

NAME _____

SECTION #

 $\frac{1}{10}$

A sphere of mass M (kgs) is fired upwards with an initial velocity of 10 m/sec. Its motion obeys the law

$$\frac{dv}{dt} = -g - \frac{b}{a}v|v|, \quad v(t) = \text{velocity at time } t,$$

where $g = 10 \text{ m/s}^2$ and $\frac{b}{a} = \frac{1}{10} \text{ m}^{-1}$.

Find the time t_1 at which it reaches its maximum height where $v(t_1) = 0$.

③

 $t_1 =$

Find an expression for $v(t)$ for $t \geq t_1$

④

 $t \geq t_1 =$, $v(t) =$

Draw the graph (approximately) of $v(t)$

③



Show your work on the back.