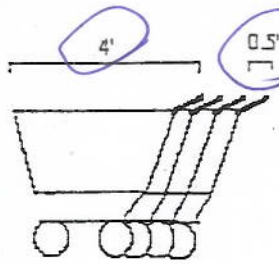
MATH 172 Fall, 2009 Quiz #2 Name: M²

1. Give the updating equation (also known as the recurrence equation) for the length $\ell(n)$ of a chain of n grocery buggies, where each buggy is 4 feet long, and when you push a new buggy into the chain, only 6 inches sticks out. Note that the pattern doesn't really begin until you actually have one buggy, so $\ell(0)$ is not defined, $\ell(1) = 4$, $\ell(2) =$ 4.5, $\ell(3) =$ 5. Then find an explicit formula for $\ell(n)$ in terms of n. Suggestion: make a table with a column for n and a column for $\ell(n)$.

$\ell(n+1) = \ell(n) + 0.5$

chain gets $\frac{1}{2}$ ft longer with each additional cart.

need same units for both



n	$\ell(n)$
0	–
1	4
2	4.5
3	5.0
4	5.5
5	6.0

+0.5
+2(0.5)
+3(0.5)
+4(0.5)

Now n carts is one cart (4') plus $n-1$ handle lengths ($(0.5)(n-1)$ feet)

$\ell(n) = 4 + 0.5(n-1)$

$= 3.5 + 0.5n$

2. If $P(n) = n^2 - 3n$, compute ΔP.

$\Delta P = P(n+1) - P(n)$

$= [(n+1)^2 - 3(n+1)] - [n^2 - 3n]$

$= n^2 + 2n + 1 - 3n - 3 - n^2 + 3n$

$= 2n - 2$