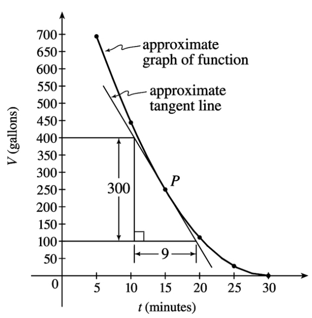
1. **(a)** Using $P(15,250)$, we construct the following table:

t	Q	slope=m_{PQ}
5	$(5,694)$	$\frac{694-250}{5-15}=-\frac{444}{10}=-44.4$
10	$(10,444)$	$\frac{444-250}{10-15}=-\frac{194}{5}=-38.8$
20	$(20,111)$	$\frac{111-250}{20-15}=-\frac{139}{5}=-27.8$
25	$(25,28)$	$\frac{28-250}{25-15}=-\frac{222}{10}=-22.2$
30	$(30,0)$	$\frac{0-250}{30-15}=-\frac{250}{15}=-16.\overline{6}$

(b) Using the values of t that correspond to the points closest to P ($t=10$ and $t=20$), we have

$$\frac{-38.8+(-27.8)}{2}=-33.3$$

(c) From the graph, we can estimate the slope of the tangent line at P to be $\frac{-300}{9}=-33.\overline{3}$.



3. For the curve $y=x/(1+x)$ and the point $P\left(1,\frac{1}{2}\right)$:

(a)

	x	Q	m_{PQ}
(i)	0.5	$(0.5,0.333333)$	0.333333
(ii)	0.9	$(0.9,0.473684)$	0.263158
(iii)	0.99	$(0.99,0.497487)$	0.251256

(iv)	0.999	(0.999,0.499750)	0.250125
(v)	1.1	(1.5,06)	0.2
(vi)	1.5	(1.1,0.523810)	0.238095
(vii)	1.01	(1.01,0.502488)	0.248756
(viii)	1.001	(1.001,0.500250)	0.249875

(b) The slope appears to be $\frac{1}{4}$.

(c) $y-\frac{1}{2}=\frac{1}{4}(x-1)$ or $y=\frac{1}{4}x+\frac{1}{4}$.

5. **(a)** $y=y(t)=40t-16t^2$. At $t=2$, $y=40(2)-16(2)^2=16$. The average velocity between times 2 and $2+h$ is $v_{ave}=\frac{y(2+h)-y(2)}{(2+h)-2}=\frac{\left[40(2+h)-16(2+h)^2\right]-16}{h}=\frac{-24h-16h^2}{h}=-24-16h$, if $h\neq 0$.

(i) $[2,2.5]$: $h=0.5$, $v_{ave}=-32$ ft / s
(ii) $[2,2.1]$: $h=0.1$, $v_{ave}=-25.6$ ft / s
(iii) $[2,2.05]$: $h=0.05$, $v_{ave}=-24.8$ ft / s
(iv) $[2,2.01]$: $h=0.01$, $v_{ave}=-24.16$ ft / s

(b) The instantaneous velocity when $t=2$ (h approaches 0) is -24 ft / s.