2 x^3 \sqrt{x^2 + 4} \, dx$

45. $\int_0^a \dfrac{dx}{(a^2 + x^2)^{3/2}}, \quad a > 0$

46. $\int \dfrac{dt}{t^2 \sqrt{t^2 - 16}}$

47. $\int \dfrac{dx}{\sqrt{x^2 + 16}}$

48. $\int \dfrac{t^5}{\sqrt{t^2 + 2}} \, dt$

49. $\int \sqrt{1 - 4x^2} \, dx$

50. $\int \dfrac{du}{u \sqrt{5 - u^2}}$

51. $\displaystyle\int \frac{\sqrt{x^2 - 9}}{x^3}\,dx$

52. $\displaystyle\int \frac{x}{\sqrt{1 + x^2}}\,dx$

53. $\displaystyle\int_0^{0.6} \frac{x^2}{\sqrt{9 - 25x^2}}\,dx$

54. $\displaystyle\int \frac{dx}{[(ax)^2 - b^2]^{3/2}}$

55. $\displaystyle\int \frac{x}{\sqrt{x^2 - 7}}\,dx$

56. $\displaystyle\int_0^1 \sqrt{x^2 + 1}\,dx$

57. $\displaystyle\int \frac{\sqrt{1 + x^2}}{x}\,dx$

58. $\displaystyle\int_0^1 \frac{dx}{(x^2 + 1)^2}$

59. $\displaystyle\int x\sqrt{1 - x^4}\,dx$

60. $\displaystyle\int_0^{\pi/2} \frac{\cos t}{\sqrt{1 + \sin^2 t}}\,dt$