H.W. 2

pg. 69-70:

4) For the curve $y = \sqrt{x+4}$ and the point $P(5, 3)$

a)

	x	Q	m_{PQ}
i)	4.5	(4.5, 2.915)	0.169
ii)	4.9	(4.9, 2.983)	0.167
iii)	4.998	(4.998, 2.998)	0.1667
iv)	4.999	(4.999, 2.999)	0.16667
v)	5.5	(5.5, 3.082)	0.164414
vi)	5.1	(5.1, 3.016)	0.16620
vii)	5.01	(5.01, 3.0016)	0.16662
viii)	5.001	(5.001, 3.00016)	0.16666

b) The slope appears to be $0.166 \approx \frac{1}{6}$

c) $y - 3 = \frac{1}{6}(x - 5)$ hence $y = \frac{1}{6}x + \frac{13}{6}$

6.) The average velocity between t and $t+h$ seconds is

$$\frac{58(t+h) - 0.83(t+h)^2 - (58t - 0.83t^2)}{h}$$

$$= \frac{58h - 1.66th - 0.83h^2}{h}$$

$$= 58 - 1.66t - 0.83h \quad \text{if } h \neq 0.$$

a) Here $t=1$, so the average velocity is

$58 - 1.66 - 0.83h = 56.34 - 0.83h$

i) For $[1,2]$, $h=1$, $v_{ave} = 55.51$ m/s

ii) For $[1,1.5]$, $h=0.5$, $v_{ave} = 55.925$ m/s

iii) For $[1,1.1]$, $h=0.1$, $v_{ave} = 56.257$ m/s.

iv) For $[1,1.01]$, $h=0.01$, $v_{ave} = 56.3317$ m/s.

v) For $[1,1.001]$, $h=0.001$, $v_{ave} = 56.33917$ m/s.

b) The instontoneous velocity after 1 second is 56.34 m/s.

8) Average velocity between times $t=2$ and $t=2+h$ is given by $\frac{s(2+h)-s(2)}{h}$

a) i) $h=3 \Rightarrow v_{ave} = \frac{s(5)-s(2)}{5-2} = \frac{178-32}{3} \approx 48.7$ ft/s

ii) $h=2 \Rightarrow v_{ave} = \frac{s(4)-s(2)}{4-2} = \frac{119-32}{2} = 43.5$ ft/s.

iii) $h=1 \Rightarrow v_{ave} = \frac{s(3)-s(2)}{3-2} = \frac{70-32}{1} = 38$ ft/s.

b) Using the points $(0.8, 0)$ and $(5, 118)$ from the approximate tangent line, the instantaneous velocity at $t=2$ is about $\frac{118-0}{5-0.8} \approx 28$ ft/s.