HW Problem 9: **SOLUTION** **2005**

Design a system for the collection of residential recyclables (Scenario C), 1 time per week

Given the following data:

SOR	RT
20	1412162
25	1668919
30	1925676
35	2182432
40	2439189

RT in seconds

a. Determine tp for the SORs given above, given the relationships presented below.

tp = n x RT / (60 x NOR) n = 1

Using the parameters from the previous prob. (except n, tp, and r), for H = 8 hrs, solve b-g for each SOR.

b. Determine the time available for each collection route.
c. Determine the number of pick-up locations (houses) that can be served per route.
d. Determine the number of routes required per collection period.
e. Determine the required number of collection vehicles.
f. Determine the labor requirements.
g. Determine the required truck volume.

SOR % 1	tp min/hs 2	Pscs hr 3	Np hse/rt 4	Rcp rt/col per 5	NOVf # 6	NOVi # 7	LR col d/col pe 8	V cu-yd 9
20	0.8	2.4	172.5	166.9	16.7	17.0	77	11.8
25	1.0	2.4	145.9	197.3	19.7	20.0	90	9.9
30	1.1	2.4	126.5	227.6	22.8	23.0	104	8.6
35	1.3	2.4	111.6	258.0	25.8	26.0	118	7.6
40	1.4	2.4	99.8	288.3	28.8	29.0	132	6.8

Calculations

column	Description
1	Set-out rate, % (given)
2	tp = n x RT / (60 x NOR)
3	Pscs = [H(1-W)-(t1+t2)]/Nd - (s+h)
4	Np = 60 x Pscs x n / tp
5	Rcp = NOR / Np NOR = 28787.88
6	NOV = Rcp / (Nd x Cwp) Cwp = 5
7	column 5 rounded up
8	LR = {n [Rcp x Pscs + Rcpi (s + h) + Cwp (t1 + t2)] x 7}/[(1 - W) x H x Cp)]
9	truck volume = per capita MSW gen rate x people per house x days/collection period
	x fraction collected recyclables are of MSW gen
	x fraction of recyclables collected in residential areas x Np / SW / r
	where SW = specific weight of recyclables