1. Water balance problem. The 78% trace recovery suggests that there was 22% infiltration/soilage losses from the cells. 

\[ (Q_{in} - Q_{out}) = \text{Losses} = \Delta \text{Storage} \] 

where Losses = L = ET + W

\[ L = (378 - 255) \text{m}^3/m^2 \times \frac{3600 \text{sec}}{1 \text{hr}} \times \frac{1 \text{m}}{100 \text{cm}} \times (29.4 - 20.3 \text{cm}) \]

\[ = 1.35 \text{cm} + 2.6 \text{cm} = 14 \text{cm} \]

\[ L = ET + 0.22L \Rightarrow 0.78L = ET \Rightarrow ET = 0.78 \times (14) = 11.3 \text{ cm} \]

2. Manometer problem - the pressure @ the manometer connection is 4.1 m; from the connector to gage x, the h is 4.1 m + 1.1 m = 5.2 m H2O.

Therefore,

\[ 5.2 \text{ m H}_2\text{O} = 0.2 \text{ m } x + 2.5 \text{ m H}_2\text{O} \]

\[ 2.7 \text{ m H}_2\text{O} = 0.2 \text{ m } x \]

\[ x = \frac{2.7}{0.2} \text{ m} = 13.5 \text{ gpm/cm}^3 \text{ probably H}_2\text{O} \]

3. (a) By counting blocks e, triangles - the total area = 610 - 611 ha

(b) The polygons result in a square centered on station C and symmetry areas for stations A & B m² B & E.

<table>
<thead>
<tr>
<th>Station</th>
<th>In Area</th>
<th>P/A²</th>
<th>ΣP/A²</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>17.4</td>
<td>0.948</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>17.4</td>
<td>0.985</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>20.2</td>
<td>0.600</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>22.5</td>
<td>0.385</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>22.5</td>
<td>0.540</td>
<td></td>
</tr>
</tbody>
</table>

(c) Gages C, D & E have the greatest influence. Given a 25% interception loss for Douglas Fir, the Vel, or effective P/E = 2.15, 0.72 = 1.6 cm or #52, so this qualifies as a possible 121G storm.

4. Water Balance problem - note that DR = eff. ppt. = \[ \frac{22.6}{41} \text{ m} = 0.54 \text{ cm} \]

Eff. Ppt. = total ppt. - abstraction => Abst. = 2.15 - 1.18 = 0.97 cm

\[ \text{Abst.} = \text{Intercept} + \text{Infilt.} + \text{depression storage} \]

\[ = 0.97 + 0.52 = 0.52 \text{ cm} \]

\[ = 0 \text{ Infilt.} + \text{storage} = 0.97 - 0.52 = 0.45 \text{ cm} \]

5. The peak discharge = \( (4.24 \text{ m/s}) \times 1.18 + 0.5 \text{ m}^2/s = 5.5 \text{ m}^3/s \)

where 1.18 is the total dr from #4 expressed in cm