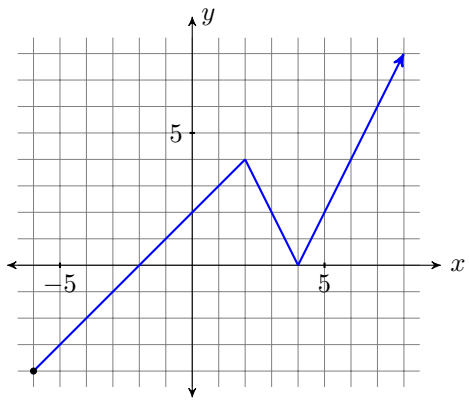
Quiz 3

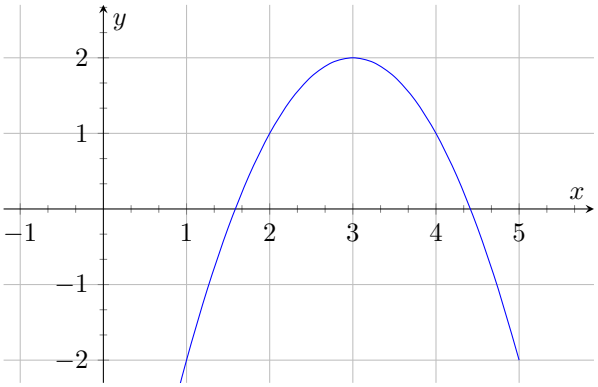
1. Graph the piecewise function $f(x) = \begin{cases} x+2, & \text{if } -6 \le x \le 2 \\ 2|x-4|, & \text{if } x > 2 \end{cases}$.

   Solution:



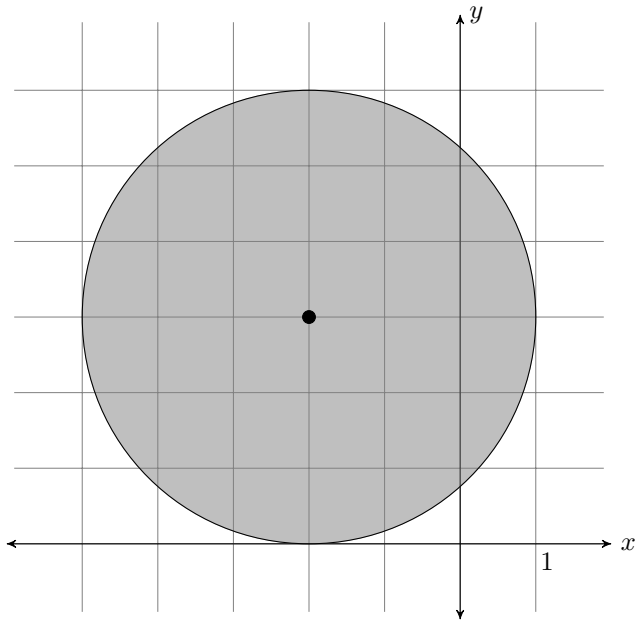
2. Graph $g(x) = -(x-3)^2 + 2$.

   Solution:

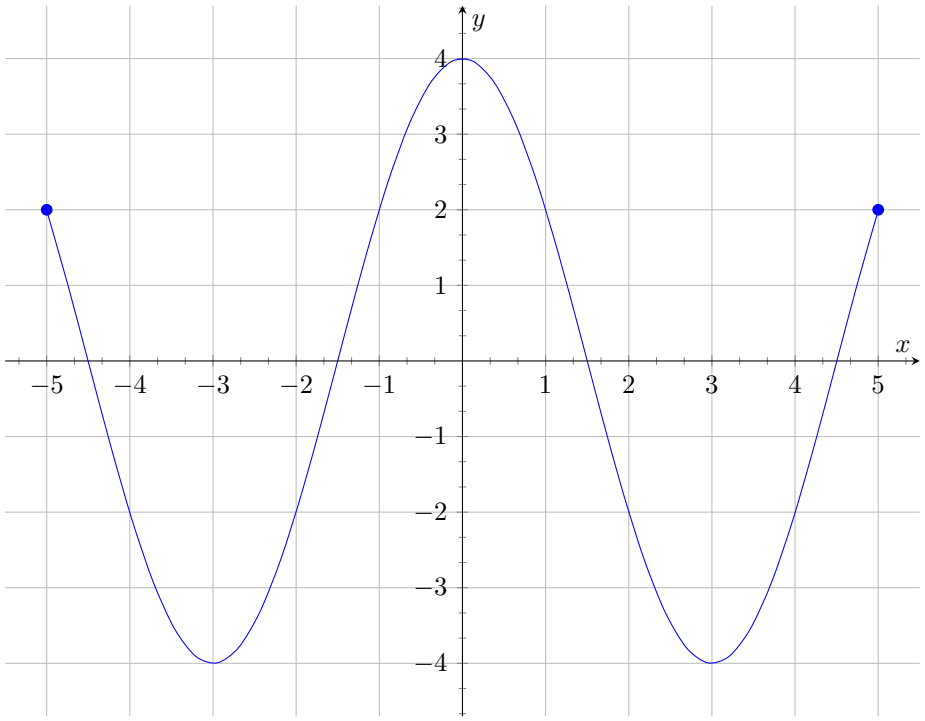


3. Graph the set of points $\{(x, y) \mid (x+2)^2 + (y-3)^2 \leq 9\}$. (This set can also be written using the distance formula, $\{(x, y) \mid d\big((x, y), (-2, 3)\big) \leq 3\}$.)

Solution:



4. Consider the graph of a function f:



(a) Where is f increasing?

On $(-3, 0) \cup (3, 5]$

(b) Where is f decreasing?

On $[-5,-3) \cup (0,3)$

(c) What are the local maxima of f?

$y = 4$ at $(0,4)$ (We don't consider $y = 2$ at $(-5,2)$ and $(5,2)$, because 2 is less than 4. If it had been the other way around, we would have said all three points were local maxima, with the endpoints being the global maxima.)

(d) What are the local minima of f?

$y = -4$ at $(-3,-4),\ (3,-4)$

5. Find the equation of the line passing through the points $(-1,2)$ and $(2,3)$, and put it in standard form.

Using the equation for the slope we immediately get

$$m = \frac{3-2}{2-(-1)} = \frac{1}{3}$$

Pick one of the points, say $(2,3)$, and use the point-slope formula:

$$y - 3 = \frac{1}{3}(x-2)$$

Simplify and solve for y, and you're done

$$\boxed{y = \frac{1}{3}x + \frac{7}{3}}$$