Calculus

Story Problem Celebration #2

(29) a) $700 per item

b) $500 per item

c) $300 per item

d) $\lim_{h\to 0} \frac{P(4+h)-P(4)}{h}$

$\lim_{h\to 0} \frac{2(16+8h+h^2)-5(4+h)+6-18}{h}$

$\lim_{h\to 0} \frac{32+16h+2h^2-20-5h-12}{h}$

$\lim_{h\to 0} \frac{11h+2h^2}{h} = \lim_{h\to 0} 11+2h = \$1100$ per item

(30) a) $5998

b) $6000

c) $5998

d) a & c are =

(32) $\lim_{s\to\infty} P(s) = 63$; No matter how many days of training the production maxs out at 63 items/day.

(32) a) $\frac{P(4)-P(1)}{4-1} = \frac{20-2}{3} = \frac{18}{3} =$ 6% per day

b) $\lim_{h\to 0} \frac{P(3+h)-P(3)}{h} = \lim_{h\to 0} \frac{(3+h)^2+(3+h)-12}{h} = \lim_{h\to 0} \frac{9+6h+h^2+3+h-12}{h}$

$= \lim_{h\to 0} \frac{7h+h^2}{h} = \lim_{h\to 0} 7+h =$ 7% per day

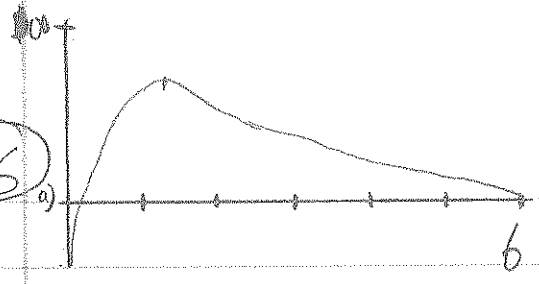
(35) a) $\frac{L(28)-L(22)}{28-22} = \frac{7.176-5.448}{6} =$ .288 mm/week

b) $\lim_{h\to 0} \frac{L(22+h)-L22}{h} = \frac{-.01(22+h)^2+.788(22+h)-7.048-5.448}{h}$

$\lim_{h\to 0} \frac{-4.84-.44h-.01h^2+17.336+.788h-12.496}{h} = \lim_{h\to 0} \frac{.348h-.01h^2}{h}$

$= \lim_{h\to 0} .348-.01h =$ .348 mm/week

(36) a)



b) $\frac{F(1)-F(0)}{1-0} = \frac{71.226-70.28}{1}$

$= \boxed{81.506 \ \frac{kJ}{hr} \text{ per hour}}$

c) $\boxed{18.81 \ \frac{kJ}{hr} \text{ per hour}}$

d) $\boxed{t = 1.3 \text{ hours}}$

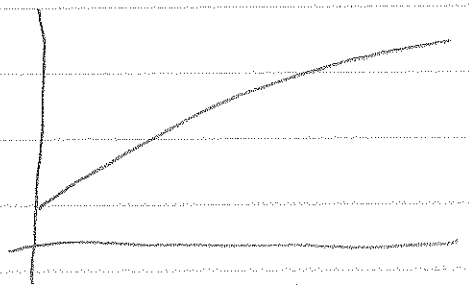
(37) a) $\frac{M(115)-M(105)}{115-105} = \frac{48.775-47.975}{10} = .08 \ kg/day$

b) $\lim_{h\to 0} \frac{M(105+h)-M(105)}{h} = \lim_{h\to 0} \frac{27.5+.3(105+h)-.001(105+h)^2-47.975}{h}$

$= \lim_{h\to 0} \frac{27.5+31.5+.3h-11.025-2.1h-.001h^2-47.975}{h}$

$\lim_{h\to 0} \frac{-1.8h-.001h^2}{h} = \lim_{h\to 0} -1.8-.001h = \boxed{-1.8}$

c)



d) NO, mass should keep increasing not flatten out as graph does

(41) a) $\frac{10-0}{2-0} = \boxed{5 \frac{ft}{sec}}$ b) $\frac{14-10}{4-2} = \frac{4}{2} = \boxed{2 \frac{ft}{sec}}$

c) $\frac{20-14}{6-4} = \frac{6}{2} = \boxed{3 \frac{ft}{sec}}$ d) $\frac{30-20}{8-6} = \frac{10}{2} = \boxed{5 \frac{ft}{sec}}$

e) i) $\frac{20-10}{6-2} = \frac{10}{4} = \boxed{2.5 \frac{ft}{sec}}$ f) i) $\frac{30-14}{8-4} = \frac{16}{4} = \boxed{4 \frac{ft}{sec}}$

ii) $\frac{3+2}{2} = \boxed{2.5 \text{ ft/sec}}$ ii) $\frac{5+3}{2} = \boxed{4 \frac{ft}{sec}}$

g) No it will not always be the same.