I-U1

1. The Riemann definition of the definite integral is given by $$\lim_{n\to\infty}\sum_{i=1}^{n} f(x_i)\Delta x = \int_a^b f(x)dx$$ where $\Delta x = \frac{b-a}{n}$. Explain why this is so in the context of area under a curve. You may use diagrams to accompany your explanation.

I-U2

2. Write a definite integral whose value equals
$$\lim_{n\to\infty}\sum_{i=1}^{n} \sec^2(3+\frac{5i}{n})\frac{5}{n}$$

3. Write the definite integral as an infinite Riemann sum using correct notation
$$\int_2^5 x^3+\sqrt{x-1}\,dx$$

I-U3a

4. Find both the left and right rectangle approximations for $\int_5^7 20-(x+3)^2\,dx$ using 4 rectangles of equal width.

I-U3b

5. Approximate $\int_{-5}^{-1} -\frac{3}{x}\,dx$ using 4 trapezoids of equal width.

I-U3c

6. Selected values for $f(x)$ are given in the table below. Use a midpoint Riemann sum to approximate $\int_{10}^{90} f(x)\,dx$ using 4 intervals of equal width.

x	10	20	30	40	50	60	70	80	90
$f(x)$	8	12	35	44	37	26	54	61	83

I-U5

Evaluate each definite integral.

7. $\int_{-1}^{3} x^2 - 2x\,dx$

8. $\int_{2}^{5} \frac{3}{x+1}\,dx$

I-A3

9. A particle is moving with acceleration $a(t) = -4t\ m/s^2$. Find its position at t=3 if its initial velocity is $-2\ m/s$ and its initial position is 12 *m*.