

**Worksheet 11**  
**MORE RIEMANN SUMS**  
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Let  $U = \mathbb{R} \times \mathbb{R}$

**Exercise 11.1.** Let  $f : \mathbb{R} \rightarrow \mathbb{R}$  such that  $f(x) = x^2 + 1$ . Let  $g : \mathbb{R} \rightarrow \mathbb{R}$  such that  $g(x) = -3 \cdot x^2 + 1$ . Let  $x = 5$ . Define R as the region bounded by  $x = 5$ ,  $f$ ,  $\wedge$   $g$ . Draw R.

Find the area of R using Riemann Sums.

**Exercise 11.2.** Let  $f : \mathbb{R} \rightarrow \mathbb{R}$  such that  $f(x) = 3x + 4$ . Let  $g : \mathbb{R} \rightarrow \mathbb{R}$  such that  $g(x) = x^2$ . Define S as the region bounded by  $f$ ,  $\wedge$   $g$ .

Draw S.

Find the area of S using Riemann Sums.

**Exercise 11.3.** Let  $f : \mathbb{R} \rightarrow \mathbb{R}$  such that  $f(x) = 3 \cdot x + 4$ . Let  $g : (0, \infty) \rightarrow \mathbb{R}$  such that  $g(x) = \frac{1}{x}$ .

Let  $x = 1$ . Let  $x = 3$ . Let  $y = 0$ .

Define T as the region bounded by  $x = 3$ ,  $x = 1$ ,  $y = 0$ ,  $\wedge$   $f$ .

Draw T.

Set up the Riemann Sum to find the area of T.

Note you cannot complete the Riemann Sum.