

Figure8:

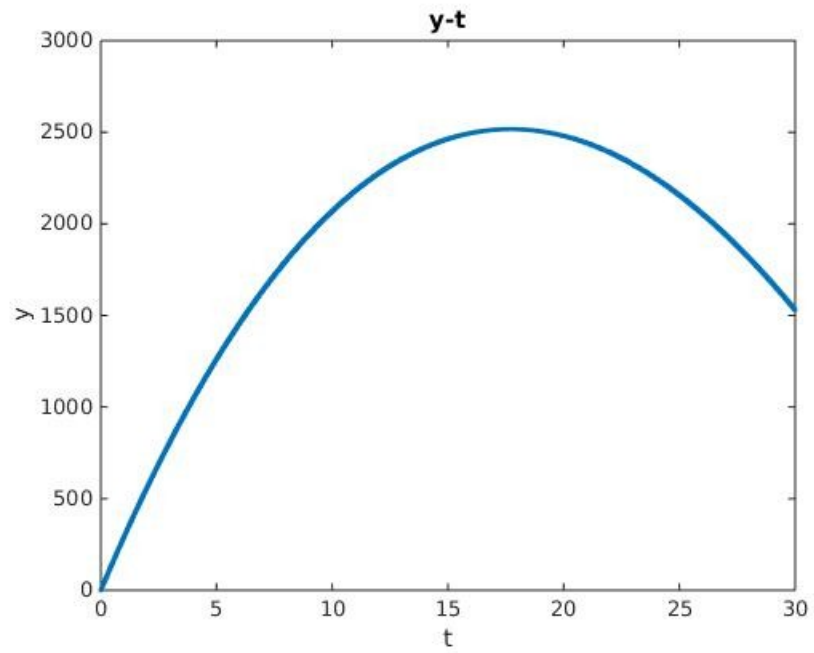
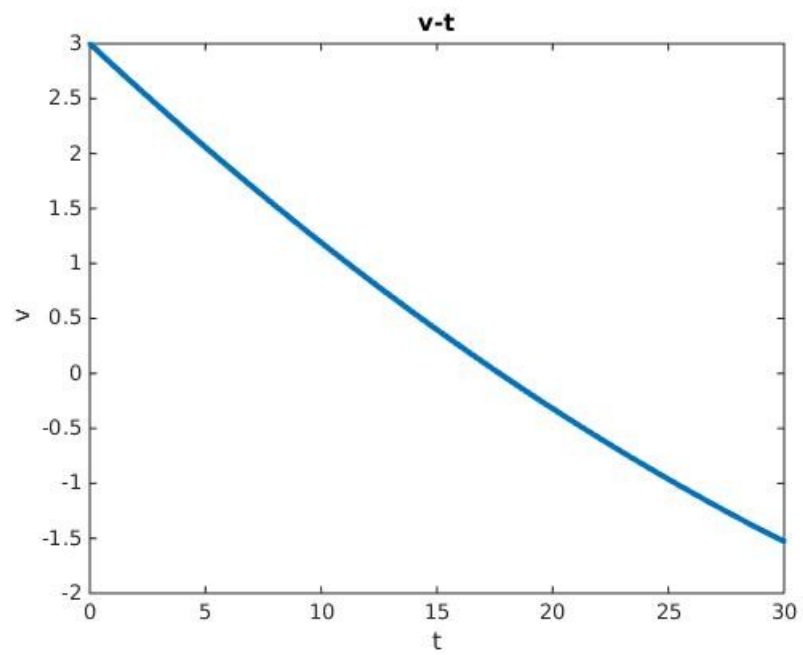
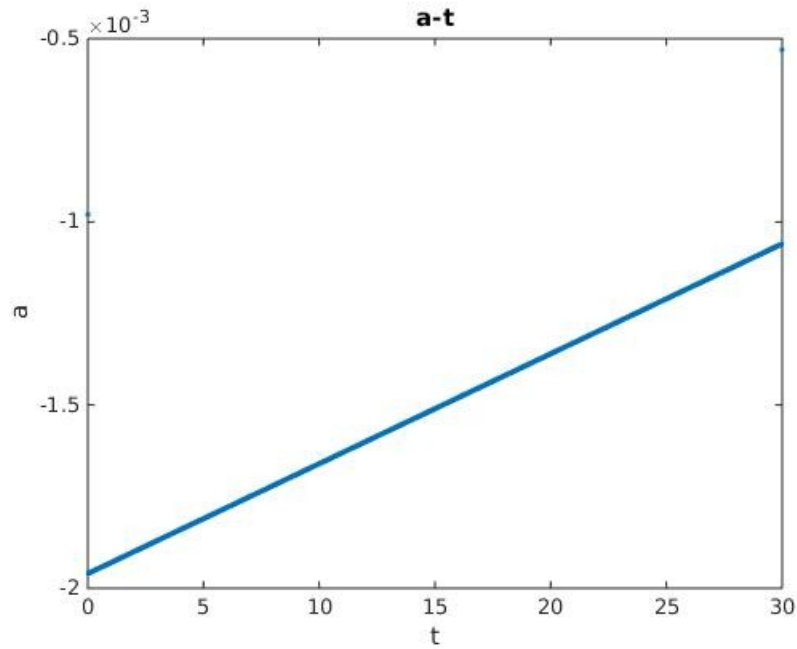


Figure9:



diff the position in order to find velocity out.

Figure10:



diff the velocity in order to find acceleration out.

Ques11:

Ans: At $t=17.71$, the thing is at the highest place $Y = 2.517020e+03$

use binary search to find when velocity may be 0 (or to find the closest one).
At this time, the position is the highest!!