HW 8

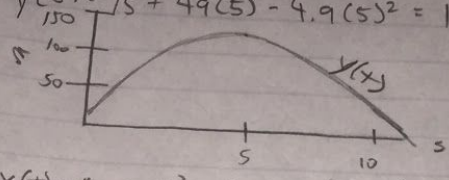
8-2. a. $y(t) = 15 + 49t - 4.9t^2$

b. $v(t) = 49 - 9.8t$

c. $a(t) = -9.8$

d. highest point: $v(0) = 49 - 9.8t = 0$ $\therefore t = -49/-9.8 = 5s$

$y(5) = 15 + 49(5) - 4.9(5)^2 = 137.5m$



$t=3$ 8-5 a. $x(t) = 4\cos(\frac{2}{8}\pi t) + 3\sin(\frac{2}{3}\pi t)$ $x(3) = 4$

$v(t) = -\frac{8}{8}\pi\sin(\frac{2}{3}\pi t) + 2\pi\cos(\frac{2}{3}\pi t)$ $v(3) = 2\pi$

$a(t) = -\frac{16}{9}\pi^2\cos(\frac{2}{3}\pi t) - \frac{4}{3}\pi\sin(\frac{2}{3}\pi t)$ $a(3) = -\frac{16}{9}\pi^2$

b. $x(t) = 3t^5 - 5t^2 + \frac{7}{t} + 2\sqrt{t}$ $x(3) = 689.8$

$v(t) = 15t^4 - 10t - 7t^{-2} + t^{-\frac{1}{2}}$ $v(3) = 1184.8$

$a(t) = 60t^3 - 10 + 14t^{-3} - \frac{1}{2}t^{-\frac{3}{2}}$ $a(3) = 1609.4$

c. $x(t) = 2e^{4t} + 3e^{-5t} + 2e^t - 2$ $x(3) = 325547.75$

$v(t) = 8e^{4t} - 15e^{-5t} + 2e^t$ $v(3) = 1302078.50$

$a(t) = 32e^{4t} + 75e^{-5t} + 2e^t$ $a(3) = 5208193.50$

8-8 a. $v(t) = 6t^2 - 30t + 24 \Rightarrow 6t^2 - 30t + 24 = 0$ $\therefore t = 1, 4$

$y(1) = 19m$

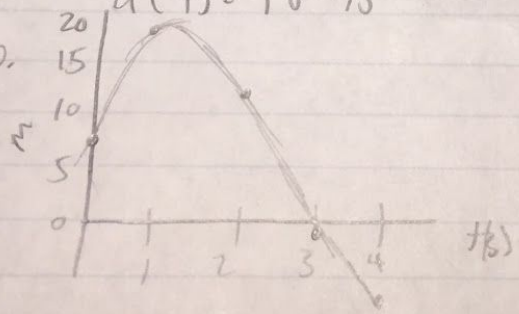
$y(4) = -8m$

$a(t) = 12t - 30$

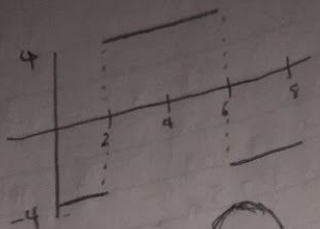
$a(1) = -18\ m/s^2$

$a(4) = 18\ m/s^2$

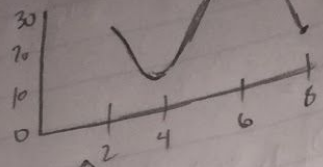
b.



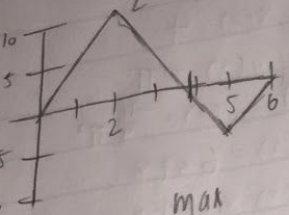
8-15. a.



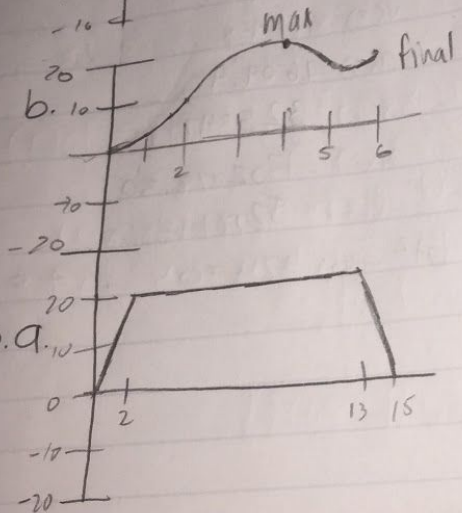
b.



8-19 a.



b.



8-20. a.

b.