MATH 1300: HW #13

Due on April 20, 2017 at 10:00am

Professor Braden Balentine Section 005

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Section 5.1

12. Speedometer readings for a motorcycle at 12-second intervals are given in the table.

$t(s)$	0	12	24	36	48	60
v(ft/s)	30	28	25	22	24	27

(a) Estimate the distance traveled by the motorcycle during this time period using the velocities at the beginning of the time intervals.

$$30(12) + 28(12) + 25(12) + 22(12) + 24(12) = 1548 \text{ ft}$$

(b) Give another estimate using the velocities at the end of the time periods.

$$28(12) + 25(12) + 22(12) + 24(12) + 27(12) = 1512 \text{ ft}$$

(c) Are your estimates in parts (a) and (b) upper and lower estimates? Explain.
The estimates are neither upper nor lower.

18. Use Definition 2 to find an expression for the area under the graph of f as a limit. Do not evaluate the limit.

$$f(x) = x^2 + \sqrt{1+2x}, \quad 4 \le x \le 7$$
$$\Delta x = \frac{7-4}{n} = \frac{3}{n}$$
$$x_i = a + i = 4 + i\left(\frac{3}{n}\right)$$
$$f(x_i) = f(x\sum_{i=4}^{7} f\left(4 + i\left(\frac{3}{n}\right)\right)\frac{3}{n}$$

22. (a) Use Definition 2 to find an expression for the area under the curve $y = x^3$ for 0 to 1 as a limit.

$$A = \lim_{n\to\infty} R_n = \lim_{n\to\infty} (f(x_1)\Delta x + f(x_2)\Delta x + ... + f(x_n)\Delta x)$$

(b) The following formula for the sum of the cubes of the first n integers is proved in Appendix F. Use it to evaluate the limit in part (a).

$$\Delta x = \frac{1}{n}$$
$$\lim_{n\to\infty} (\frac{n(n+1)}{2})^2 \frac{1}{n}$$

Section 5.2

42. If $\int_1^5 f(x)dx = 12$ and $\int_4^5 f(x)dx = 3.6$, find $\int_1^4 f(x)dx$.

48. If $\int_2^x f(t)dt$, where f is the function whose graph is given, which of the following values is largest?

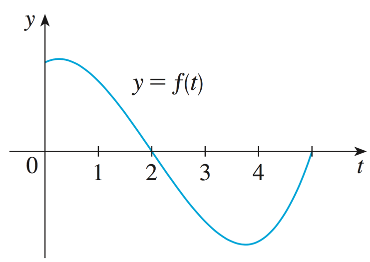
    (a) $F(0)$

    (b) $F(1)$

    (c) $F(2)$

    (d) $F(3)$

    (e) $F(4)$



49. Each of the regions A, B, and C bounded by the graph of f and the x-axis has area 3. Find the value of

$$\int_{-4}^{2} [f(x) + 2x + 5]dx$$