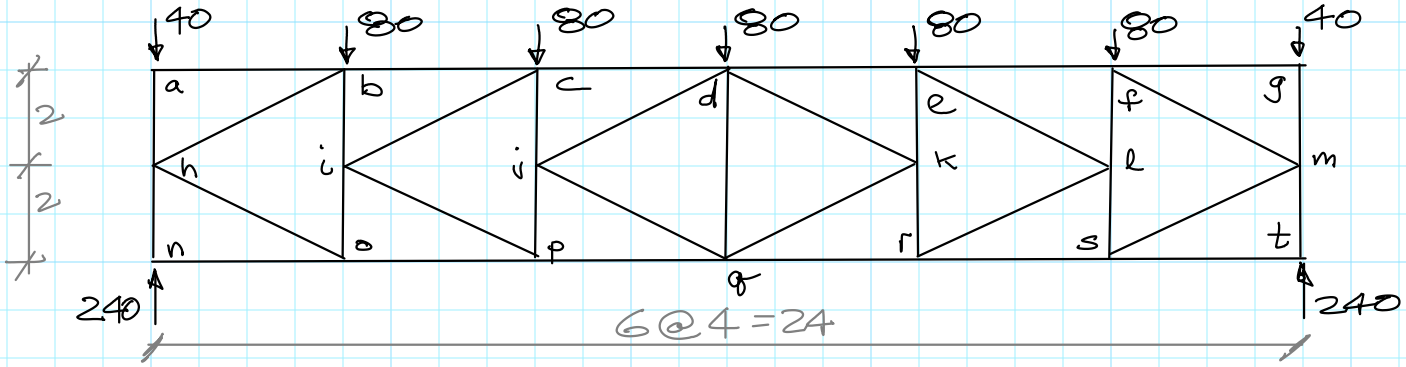
Example T-4

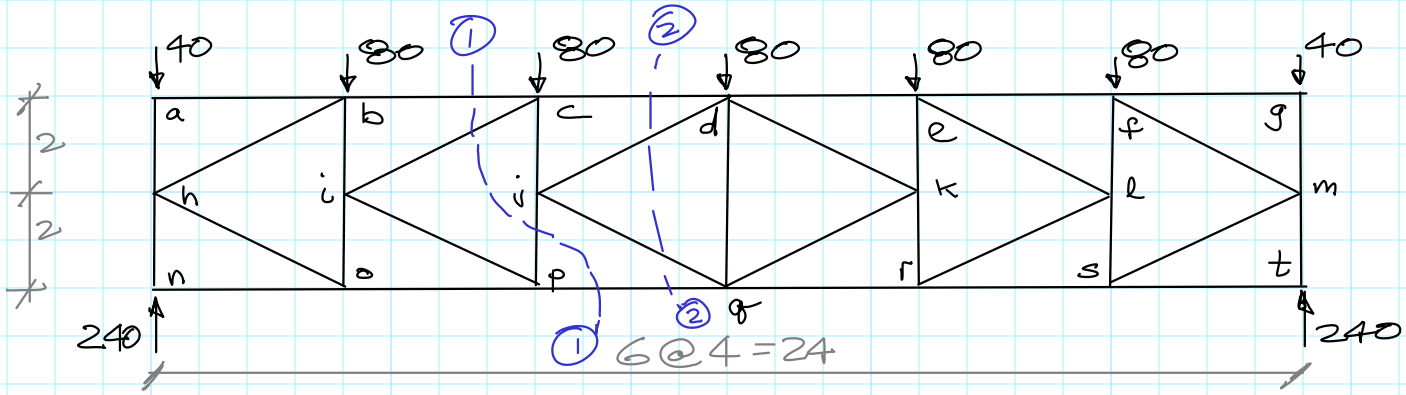


Determine forces in cd, jd, jq, pq.

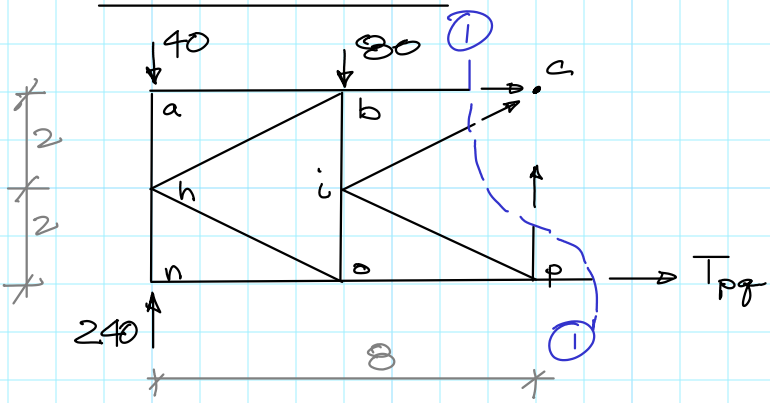
Could do joints in order: a, n, h, b, o, i, c, p, j
- lots of work

Method of sections – can't seem to cut through only three (or fewer unknowns)

However:



Section 1-1



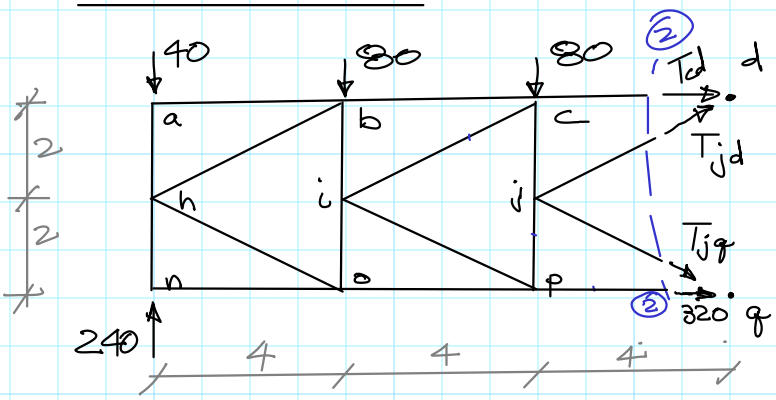
$\Sigma M_c = 0$ (+↺)

$40 \times 8 + 80 \times 4 - 240 \times 8 + T_{pq} \times 4 = 0$

$T_{pq} = 320$ (i.e. T)

Note: cuts 4 members but we found an equilibrium eqn that involves only 1 unknown.

Section 2-2



$\Sigma M_j = 0$ (+)

$+40\times8 + 80\times4 - T_{cd}\times2 - 240\times8 + 320\times2 = 0$

$T_{cd} = -320$ (i.e. c)

$\Sigma M_g = 0$ (+)

$40\times12 + 80\times8 + 80\times4 - T_{cd}\times4 - \frac{4}{\sqrt{20}} T_{jd}\times4 - 240\times12 = 0$

$1440 + 320\times4 - \frac{16}{\sqrt{20}} T_{jd} - 2880 = 0$

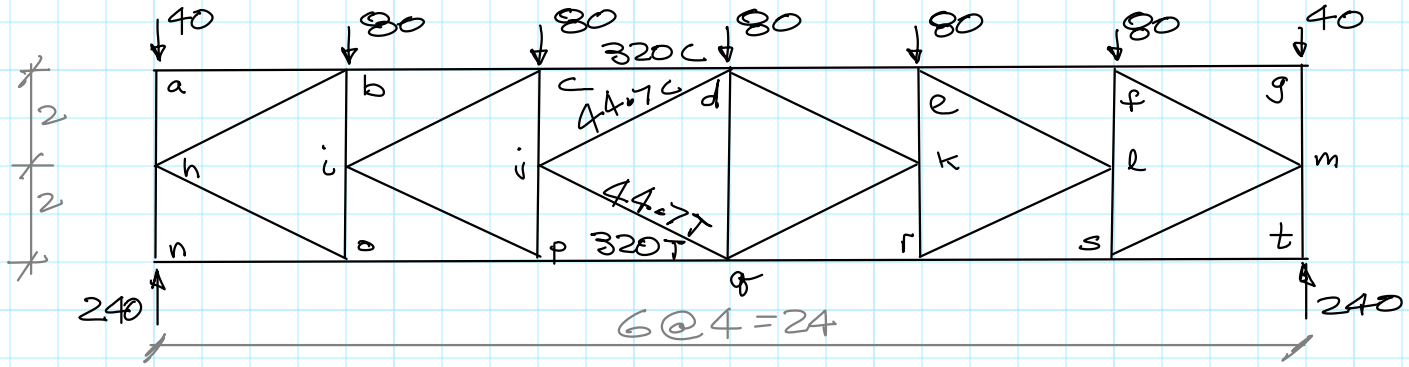
$T_{jd} = -44.72$ (i.e. c)

$\Sigma M_d = 0$ (+)

$40\times12 + 80\times8 + 80\times4 - 240\times12 + 320\times4 + \frac{4}{\sqrt{20}} T_{jg}\times4 = 0$

$T_{jg} = 44.72$ (i.e. T)

Summary:



Note: diagonals resist shear force, which is small near centre span.

chords resist bending moment, which is large near centre span.