HW 4.1-4.4 Review

4.1 You can check the bolded items online at www.calcchat.com

In the following exercises, find the integral.

1. $\int \left(5x^4 + 6x^2 - 1\right) dx$

17. $\int \left(2x - 3x^2\right) dx$

29. $\int (x+1)(3x-2)\, dx$

30. $\int \left(2t^2 - 1\right)^2 dt$

32. $\int d\theta$

34. $\int \frac{1}{x^6}\, dx$

36. $\int \left(t^2 - \sin t\right) dt$

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

In the following exercises, solve the differential equation.

57. $h'(t) = 8t^3 + 5,\ h(1) = -4$

58. $f''(x) = 6,\ f'(2) = 12,\ f(2) = 22$

In 60, use a(t)=-32 feet per second per second as the acceleration due to gravity.

60. A ball is thrown vertically upward from a height of 5 feet with an initial velocity of 50 feet per second. How high will the ball go?

In 62, use a(t)=-9.8 meters per second per second as the acceleration due to gravity.

62. A baseball is thrown upward from a height of 2 meters with an initial velocity of 18 meters per second. Determine its maximum height.

HW 4.2

Use the limit process to find the area of the region between the graph of the function and the x-axis over the given interval.

51. $y = 16 - x^2,\ [1,3]$

56. $y = x^2 - x^3,\ [-1,0]$

HW 4.3

Evaluate the following definite integrals.

1. $\int_{1}^{3}(6-\mathrm{x})\,\mathrm{dx}$
2. $\int_{-3}^{0}\left(6\mathrm{x}^{2}+8\mathrm{x}-1\right)\mathrm{dx}$
3. $\int_{1}^{2}\frac{\mathrm{dx}}{\mathrm{x}^{4}}$
4. $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}}2\cos\theta\,\mathrm{d}\theta$

Find the area under the graph f from a to b

5. $f(x)=6-x; a=-2, b=2$
6. $f(x)=2x^{2}+8; a=-2, b=2$
7. $f(x)=-x^{3}+2x^{2}; a=-2, b=4$

HW 4.4

Evaluate the definite integral of the algebraic function.

8. $\int_{-3}^{3}\mathrm{v}^{2/3}\mathrm{dv}$

12. $\int_{0}^{2}(4-\mathrm{t})\sqrt{\mathrm{t}}\,\mathrm{dt}$

14. $\int_{-3}^{0}4-|2\mathrm{x}+3|\,\mathrm{dx}$

23. $\int_{0}^{3}\left(|2\mathrm{x}-3|\right)\mathrm{dx}$

27. $\int_{0}^{\pi/6}(1+\sin\mathrm{x})\,\mathrm{dx}$

28. $\int_{0}^{\frac{\pi}{6}}\frac{1-\sin^{2}\theta}{\cos^{2}\theta}\,\mathrm{d}\theta$

31. $\int_{-\frac{\pi}{3}}^{\frac{\pi}{3}}4\sec\theta\tan\theta\,\mathrm{d}\theta$

4.4

Determine the area of the given region.

9. $y = 3x^2 - 3,\ x = -2,\ x = 2,\ y = 0$

Find the value(s) for c guaranteed by the Mean Value Theorem for Integrals for the function over the given interval.

43. $f(x) = x - 2\sqrt{x} \quad [0, 2]$

Find the average value of the function over the given interval and all values of x in the interval for which the function equals its average value.

47. $f(x) = 4 - x^2 \quad [-2, 2]$

Find F as a function of x and evaluate it at x=2, x=5 and x=8.

69. $F(x) = \int_1^x \frac{10}{v^2}\, dv$

72. $F(x) = \int_0^x \sin\theta \, d\theta$

In the following exercises a) integrate to find F as a function of x and b) demonstrate the Second Fundamental Theorem of Calculus by differentiating the result in part a).

76. $F(x) = \int_0^x t\left(t^2 + 1\right) dt$

77. $F(x) = \int_8^x \sqrt[3]{t}\, dt$

Use the Second Fundamental Theorem of Calculus to find F'(x).

84. $F(x) = \int_1^x \sqrt[4]{t}\, dt$

85. $F(x) = \int_0^x t \cos t\, dt$