4. The Awkward Turtle is riding a mini ferris wheel! The wheel has radius 1.5 meters but is lifted off the ground, so that even when he is at the lowest point of the ride, the Awkward Turtle is still 0.5 meters above the ground, which is, needless to say, distinctly awkward. The wheel turns at a constant rate of 1 revolution every 90 seconds.

   Suppose that precisely at noon, the Awkward Turtle is 2 meters above the ground and moving toward the ground. Let $H(t)$ denote the height (in meters) of the Awkward Turtle above the ground, t minutes after noon.

   (a) (2 points) What is the sign of $H'(0)$? Explain.

   > $H'(0)$ is negative, because the turtle is moving downwards at noon, i.e. the height is decreasing at noon.

   (b) (4 points) Sketch, on the axes below, the function $H(t)$. Make sure you label the tick-marks!
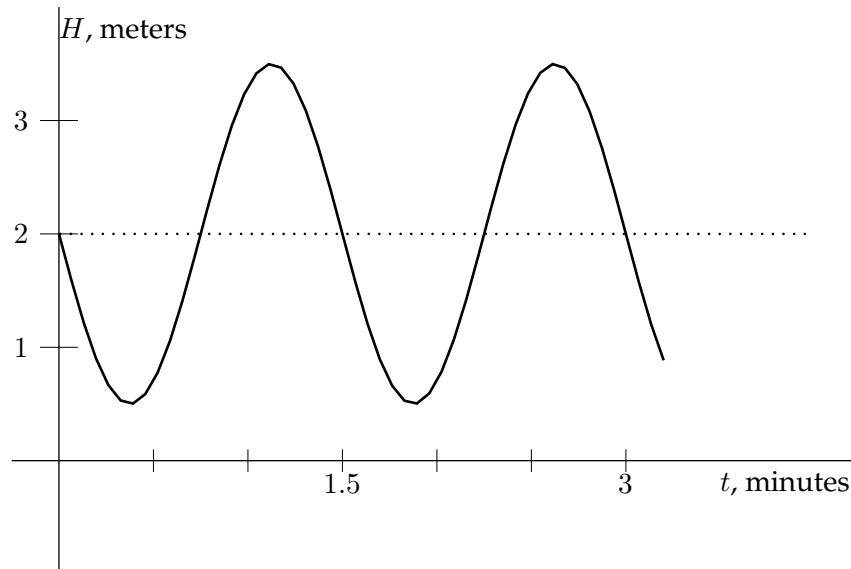
   (c) (4 points) Determine a formula for the function $H(t)$.

   $$H(t) = -1.5 \sin\left(\frac{4\pi}{3} t\right) + 2$$