Name __Mine__   Date _____

Math 112: #11 A/B

A) (**No calculator**) The number of hours S studied by Scappoose students on the tth day since January 1, 2016 can be modeled by:
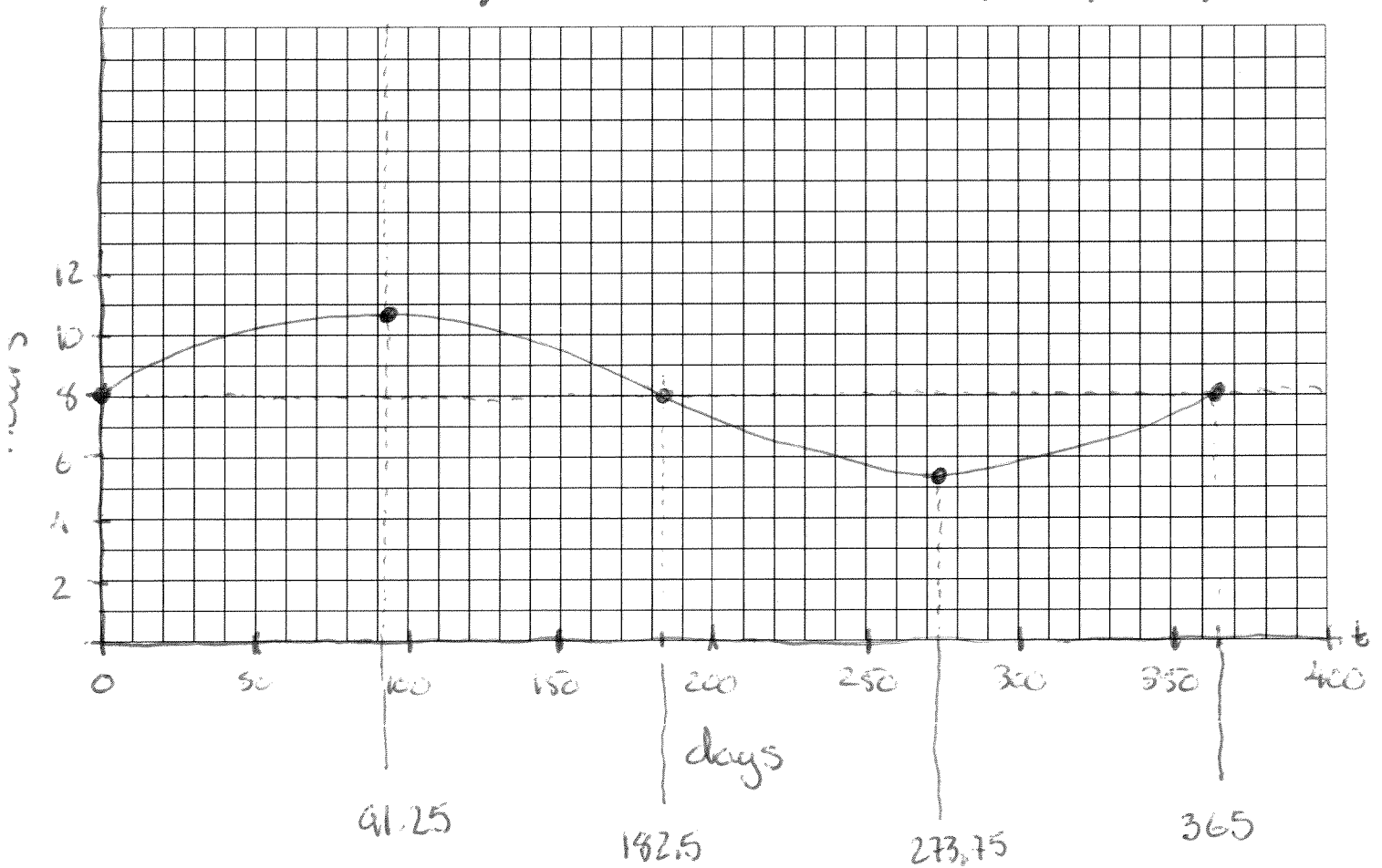
$$S(t) = 8 + \frac{11}{4}\sin\left(\frac{2\pi t}{365}\right)$$

↓ shift up 8 hrs   Period $= \frac{2\pi}{2\pi/365} = 365$ d

amp $= \frac{11}{4} = 2.75$ hrs

Graph $S(t)$ vs. t carefully (labeled axes with appropriate tick marks) for $0 \le t \le 365$. Estimate the values of t at which the graph exhibits a maximum or a minimum, respectively. You may graph this as a continuous function.

S(t)   Max: (91.25, 10.75)   min: (273.75, 5.25)

91.25   182.5   273.75   365

B. (No calculator) The Height in meters, *H*, of Usain Bolt's foot as he runs a 100m dash at the time *t* seconds can be modeled fairly well by

$$H(t) = 0.5 - \frac{1}{2}\cos(0.4\pi t)$$

v. Shift: up 0.5m

amp = $\frac{1}{2}$ = 0.5m

reflect over x

Period = $\frac{2\pi}{0.4\pi}$ = 5 sec

Graph *H(t)* vs. *t* carefully (labeled axes with appropriate tick marks) for 0 ≤ *t* ≤ 10. Estimate the values of *t* at which the graph exhibits a maximum or a minimum, respectively. You may graph this as a continuous function.

max
(2.5, 1)

max
(7.5, 1)

H(t)

height (m)

1

0.5

1.25   2.5   3.75   5   6.25   7.5   8.75   10   t

min
(0,0)

time (sec)

min
(5,0)

min
(10,0)