

For the following exercises, consider the points on the given graphs. Use a calculator to graph the functions.

347. **[T]** Where is the line $y = 5 - 2x$ closest to the origin?

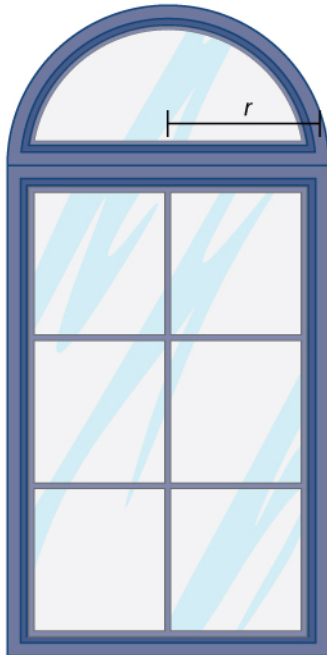
348. **[T]** Where is the line $y = 5 - 2x$ closest to point $(1, 1)$?

349. **[T]** Where is the parabola $y = x^2$ closest to point $(2, 0)$?

350. **[T]** Where is the parabola $y = x^2$ closest to point $(0, 3)$?

For the following exercises, set up, but do not evaluate, each optimization problem.

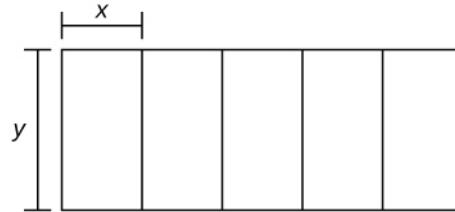
351. A window is composed of a semicircle placed on top of a rectangle. If you have 20 ft of window-framing materials for the outer frame, what is the maximum size of the window you can create? Use r to represent the radius of the semicircle.



352. You have a garden row of 20 watermelon plants that produce an average of 30 watermelons apiece. For any additional watermelon plants planted, the output per watermelon plant drops by one watermelon. How many extra watermelon plants should you plant?

353. You are constructing a box for your cat to sleep in. The plush material for the square bottom of the box costs $\$5/\text{ft}^2$ and the material for the sides costs $\$2/\text{ft}^2$. You need a box with volume 4 ft^3 . Find the dimensions of the box that minimize cost. Use x to represent the length of the side of the box.

354. You are building five identical pens adjacent to each other with a total area of 1000 m^2 , as shown in the following figure. What dimensions should you use to minimize the amount of fencing?



355. You are the manager of an apartment complex with 50 units. When you set rent at $\$800/\text{month}$, all apartments are rented. As you increase rent by $\$25/\text{month}$, one fewer apartment is rented. Maintenance costs run $\$50/\text{month}$ for each occupied unit. What is the rent that maximizes the total amount of profit?