

SCORE: ___ / 30 POINTS

NO CALCULATORS ALLOWED

**SHOW PROPER ALGEBRAIC WORK (DO NOT USE ANTI-DERIVATIVES)
 USE PROPER NOTATION & SIMPLIFY ALL ANSWERS WHERE REASONABLE**

State the definition of "definite integral" given in class.

SCORE: ___ / 3 POINTS

Use complete sentences and proper algebra & English as shown in class.

SEE 7:30 VERSION D

Evaluate $\int_1^4 (1 - 4x^2) dx$ using the definition of the definite integral and right hand sums.

SCORE: ___ / 8 POINTS

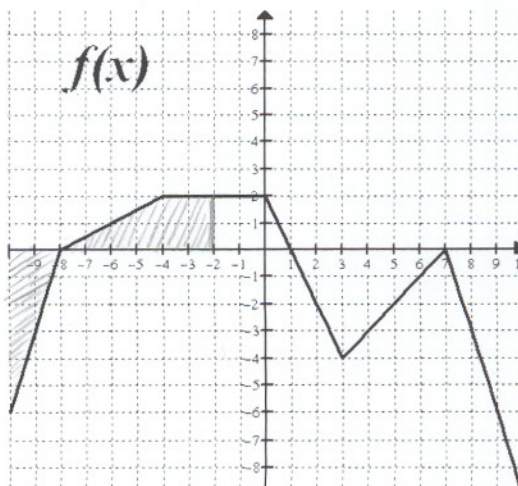
$$\begin{aligned}
 & \lim_{n \rightarrow \infty} \sum_{i=1}^n (1 - 4(1 + \frac{3i}{n})^2) \frac{3}{n} \\
 &= \lim_{n \rightarrow \infty} \frac{3}{n} \sum_{i=1}^n (1 - 4(1 + \frac{6i}{n} + \frac{9i^2}{n^2})) \\
 &= \lim_{n \rightarrow \infty} \frac{3}{n} \sum_{i=1}^n (-3 - \frac{24i}{n} - \frac{36i^2}{n^2}) \\
 &= \lim_{n \rightarrow \infty} \frac{3}{n} \left[\sum_{i=1}^n -3 - \frac{24}{n} \sum_{i=1}^n i - \frac{36}{n^2} \sum_{i=1}^n i^2 \right] \\
 &= \lim_{n \rightarrow \infty} \frac{3}{n} \left[-3n - \frac{24}{n} \frac{n(n+1)}{2} - \frac{36}{n^2} \frac{n(n+1)(2n+1)}{6} \right] \\
 &= \lim_{n \rightarrow \infty} 3 \left[-3 - \frac{12(n+1)}{n} - \frac{6(n+1)(2n+1)}{n^2} \right] \\
 &= 3[-3 - 12 - 12] \\
 &= -81
 \end{aligned}$$

MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER

SCORE: ___ / 3 POINTS

$$\int_{-10}^{-2} f(x) dx =$$

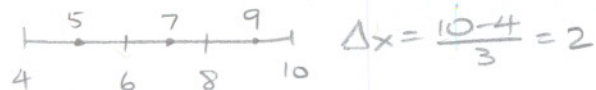
- [a] -17
- [b] -5
- [c] 2
- [d] 5
- [e] 9
- [f] none of the above



$$\begin{aligned}
 & -\frac{1}{2}(6)(2) \\
 & + \frac{1}{2}(2+6)(2) \\
 & = 2
 \end{aligned}$$

If the velocity of a particle at time t is given by $v(t) = t^2 - 16$, estimate the distance travelled by the object from $t = 4$ to $t = 10$ using 3 equal subintervals and the midpoint rule.

SCORE: ___ / 3 POINTS

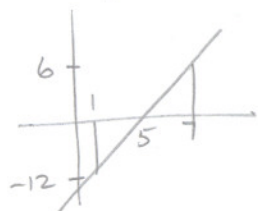


$$(5^2 - 16)2 + (7^2 - 16)2 + (9^2 - 16)2 = 9 \cdot 2 + 33 \cdot 2 + 65 \cdot 2 = 214$$

OR

Evaluate $\int_1^7 (3x - 15) dx$ using geometry. Sketch a diagram and show the calculations used.

SCORE: ___ / 3 POINTS



$$-\frac{1}{2}(12)(5-1) + \frac{1}{2}(6)(7-5) = -\frac{1}{2}(12)(4) + \frac{1}{2}(6)(2)$$

$$= -24 + 6$$

$$= -18$$

OR

Write $\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{4}{n} \sqrt{5 + \frac{4k}{n}}$ as a definite integral. Do NOT evaluate the limit/definite integral.

SCORE: ___ / 3 POINTS

$$\frac{1}{4} \int_5^9 \sqrt{x} dx$$

Write $\int_{-2}^{-4} g(x) dx - \int_4^2 g(x) dx + \int_{-4}^2 g(x) dx$ as a single integral in the form $\int_a^b g(x) dx$.

SCORE: ___ / 3 POINTS

Show each step CLEARLY.

see 7:30 version D

If $\int_5^8 g(x) dx = -1$, find $\int_8^5 (2 + g(x)) dx$. Show each step CLEARLY.

SCORE: ___ / 4 POINTS

$$= - \int_5^8 (2 + g(x)) dx$$

$$= - \left[\int_5^8 2 dx + \int_5^8 g(x) dx \right]$$

$$= - [2(8-5) + -1]$$

$$= - [6 - 1] = -5$$

OR

$$= \int_8^5 2 dx + \int_8^5 g(x) dx$$

$$= 2(5-8) - \int_5^8 g(x) dx$$

$$= -6 - -1$$

$$= -5$$