Classroom Voting Questions: Calculus II

Section 5.2 The Definite Integral

1. Which of the following is the best estimate of \( \int_{0}^{3} f(x) \, dx \), where \( f(x) \) is given in the figure below?

   (a) 13
   (b) 17
   (c) 65
   (d) 85

2. Which of the following is the best estimate of \( \int_{-2}^{2} f(x) \, dx \), where \( f(x) \) is given in the figure below?

   (a) -4
   (b) -6
3. Make a sketch of the function $f(x) = \cos x$ and decide whether $\int_{-\frac{\pi}{2}}^{0} f(x)\,dx$ is:
   (a) Positive
   (b) Negative
   (c) Zero

4. Make a sketch of the function $f(x) = -x^3$ and decide whether $\int_{-5}^{5} f(x)\,dx$ is:
   (a) Positive
   (b) Negative
   (c) Zero

5. **True or False:** If a piece of string has been chopped into $n$ small pieces and the $i^{th}$ piece is $\Delta x_i$ inches long, then the total length of the string is exactly $\sum_{i=1}^{n} \Delta x_i$.
   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident

6. You want to estimate the area underneath the graph of a positive function by using four rectangles of equal width. The rectangles that must give the best estimate of this area are those with height obtained from the:
   (a) Left endpoints
   (b) Midpoints
   (c) Right endpoints
   (d) Not enough information

7. Suppose you are slicing an 11-inch long carrot REALLY thin from the greens end to the tip of the root. If each slice has a circular cross section $f(x) = \pi |r(x)|^2$ for each $x$ between 0 and 11, and we make our cuts at $x_1, x_2, x_3, \ldots, x_n$ then a good approximation for the volume of the carrot is
8. Let $f$ be a continuous function on the interval $[a, b]$.

**True or False:** $\lim_{n \to \infty} \sum_{i=1}^{n} f(x_i^*) \Delta x_i$ may lead to different limits if we choose the $x_i^*$ to be the left-endpoints instead of midpoints.

(a) True, and I am very confident
(b) True, but I am not very confident
(c) False, but I am not very confident
(d) False, and I am very confident