Name: Richard

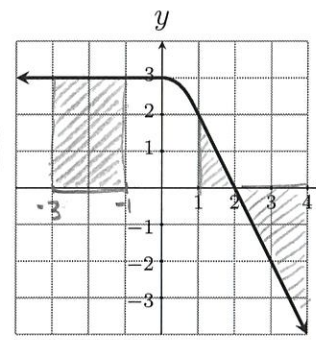
Quiz 23

MATH 200
November 18, 2025

1. Suppose that, for the function graphed below, $\int_{-4}^{2} f(x)\,dx = 15.7$. Answer the questions below.

(a) $\int_{-3}^{-1} 5f(x)\,dx = 5\int_{-3}^{-1} f(x)\,dx = 5\cdot 6 = \boxed{30}$

(b) $\int_{1}^{2} f(x)\,dx = \frac{1}{2}1\cdot 2 = \boxed{1}$



(c) $\int_{1}^{4} f(x)\,dx = A_{up} - A_{down} = 1-4 = \boxed{-3}$

(d) $\int_{0}^{2} f(x)\,dx = \boxed{3.7}$

$$15.7 = \int_{-4}^{2} f(x)\,dx = \int_{-4}^{0} f(x)\,dx + \int_{0}^{2} f(x)\,dx$$

$$15.7 = 12 + \int_{0}^{2} f(x)\,dx \Rightarrow \int_{0}^{2} f(x)\,dx = \boxed{3.7}$$

(e) $\lim_{n\to\infty} \sum_{k=1}^{n} f\underbrace{\left(1+\frac{k}{n}\right)}\underbrace{\frac{1}{n}}_{\Delta x} = \int_{1}^{2} f(x)\,dx = \boxed{1}$

$x_k = 1 + k\cdot\frac{1}{n}$ $\quad\Delta x = \frac{b-a}{n}$

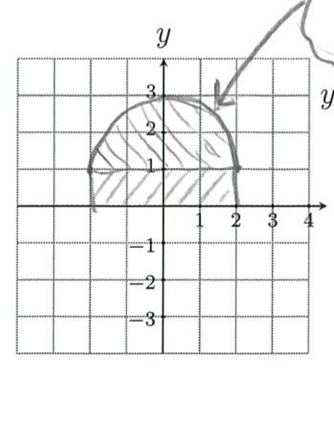
$a = 1$ $\quad= \frac{2-1}{n}$

$b = 1 + n\cdot\frac{1}{n} = 2$ $\quad= \frac{1}{n}$

2. Find $\int_{-2}^{2} \left(1+\sqrt{4-x^2}\right) dx$ by considering area. You may find it helpful to sketch the graph.

$$\int_{-2}^{2} (1+\sqrt{4-x^2})\,dx = 4 + \frac{1}{2}\pi\cdot 2^2$$

$$= \boxed{4 + 2\pi}$$



circle, radius 2 raised 1 unit

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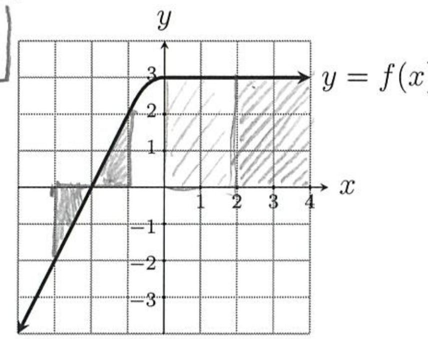
1. Suppose that, for the function graphed below, $\int_{-2}^{0} f(x)\,dx = 3.7$. Answer the questions below.

(a) $\int_{-2}^{2} f(x)\,dx = \int_{-2}^{0} f(x)\,dx + \int_{0}^{2} f(x)\,dx$

$= 3.7 + 6 = \boxed{9.7}$

(b) $\int_{2}^{4} \frac{f(x)}{2}\,dx = \frac{1}{2}\int_{2}^{4} f(x)\,dx = \frac{1}{2}\cdot 6 = \boxed{3}$



(c) $\int_{3}^{1} f(x)\,dx = -\int_{1}^{3} f(x)\,dx = -6$

(d) $\int_{-3}^{-1} f(x)\,dx = A_{up} - A_{down} = \boxed{0}$

(e) $\lim_{n\to\infty} \sum_{k=1}^{n} f\left(\underbrace{1+\frac{3k}{n}}\right)\frac{3}{n} = \int_{1}^{4} f(x)\,dx = \boxed{9}$

$x_k = 1 + k\cdot\frac{3}{n}$
so $a = 1$, $b = 1 + n\frac{3}{n} = 4$
and $\Delta x = \frac{4-1}{n} = \frac{3}{n}$

2. Find $\int_{0}^{2} \left(2 + \sqrt{4 - x^2}\right) dx$ by considering area. You may find it helpful to sketch the graph.

Circle, radius 2, raised 2 units

$\int_{0}^{2} (2 + \sqrt{4-x^2})\,dx = 4 + \frac{1}{4}\pi\cdot 2^2$

$= 4 + \pi$