Green & Ampt Method

Given: K = hydraulic conductivity; θ_s = final moisture content; θ_i = initial moisture content; ψ = avg capillary suction; i = intensity. Make sure all units are in cm or in.

1) $Md = \theta_s - \theta_i$ (initial moisture deficit)

2) $F_s = \frac{\psi Md}{(1 - i/K)}$ (volume of water that will infil. before saturation is reached) — in. or cm.

Until that volume has been reached, $f = i$

After that $f = K_s\left(1 - \frac{Md\,\psi}{F}\right)$

time to reach infiltration $= \frac{F_s}{i}$ (may not be required)

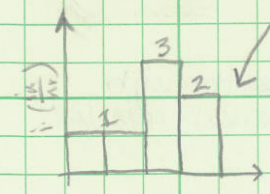
3) create a table and calculate $\sum f$ (rate of infil) for various increments of F (infiltration volume) go up to at least 8 cm or in.

4) graph f vs. F (keep in mind)

Storm Hydrograph

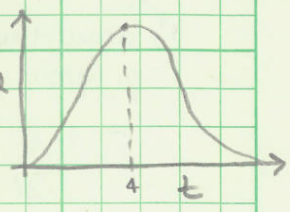
Given: A hyetograph (1-hr) & a unit hyetograph (6 hr)

1) Create table



Time (hr)	U.H. ordinate	R_1U (1.0 x U)	R_2U (1.0 x U)	R_3U (3 x U)	R_4U (2 x U)	$Q = \Sigma R_i U$
0	0	0				0
1	0.5	0.5	0			0.5
2	1.0	1.0	0.5	0		1.5
3	0.75	0.75	1.0	(3x.5)	0	3.25
4	0.5	0.5	0.75	(3x1)	1	5.25 Peak
5	0.25	0.25	0.5	(3x.75)	2	5.0
6	0	0	0.25	1.5	1.5	3.25
7			0	0.75	1	1.75
8				0	0.5	0.5
9					0	0

2) graph Q vs. time



Snyder's method

Given: Area; L = length from outlet to divide; L_c = length along main stream to a point near watershed centroid; C_t = Coeff; L_{ca} = ? not used in HW; C_p = storage coefficient

1) $t_p = C_t (L L_c)^{0.3}$ (hrs)

2) $Q_p = \frac{640 C_p A}{t_p}$ (A in mi^2) $= (cfs)$

3) $T_b = 4\,t_p$

Convert 1 hr UH to 3 hr UH

Given: 1 hr UH

1) find area of watershed $A \approx \frac{\Sigma \text{UH ordinates}}{1\text{ in.}} = \frac{cfs\text{-}hr}{in} = \frac{acre\text{-}in}{in} = acres$

2) Create Table, lag UH as req'd

Time	1hr UH	UH_1	UH_2	3hr UH
0	0	→		$=\Sigma/3 = 0$
1	6	0		2
2	22	6	0	9.3
3	48	22	6	25.33
4	80	48	22	50
	etc.			

3) Plot 3hr UH

SCS triangular Method

Given A, L, Slope = S, I

Determine a 1hr UH for watershed.

Create 1hr UH

1) Find C_N from table, Calculate $S = \left(\frac{1000}{CN}\right) - 10 = (in.)$, calc. y (slope) $= \frac{ft}{mi}\left(\frac{1\,mi}{5280\,ft}\right) = 0.\_\_ = \_\_\%$

2) Calc $t_p = \frac{l^{0.8}(S+1)^{0.7}}{1900\,y^{0.5}}$ (l in ft, S in inches) $\rightarrow T_R = \frac{D}{2} + t_p$ (D in hr.) $\rightarrow Q_p = \frac{484A}{T_R}$