(1) (a) f is increasing at A and E.

(b) f is decreasing at C.

(c) f' is increasing at D and E.

(d) f' is decreasing at A, B, and possibly C.

(e) $f' > 0$ at A and E.

(f) $f' < 0$ at C.

(g) $f' \approx 0$ at B and D.

(h) $f'' > 0$ at D

(i) $f'' < 0$ at B.

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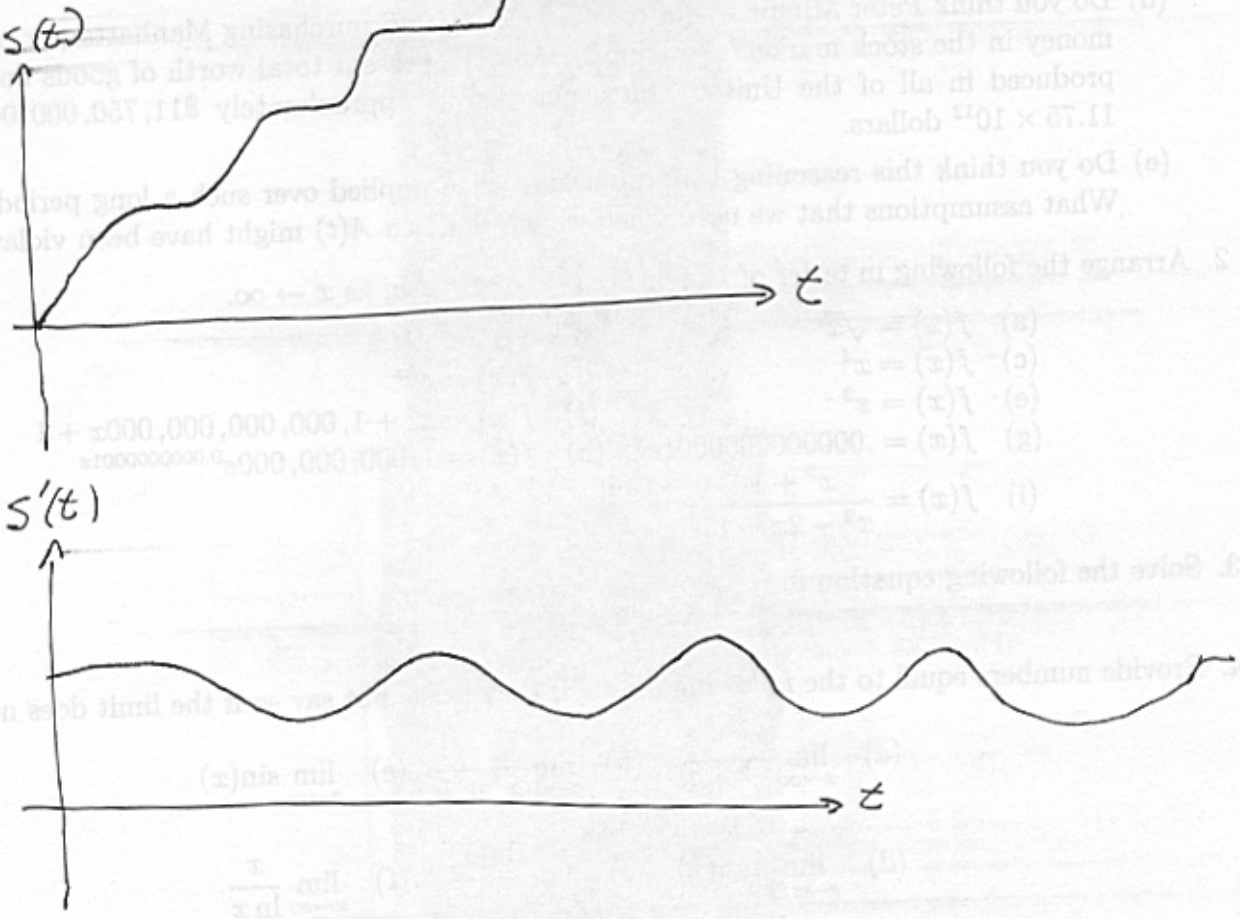
(2)

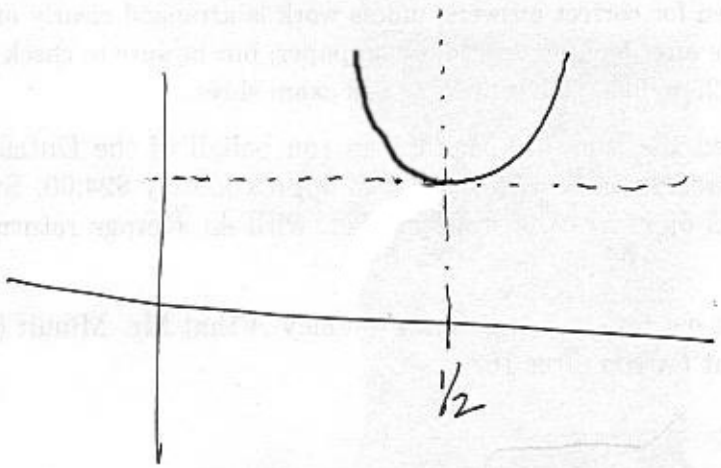


(3) (a) f is concave up where $f'' > 0$, that is,

$2x - 1 > 0$, or $2x > 1$, or $x > \frac{1}{2}$.

(b) Similarly, f is concave down when $x < 1/2$.

(c)



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(4) (a) The units of compliance are liters per centimeter of water.

(b) To obtain the maximum compliance, we approximate the derivative, from the table.

x	$f(x)$	$\approx f'(x)$	
0	0.20	0.018	
5	0.29	0.040	← max
10	0.49	0.042	
15	0.70	0.032	
20	0.86	0.018	
25	0.95	0.01	
30	1.00		

Example: $f'(0) \approx \frac{f(5) - f(0)}{5 - 0} \approx \frac{0.29 - 0.20}{5} \approx$

The maximum compliance is approximately 0.04 liters per centimeter of water.

(c) When the lungs are nearly full, there is more resistance from the rib cage, etc, so ~~the~~ increases in pressure from the diaphram are counteracted by pressure from the ribs, chest, etc.