§1.3 - §2.3

1. See: *Exam 01 Review Sheet*. Notable problems: 3, 8.

§2.4 - §3.7

2. See: *Exam 02 Review Sheet*. Notable problems: 1, 7, 8, 10, 17, 21.

§4.1 - §5.2

3. See: *Exam 03 Review Sheet*. Notable problems: 2, 7, 8, 11, 16, 18, 19, Example 5.2.3.

§5.3 Evaluating Definite Integrals

4. Evaluate the definite integral $\displaystyle\int_0^1 \frac{1}{1+x^2}\,dx$.

5. Evaluate the definite integral $\displaystyle\int_1^3 \frac{dx}{x}$.

6. The velocity of a particle moving along a horizontal line is given by $v(t) = 2t^2 - 8t + 6$ meters per second after t seconds. Find the *distance* traveled by the particle during the interval $[0, 4]$.

7. The velocity of a particle moving along a horizontal line is given by $v(t) = 2t^2 - 8t + 6$ meters per second after t seconds. Find the *displacement* of the particle during the interval $[0, 4]$.

§5.4 The Fundamental Theorem of Calculus

8. Find the derivative of $\displaystyle\int_{x^3}^{1.2} \sec^2(t)\,dt$.

9. Find $\displaystyle\frac{d}{dx}\left[\int_x^{x^2} e^{-t^2}\,dt\right]$.

10. Traffic flow is defined as the rate at which cars pass through an intersection, measured in cars-per-minute. At intersection of Elk and Helm, the traffic flow a t minutes is modeled by

$$F(t) = 75 + 5\sin\left(\frac{t}{4}\right) \text{ on the interval } 0 \le t \le 30$$

What is the average traffic flow from 20 minutes to 25 minutes?

11. Let $f(x) = -x^2 + 8x + 9$. Find the value(s) of c that satisfy the Mean Value Theorem for integrals on the interval $[-1, 5]$. Round your answer(s) to three decimal places.

1. See: *Exam 01 Review Sheet*

2. See: *Exam 02 Review Sheet*

3. See: *Exam 03 Review Sheet*

4. $\frac{\pi}{4}$

5. $\ln(3)$

6. $8\,\mathrm{m}$

7. $\frac{8}{3}\,\mathrm{m} \approx 2.667\,\mathrm{m}$

8. $-3x^2\sec^2(x^3)$

9. $-e^{-x^2} + 2xe^{-x^4}$

10. $\dfrac{1}{5}\displaystyle\int_{20}^{25} F(t)\,dt \approx 72.137\,\mathrm{cars/min}$

11. $c = 4 - \sqrt{7} \approx 1.354$