See 2.1 page 94 (1ab, 3, 6-8)

① a) $t=5$ $M_{PQ} = \frac{250-684}{15-5} = \boxed{-44.4 \text{ g/min}}$

$t=10$ $M_{PQ} = \frac{250-444}{15-10} = \boxed{-38.8 \text{ g/min}}$

$t=20$ M_{PQ} $\frac{250-111}{15-20} = \boxed{-27.8 \text{ g/min}}$

$t=25$ M_{PQ} $\frac{250-28}{15-25} = \boxed{-22.2 \text{ g/min}}$

$t=30$ M_{PQ} $\frac{250-0}{15-30} = \boxed{-16.67 \text{ g/min}}$

b) using $t=10$ + $t=20$ we have $\frac{-38.8 + -27.8}{2} = \boxed{-33.3 \text{ g/min}}$

③ a) i = 0.333333
ii = 0.263158
iii = 0.251256
iv = 0.250125
v = 0.2
vi = 0.238095
vii = 0.248756
viii = 0.249875

b) The slope appears to be 1/4.

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

$m = \frac{x-y}{x-x}$

$m(x-x) = y-y$

$y-y = m(x-x)$

$(1, \frac{1}{2})$ $m = 1/4$

$y - 1/2 = 1/4(x-1)$

(6) a) $t=1 \quad y=8.14 \Rightarrow (1, 8.14)$

V_{ave} between 1 and 1+h can be found by the equation

$$V_{ave} = \frac{y(1+h)-y(1)}{(1+h)-1} = \frac{10(1+h)-1.86(1+h)^2-8.14}{h}$$

$$= \frac{10+10h-1.86-3.72h-1.86h^2-8.14}{h}$$

$$= \frac{6.28h-1.86h^2}{h} = \boxed{6.28-1.86h}$$

i) $h=1 \quad V_{ave} = 4.42 m/s$
ii) $h=.5 \quad V_{ave} = 5.35 m/s$
iii) $h=.1 \quad V_{ave} = 6.094 m/s$
iv) $h=.01 \quad V_{ave} = 6.2614 m/s$
v) $h=.001 \quad V_{ave} = 6.27814 m/s$

b) $V(1) = 6.28 m/s$

(7) i) $= \frac{10.7-1.4}{3-1} = 4.65 m/s$

ii) $5.6 m/s$
iii) $7.55 m/s$
iv) $7 m/s$

b) I used the points (2, 4) and (5, 23) as they appear to make a good tangent line at $t=3$.

$$\therefore \frac{23-4}{5-2} \approx 6.3 m/s$$

(8) a)i) $\frac{S_2 - S_1}{2-1} = \frac{3 - -3}{1} = 6\,cm/s$

ii) $V_{ave} = -4.71\,cm/s$

iii) $V_{ave} = -6.13\,cm/s$

iv) $V_{ave} = -6.27\,cm/s$

b) $V(3) \approx -6.3\,cm/s$