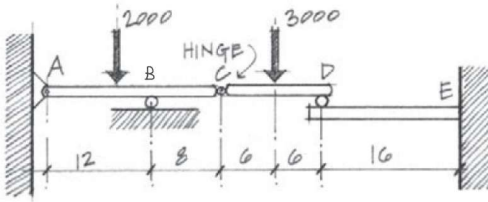


## Trusses Question Solutions

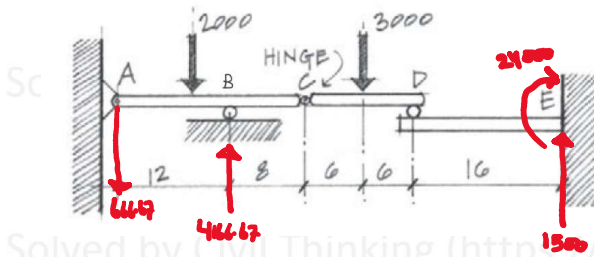
4. A compound beam supports two vertical loads as shown. Determine the support reactions developed at A, B, and E, and also the internal constraint forces at C and D.



**Step-1: Symmetric**  
 $C_y = D_y = \frac{3000}{2}$   
 $\Rightarrow C_y = D_y = 1500$   
 $\sum F_x = 0 \Rightarrow C_x = 0$

**Step-2:**  
 $\sum M_E = 0:$   
 $-(D_y \times 16) + M = 0 \Rightarrow -(1500 \times 16) + M = 0 \Rightarrow M = 24000$   
 $\sum F_y = 0:$   
 $-D_y + E_y = 0$   
 $\Rightarrow E_y = D_y \Rightarrow E_y = 1500$   
 $\sum F_x = 0:$   
 $-E_x = 0 \Rightarrow E_x = 0$

**Step-3:**  
 $\sum M_A = 0:$   
 $C_y \times (8+12) - B_y \times 12 + 2000 \times \left(\frac{12+8}{2}\right) = 0$   
 $\Rightarrow 1500 \times 20 - 12B_y + 2000 \times 10 = 0$   
 $\Rightarrow B_y = 4166.67$   
 $\sum F_y = 0:$   
 $A_y + B_y - C_y - 2000 = 0$   
 $\Rightarrow A_y + 4166.67 - 1500 - 2000 = 0$   
 $\Rightarrow A_y = -666.67$   
 $\sum F_x = 0:$   
 $A_x - C_x = 0$   
 $\Rightarrow A_x - 0 = 0$   
 $\Rightarrow A_x = 0$



This problem was solved by Civil Thinking (<https://civilthinking.com>)

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