# 21-R-KIN-MS-48
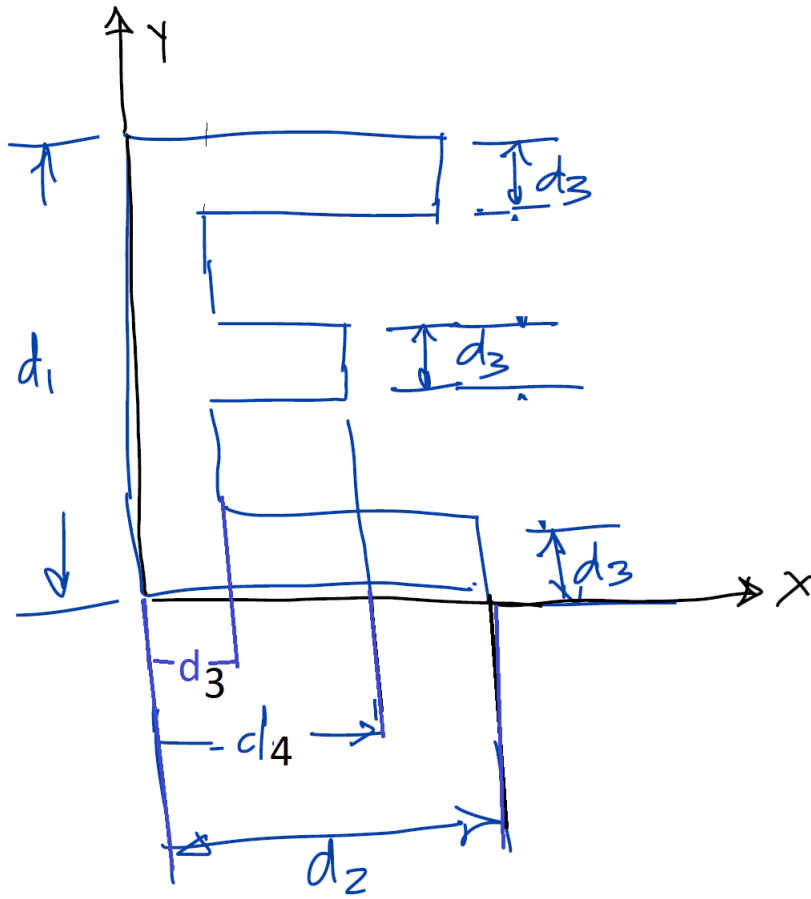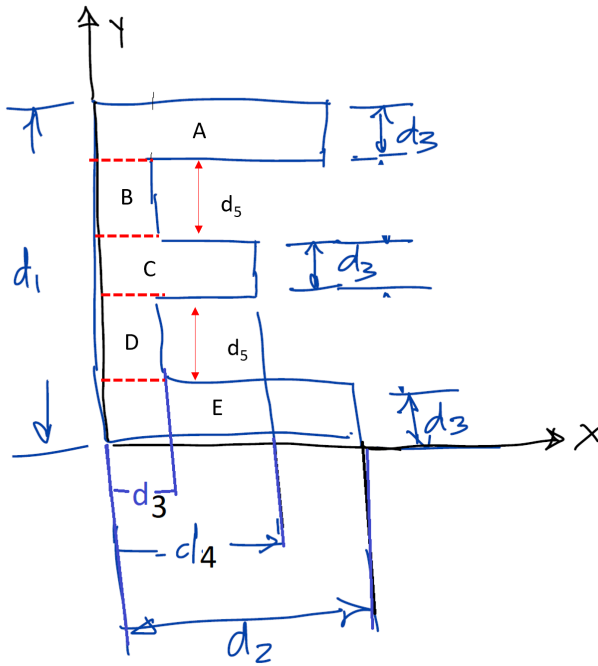


This E will be installed on an engineering building. Find its centroid.

$d_1 = 0.6m, d_2 = 0.4m, d_3 = 0.1m, d_4 = 0.25m$

**Solution:**

Divide the shape into composite rectangles:



$d_5 = \frac{d_1 - 3d_3}{2}$

| Rectangle $i$ | A | B | C | D | E |
|---|---|---|---|---|---|
| Area $A_i$ | $d_2 d_3$ | $d_3 d_5$ | $d_3 d_4$ | $d_3 d_5$ | $d_2 d_3$ |
| $\tilde{x}_i$ | $\frac{d_2}{2}$ | $\frac{d_3}{2}$ | $\frac{d_4}{2}$ | $\frac{d_3}{2}$ | $\frac{d_2}{2}$ |
| $\tilde{y}_i$ | $d_1 - \frac{d_3}{2}$ | $d_1 - d_3 - \frac{d_5}{2}$ | $\frac{d_1}{2}$ | $\frac{d_5}{2} + d_3$ | $\frac{d_3}{2}$ |

$\bar{x} = \frac{\sum \tilde{x}_i A_i}{\sum A_i} = \frac{\tilde{x}_A A_A + \tilde{x}_B A_B + \tilde{x}_C A_C + \tilde{x}_D A_D + \tilde{x}_E A_E}{A_A + A_B + A_C + A_D + A_E} = 0.153m$

$\bar{y} = \frac{\sum \tilde{y}_i A_i}{\sum A_i} = \frac{\tilde{y}_A A_A + \tilde{y}_B A_B + \tilde{y}_C A_C + \tilde{y}_D A_D + \tilde{y}_E A_E}{A_A + A_B + A_C + A_D + A_E} = 0.3m$

You could also see this with symmetry - the E is symmetric around $y = \frac{d_1}{2} = 0.3m$