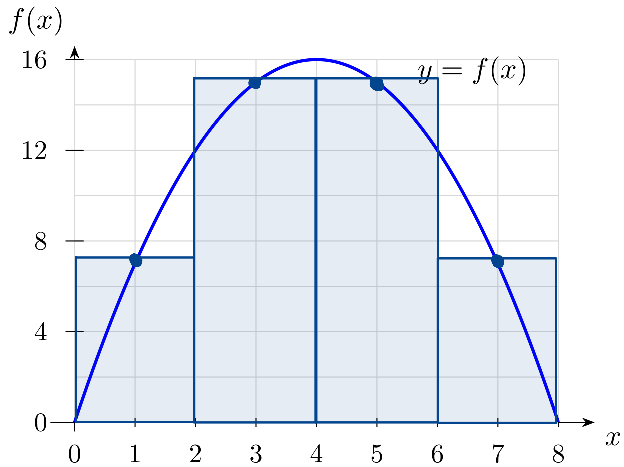
Math 1300 **Name:** Champ
Fall 2025
Quiz 12

1. (2 points) Consider the function $f(x) = -x^2 + 8x$. The graph of $f(x)$ is shown below. Compute the Riemann sum M_4 for approximating $\int_0^8 f(x)\,dx$ using 4 subintervals of equal width on $[0, 8]$.



(a) 22
(b) 44
(c) 80
(d) 88
(e) 176

$M_4 = 2 \cdot f(1) + 2 \cdot f(3) + 2 \cdot f(5) + 2 \cdot f(7)$
$= 2 \cdot 7 + 2 \cdot 15 + 2 \cdot 15 + 2 \cdot 7$
$= 14 + 30 + 30 + 14$
$= 88$

2. (2 points) Which of the following is the Riemann sum *using right endpoints*, with n rectangles, that approximates the area between $y = x^3$ and the x-axis from $x = 0$ to $x = 2$?

(a) $\sum_{i=1}^{n} \left(\frac{2}{n}(i-1)\right)^3 \cdot \frac{2}{n}$

(b) $\sum_{i=1}^{n} \left(\frac{2i}{n}\right)^3 \cdot \frac{3}{n}$

(c) $\sum_{i=1}^{n} \left(\frac{2}{n}\left(i - \frac{1}{2}\right)\right)^3 \cdot \frac{2}{n}$

(d) $\sum_{i=1}^{n} \left(2 + \frac{2i}{n}\right)^3 \cdot \frac{2}{n}$

(e) $\sum_{i=1}^{n} \left(\frac{2i}{n}\right)^3 \cdot \frac{2}{n}$

$\Delta x = \frac{2-0}{n} = \frac{2}{n}$

Right endpoints:

$x_1 = 0 + \frac{2}{n} \cdot 1$

$x_2 = 0 + \frac{2}{n} \cdot 2$

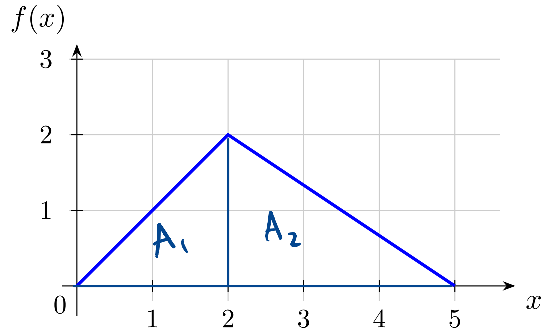
$\vdots$

$x_i = 0 + \frac{2}{n} \cdot i \rightarrow x_i = \frac{2i}{n}$

$\vdots$

$x_n = 0 + \frac{2}{n} \cdot n = 2$

3. (2 points) Use the graph below to evaluate $\int_0^5 f(x)\,dx$.



(a) 1
(b) 3
(c) 4
(d) 5
(e) Not enough information to determine.

$$A = A_1 + A_2 = \frac{1}{2}\cdot 2\cdot 2 + \frac{1}{2}\cdot 3\cdot 2$$
$$= 2+3$$
$$= 5$$

4. (2 points) Which of the following expresses the limit

$$\lim_{n\to\infty}\sum_{i=1}^{n}\left(2+\frac{3i}{n}\right)^2\frac{3}{n}$$

as a definite integral? (You may assume right-hand endpoints are used.)

(a) $\int_0^3 (2+3x)^2\,dx$ $= \lim_{n\to\infty}\sum_{i=1}^{n}\left(2+3\left(0+\frac{3}{n}\cdot i\right)\right)^2\cdot\frac{3}{n}$
(b) $\int_2^5 (2+x)^2\,dx$ $= \lim_{n\to\infty}\sum_{i=1}^{n}\left(2+\left(2+\frac{3}{n}\cdot i\right)\right)^2\cdot\frac{3}{n}$
(c) $\int_2^5 x^2\,dx$ $= \lim_{n\to\infty}\sum_{i=1}^{n}\left(2+\frac{3}{n}\cdot i\right)^2\cdot\frac{3}{n}$
(d) $\int_2^5 4x\,dx$ $= \lim_{n\to\infty}\sum_{i=1}^{n}4\left(2+\frac{3}{n}\cdot i\right)\cdot\frac{3}{n}$
(e) None of the above

The right endpoints are written in red.

5. (2 points) Do you have any questions or comments about the course so far? What has been the most helpful? What would you like to see more of?

MATH 1300 is the best!