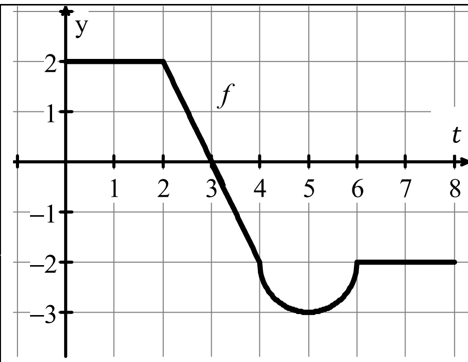
Name: ______________________________ Date:______________ **Corrective Assignment**

Mid-Unit 6 CA – Integration and Accumulation of Change

1. Let $g(x) = \int_a^x f(t)\,dt$ with the graph of f shown above and a is a constant. Find the x-values of g regarding each of the following conditions.



a. Relative minimum(s)

b. Relative maximum(s)

c. Concave up

d. Concave down

e. Increasing

f. Decreasing

g. Point(s) of inflection

h. If $g(0) = -4$, what is the maximum value of g?

i. Given $h(x) = \int_0^{3x+6} f(t)\,dt$. Find the x-value where h has a relative maximum.

2. **Calculator active problem.** Particle *A* moves along a horizontal line with velocity $v(t)$, where $v(t)$ is a positive continuous function of *t*. The time *t* is measured in cm/sec. The velocity of the particle at selected times is given in the table.

t (sec)	0	2	5	7	10
$v(t)$ (cm/sec)	1.7	6.8	7.4	15.6	24.9

a. Use the data from the table to approximate the distance traveled by a particle *A* over the interval $0 \le t \le 10$ seconds by using a left Riemann Sum with four subintervals. Show the computations that lead to your answer.

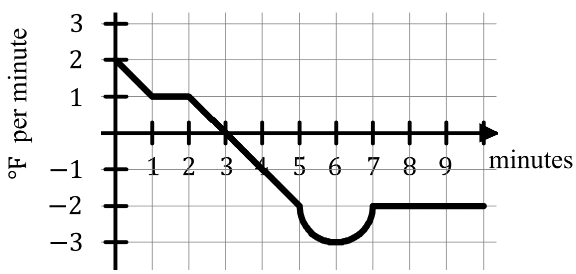
b. Assuming that $v(t)$ is a continuous increasing function, is the approximation greater or less than the true value?

c. Particle *B* moves along the same horizontal line with position $x(t) = te^{\sin(3t)}$ cm. Which particle is traveling faster at time $t = 5$? Explain your answer.

3. Given the definite integral $\int_{-3}^{1} 3x^2\,dx$, write an equivalent expression using summation notation

---

4. The graph below shows the rate of change of the temperature of Mr. Brust's hot tub over 10 minutes.



After 10 minutes, how many degrees has the temperature changed from $t = 0$ minutes?

---

5. The expression $\frac{1}{8}\left(\sqrt{\frac{1}{8}}+\sqrt{\frac{2}{8}}+\sqrt{\frac{3}{8}}+\cdots+\sqrt{\frac{8}{8}}\right)$ is a Riemann sum approximation of which of the following integrals?

(A) $\int_0^1 \sqrt{\frac{x}{8}}\,dx$ (B) $\int_0^1 \sqrt{x}\,dx$ (C) $\frac{1}{8}\int_0^1 \sqrt{\frac{x}{8}}\,dx$ (D) $\frac{1}{8}\int_0^1 \sqrt{x}\,dx$ (E) $\frac{1}{8}\int_0^8 \sqrt{x}\,dx$

Find $F'(x)$.			
6. $F(x) = \int_0^{\sin x} t^2\,dt$	7. $F(x) = \int_1^{-3x} \ln t\,dt$	8. $F(x) = \int_{-4}^{7x} f(t)\,dt$	9. $F(x) = \int_{x^2}^{x+8} (3t-8)\,dt$

10. Use a Trapezoidal approximation with 3 subintervals to approximate the area under $f(x) = x^2 + 2x + 4$ on the interval $[1, 7]$.

ANSWERS to Mid-Unit 6 Corrective Assignment

1a. none	1b. $x = 3$	1c. $(5, 6)$	1d. $(2, 5)$	1e. $(0, 3)$
1f. $(3, 8)$	1g. $x = 5$	1h. 1	1i. $x = -1$	2a. 85.4 cm

2b. The approximation is less than the true value because it is a left-Riemann sum on an increasing function.	2c. $x'(5) = -19.918$ Particle B is moving faster ≈ 20 cm/sec compared to Particle A's 7.4 cm/ sec

3. $\lim_{n\to\infty} \sum_{k=1}^{n} 3\left(\frac{4}{n}\right)\left(-3 + \frac{4k}{n}\right)^2$	4. $-9 - \frac{\pi}{2}$ degrees	5. (B) $\int_0^1 \sqrt{x}\, dx$	6. $\sin^2 x \cos x$
7. $-3\ln(-3x)$	8. $7 \cdot f(7x)$	9. $-6x^3 + 19x + 16$	10. 190