Circle your Instructor:
Faudree, Williams, Zirbes

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Math 251 Fall 2017 **Quiz #10, November 22nd**

Name: _____

There are 25 points possible on this quiz. This is a closed book quiz. Calculators and notes are not allowed. **Please show all of your work!** If you have any questions, please raise your hand.

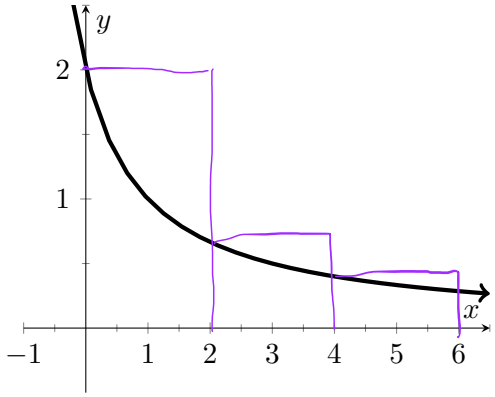
Exercise 1. (3 pts.) The speed of a skier increased steadily during the first three seconds of a race. Her speed at half-second intervals is given in the table. Find a lower estimate for the distance she traveled during the first three seconds. Include units with your answer.

time (in seconds)	0	0.5	1	1.5	2	2.5	3
velocity (in feet/sec)	0	4	10	14	20	22	24

$\frac{1}{2}(0+4+10+14+20+22) = \frac{70}{2} = 35$ ft.

Exercise 2. (9 pts.) Estimate the area under $f(x) = \frac{2}{x+1}$ from $x = 0$ to $x = 6$ using three approximating rectangles and

(a.) left endpoints. Sketch the rectangles on the graph below.

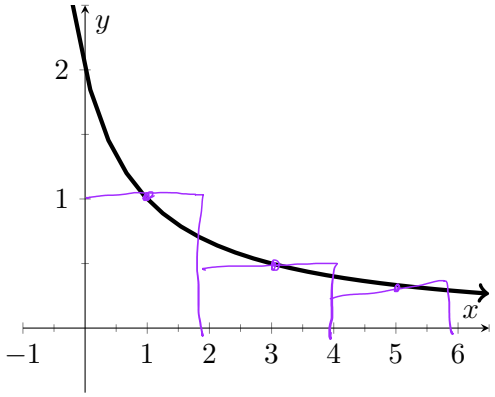


$\text{Area} \approx 2 \cdot \left[2 + \frac{2}{3} + \frac{2}{5}\right]$

$= 2\left[\frac{30+10+6}{15}\right]$

$= \frac{92}{15}$

(b.) midpoints as sample points. Sketch the rectangles on the graph below.



$\text{Area} \approx 2 \cdot \left[\frac{2}{2} + \frac{2}{4} + \frac{2}{6}\right]$

$= 2\left(1 + \frac{1}{2} + \frac{1}{3}\right)$

$= 2\left(\frac{6+3+2}{6}\right) = \frac{11}{3}$

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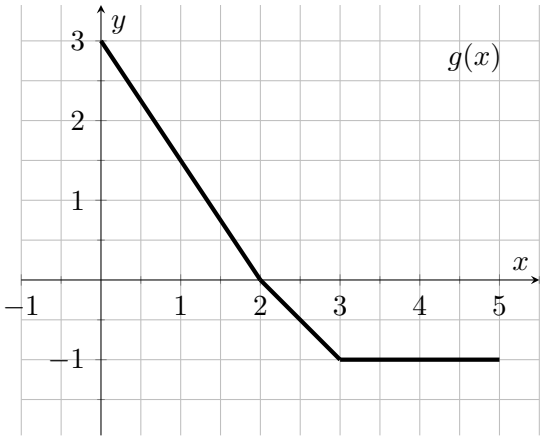
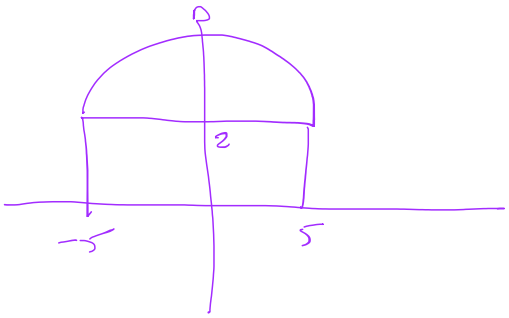
Exercise 3. (4 pts.) Use the graph of $g(x)$ to evaluate the integral $\int_0^5 g(x)\,dx$.



$\int_0^5 g(x) = \frac{1}{2}\cdot 2\cdot 3 - \frac{1}{2}\cdot 1\cdot 1 - 2\cdot 1$

$= 3 - \frac{5}{2} = \frac{1}{2}$

Exercise 4. (4 pts.) Evaluate the integral $\int_{-5}^{5} (\sqrt{25-x^2}+2)\,dx$ by interpreting it in terms of areas.



Area $= \frac{1}{2}\pi\cdot 25 + 10\cdot 2$

$= 20 + 25\frac{\pi}{2}$.

Exercise 5. (5 pts.) Assume that $\int_1^5 f(x)\,dx = 6$. Use this fact and the properties of integrals to evaluate the integrals below.

(a.) $\int_5^1 f(x)\,dx$ $= -6$

(b.) $\int_1^5 (7 - 2\pi f(x))dx$ $= 28 - 12\pi$