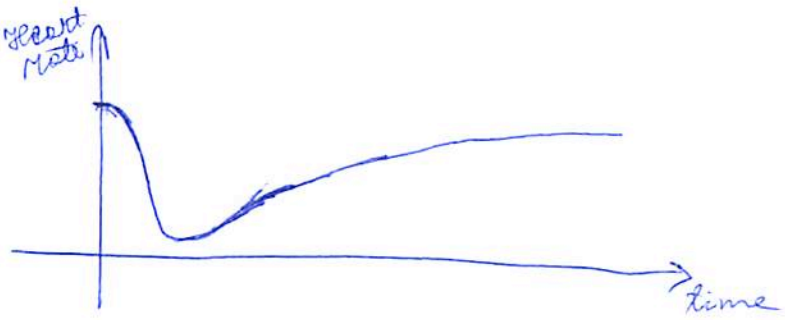
HW 1 Solution

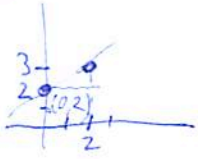
Ch 1

#2.



#3. As we increase number of workers, the productivity increases; this holds up to a certain number of workers, after which the further increase of number of workers makes productivity decrease.

#5.



$$y-2=\frac{3-2}{2-0}(x-0)$$

$$y=\frac{1}{2}x+2$$

#11.

$$12x=6y+4$$

$$6y=12x-4$$

$$y=2x-\frac{2}{3} \Rightarrow \text{slope}=m=2$$

#12.

(a) V (b) IV

(c) I (d) VI

(e) II (f) III

#15. $y-c=m(x-a)$

#18. $l_1: m_1 = 5$, $y - 1 = 5(x-2)$

$l_2: m_2 = -\frac{1}{m_1} = -\frac{1}{5}$, $y - 1 = -\frac{1}{5}(x-2)$

#28. $V = V(r)$ – volume, r – radius

$\frac{V(r)}{r^3} = c = \text{constant}$. So, $V(r) = c \cdot r^3$ (BTW, $c = \frac{4\pi}{3}$)

#31. $E = c \cdot \theta^3$, $c = \text{const}$.

#38 a) i) The force will be negative, i.e. will "try" to make distance between the atoms smaller

ii) The force will "try" to move the atoms away from each other

b) Yes, it is a stable equilibrium, since the force acts as described in part a)

#40 a) $m = \frac{212-32}{100-0} = \frac{180}{100} = \frac{9}{5}$

b) $y - 32 = \frac{9}{5}(x-0) \Rightarrow y = \frac{9}{5}x + 32$

c) $f(20) = \frac{9}{5} \cdot 20 + 32 = 9 \cdot 4 + 32 = 68\,^\circ F$

d) $\frac{9}{5}x + 32 = x$

$\frac{9}{5}x - x = 32 \Rightarrow \frac{9-5}{5}x = 32 \Rightarrow \frac{4}{5}x = 32 \Rightarrow x = \frac{32 \cdot 4}{5} \Rightarrow x = \frac{128}{5}$

#44