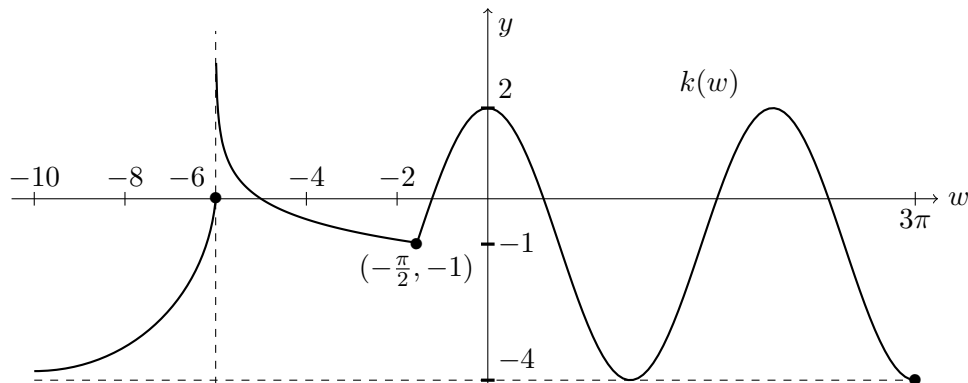**7.** [17 points] The function $k(w)$ has domain $(-\infty, 3\pi]$. The graph of $k(w)$ for $-10 \leq w \leq 3\pi$ is shown in the picture below:

Assume that the behavior of the graph for w in $(-\infty, -10)$ continues as shown. Moreover, the following are true for the function $k(w)$:

- $\displaystyle\lim_{w \to -6^+} k(w) = +\infty$
- $k(w)$ has a horizontal asymptote $y = -4$.
- $k(w) = A\cos(w) + c$, for $-\pi/2 \leq w \leq 3\pi$.

a. [4 points] Find the values of A and c.

b. [9 points] Fill in the blanks in the following sentences. You can use either interval notation or inequalities, wherever it is needed:

i. The domain of the function $k(-\frac{1}{4}(w - 4))$ is _____.

ii. $\displaystyle\lim_{w \to +\infty} -3k(-w) + 1 =$ _____.

iii. The vertical asymptote of the graph of $k(2018w+2019)$ is _____.

c. [4 points] Let $g(w) = -k(5w) - 1.5$. Find the coordinates of the point on the graph of k that correspond to the point $(\frac{2\pi}{5}, -3.5)$ on the graph of g.

The point on the graph of k is (_____ , _____).