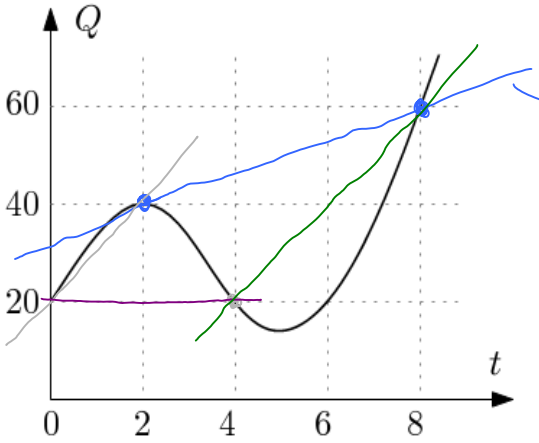
Math 124 Section 16 **QUIZ 2** **Sep 10, 2007**

1. The quantity Q of water in a water tower is shown in the following figure.

(a) Represent the average rate of change in water amount over the time period $[2, 8]$ graphically on the figure.

(b) List $m_{02}, m_{04}, m_{28}, m_{48}$ in increasing order, where m_{ab} denotes the average rate of change in Q over the interval $[a, b]$.



slope of this line represents m_{28} (answer for part (a))

(b) $m_{04} = 0 < m_{28} < m_{02} = m_{48}$

2. A company that makes microwave owens has fixed costs \$250000. Producing each unit costs \$25 and they are sold at \$60.

(a) $C(q) =$ $250000 + 25q$ **(b)** $R(q) =$ $60q$

(c) After how many units does the company start to make profit?

break-even point:

$$R(q) = C(q)$$
$$60q = 25000 + 25q$$
$$35q = 250000 \longrightarrow q = 7142.86$$

after producing and selling 7143 units the company starts to make profit

3. In a farm there were 160 rabbits in March 1st, 2006 and 200 rabbits in May 1st, 2006. If the rabbit population is increasing exponentially, find a formula for the rabbit population $P(t)$ where t is the number of months since March 1st, 2006.

Mar 1 $\longleftrightarrow$ $t = 0$

May 1 $\longleftrightarrow$ $t = 2$ (2 months since Mar 1)

	Mar 1	Apr 1	May 1
t	0	1	2
P	160		200

$P(t) = P_0 \cdot a^t = 160 \cdot a^t$

$P(2) = 200 = 160 \cdot a^2 \longrightarrow a^2 = \frac{200}{160} = 1.25 \longrightarrow a = \sqrt{1.25} = 1.1180$

$P(t) = 160 \cdot (1.1180)^t$