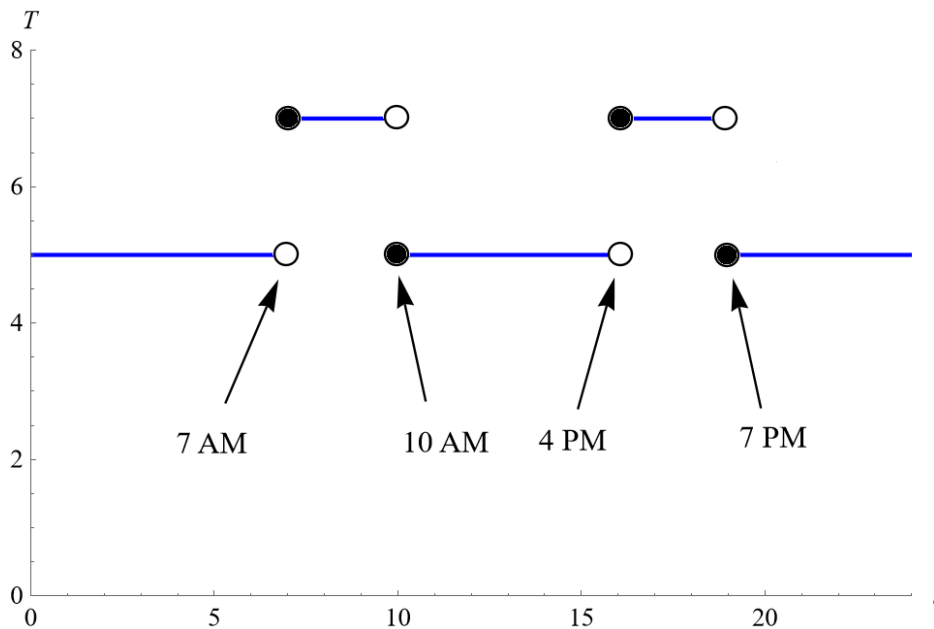## Exercise 9

The toll T charged for driving on a certain stretch of a toll road is \$5 except during rush hours (between 7 AM and 10 AM and between 4 PM and 7 PM) when the toll is \$7.

    (a) Sketch a graph of T as a function of the time t, measured in hours past midnight.

    (b) Discuss the discontinuities of this function and their significance to someone who uses the road.

Solution

Below is a graph of $T(t)$ versus t from 0 to 24 hours past midnight.

The discontinuities of this function are jump discontinuities; they occur at the moments in time where the toll changes to a different value. These toll changes are effective immediately when the clock hits the hour mark, which are indicated by the filled in circles whenever there's a new price.