2. If you pluck a guitar string, a point $P$ on the string vibrates. The motion of the point $P$ is given by

$$g(t) = A \cos(220\pi t),$$

where $g(t)$ is the displacement (in mm) of $P$ from its position before the string was plucked, $t$ is the number of seconds after the string was plucked, and $A$ is a positive constant.

(a) (6 points) Sketch a graph of $g(t)$, for $0 \leq t \leq 1/55$, on the axes below. Be sure to indicate $A$ on your sketch.

(b) (3 points) Sketch tangent lines to your graph at $t = \frac{6}{880}$, $t = \frac{9}{880}$, and $t = \frac{12}{880}$. Use these to write the numbers $g'(\frac{6}{880})$, $g'(\frac{9}{880})$, and $g'(\frac{12}{880})$ in order from least to greatest.

$$g'(\frac{9}{880}) < g'(\frac{12}{880}) < g'(\frac{6}{880})$$

(c) (3 points) What is the meaning of $A$, in terms of the plucked string?

$A$ is the initial displacement (in mm) of $P$. It is also the maximum displacement of the string.