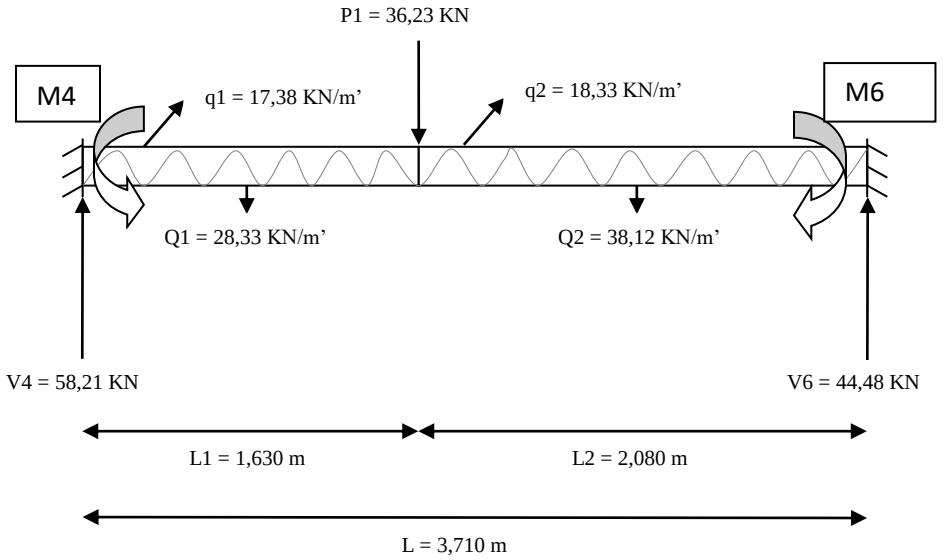
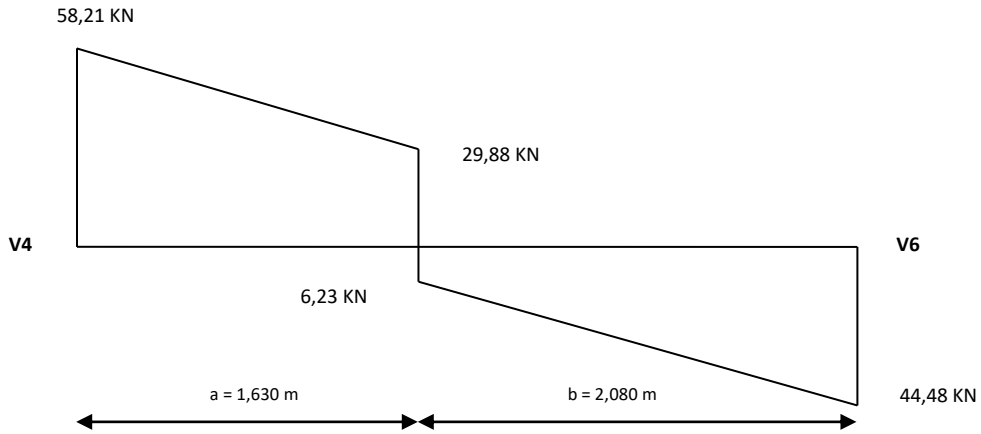
Perhitungan momen maks pada bidang D (arah Y)

1) As A (4-6)



Gambar bidang D



Mencari Mmaks :

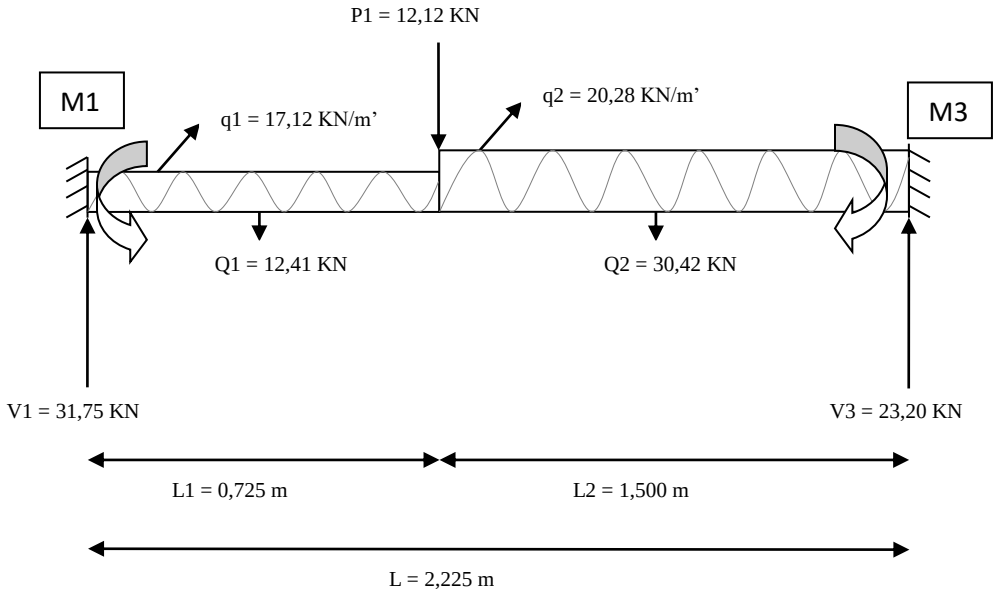
Mmaks $= (V_4 * a) - M_4 - (^1/_2 * q_1 * L_1^2)$

$= (58,21 * 1,630) - 12,56 - (^1/_2 * 16,16 * 1,630^2)$

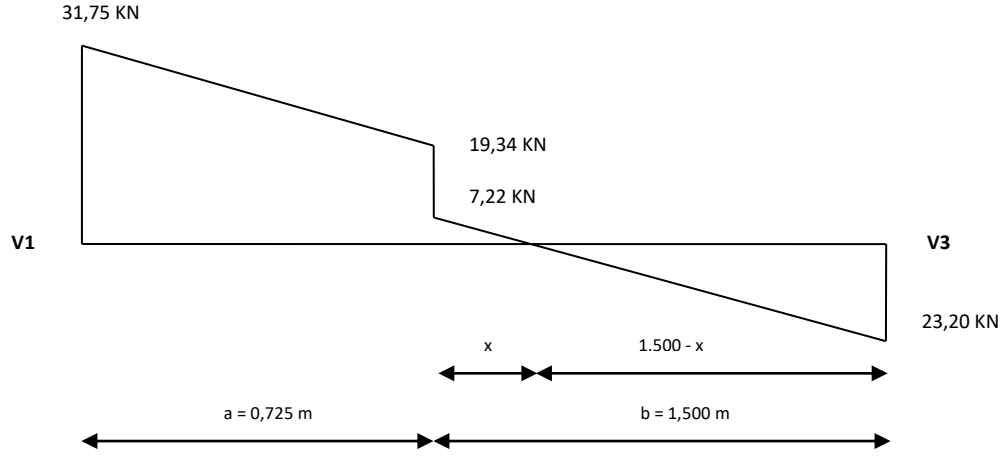
$= 59,23$ KN.m

2) As B (1-3)

`



Gambar bidang D



Mencari x :

$$\frac{x}{7{,}22} = \frac{1{,}500 - x}{23{,}20}$$

23,20 x = 10,83 – 7,22 x

23,20 x + 7,22 x = 10,83

30,42 x = 10,83

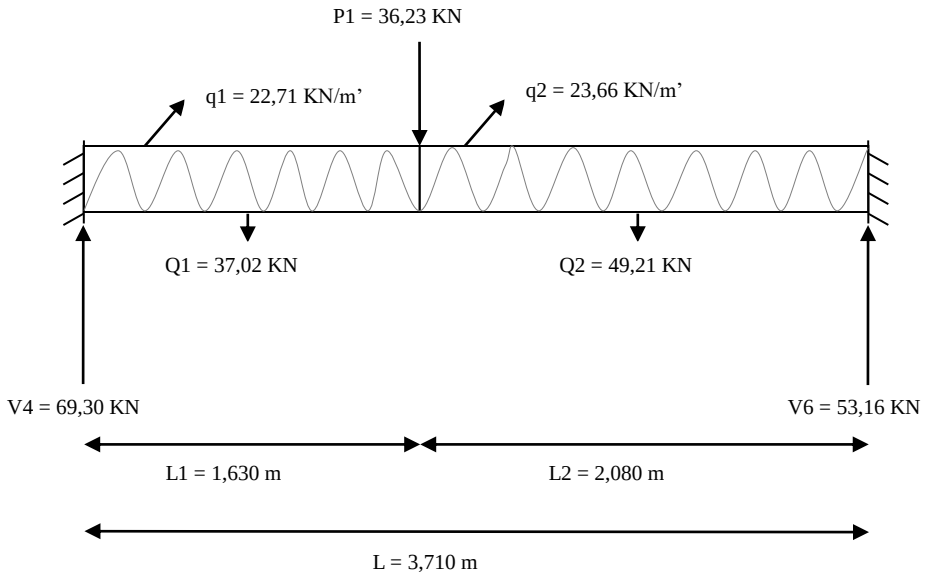
x = 0,36 m

Mmaks = $(V_1 * (a + x)) – M_1 – ((q_1 * a)*(^1/_2 * (a + x)) – (P * x) – ((q_2 * x) * (^1/_2 * x))$

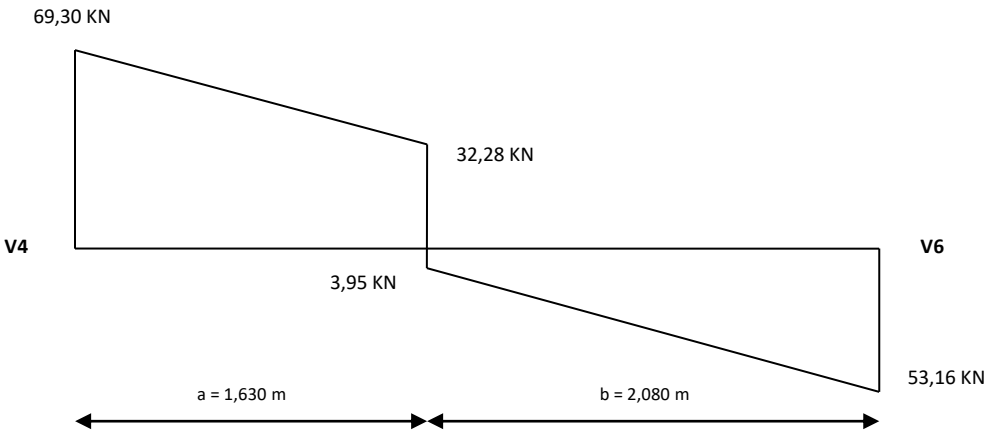
= $(31{,}75 * (0{,}725 + 0{,}36)) – 6{,}41 – ((12{,}41) * (^1/_2 * 1{,}09)) – (12{,}12 * 0{,}36) – ((20{,}28 * 0{,}36) * (^1/_2 * 0{,}36))$

= 15,63 kN.m

3) As B (4-6)



Gambar bidang D



Mencari Mmaks :

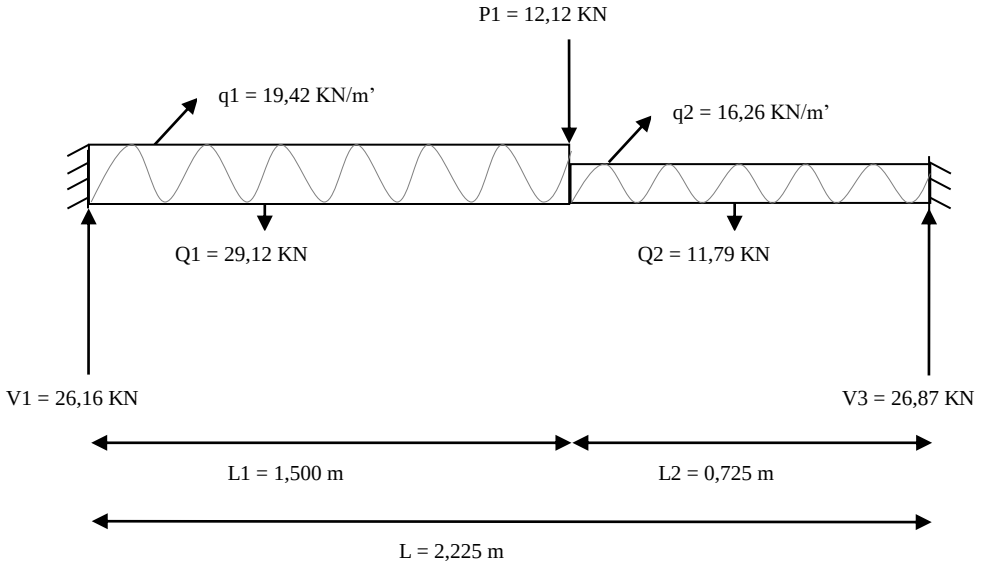
Mmaks $= (V_4 * a) - M_4 - (^1/_2 * q_1 * L_1^2)$

$= (69,30 * 1,630) - 14,81 - (^1/_2 * 22,71 * 1,630^2)$

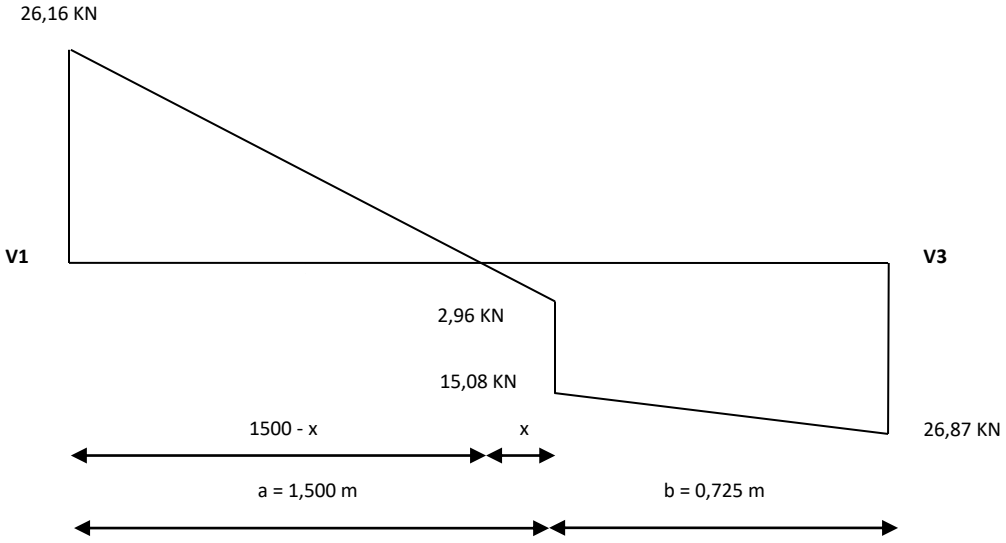
$= 112,96 - 14,81 - 30,17$

$= 67,97$ KN.m

4) As C (1-3)



Gambar bidang D



Mencari x :

$$\frac{x}{2,96} = \frac{1,500 - x}{26,16}$$

$26,16\ x = 4,44 - 2,96\ x$

$26,16\ x + 2,96\ x = 4,44$

$29,12\ x = 4,44$

$x = 0,15\ m$

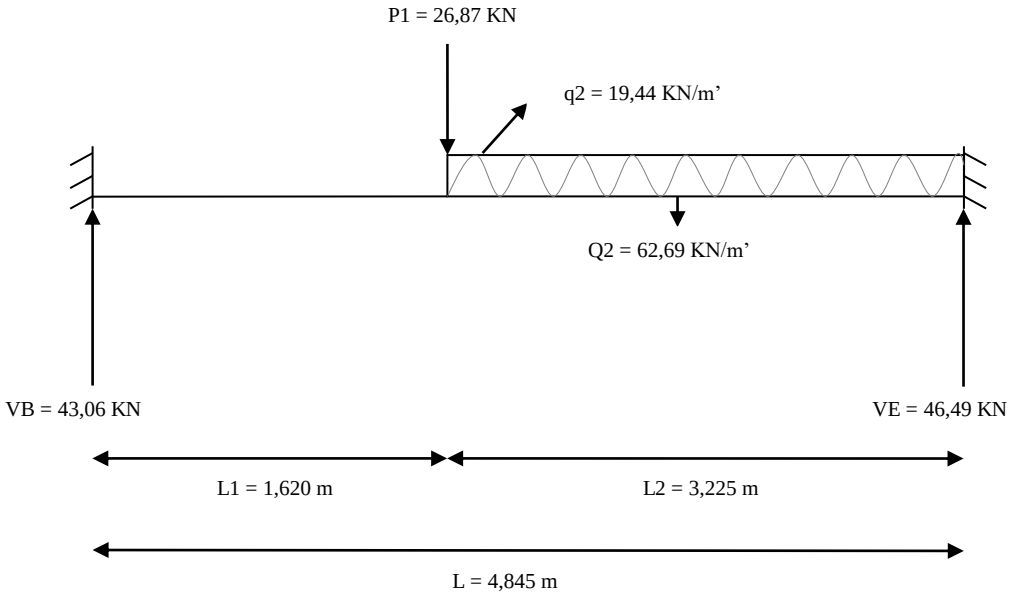
Mmaks $= (V_1 * (a - x)) - M_1 - ((q_1 * (a - x)) * (^1/_2 * (a - x)))$

$= (26,16 * (1,500 - 0,15)) - 5,28 - ((19,42 * (1,500 - 0,15)) * (^1/_2 * (1,500 - 0,15)))$

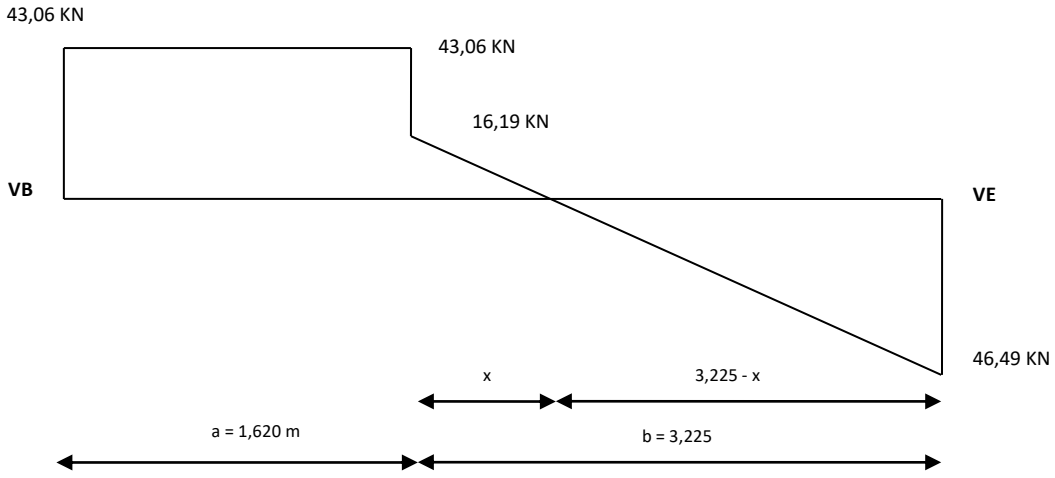
$= 12,29\ kN.m$

Perhitungan momen maks pada bidang D (arah X)

1) As 1 (B-E)



Gambar bidang D :



Mencari x :

$$\frac{x}{16{,}19} = \frac{3{,}225 - x}{46{,}49}$$

46,49 x = 52,21 – 16,19 x

46,49 x + 16,19 x = 52,21

62,68 x = 52,21

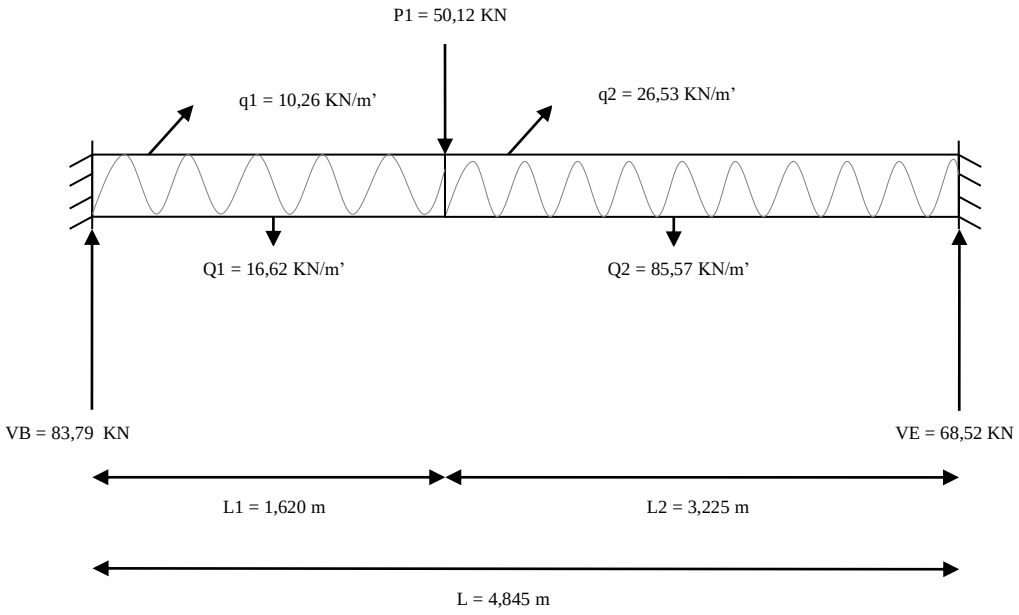
x = 0,83

Mmaks = $(V_B * (a + x)) – M_B – (P * x) – ((q_2 * x) * (^1/_2 * x)$

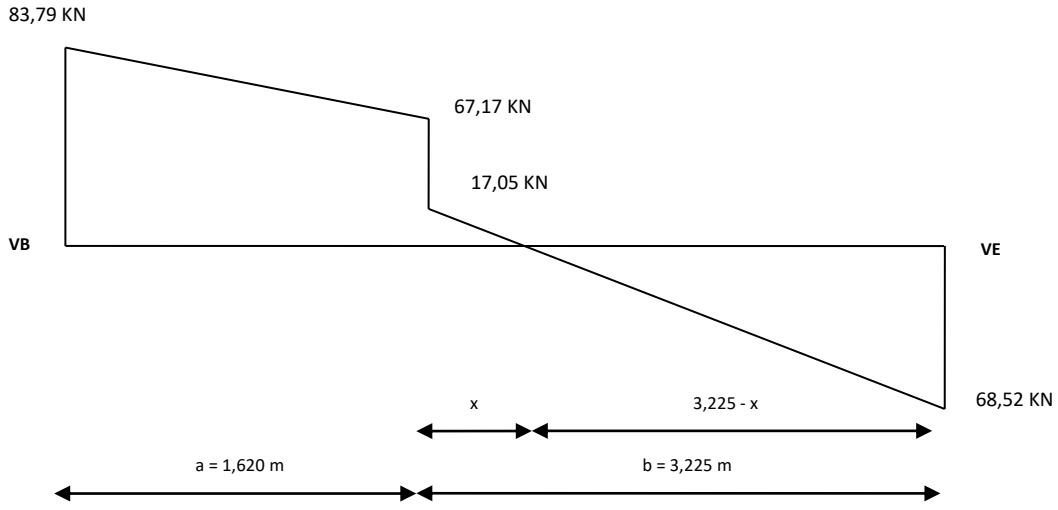
= (43,06 * (1,620 + 0,83)) – 10,95 – (26,87 * 0,83) – ((19,44 * 0,83) * ($^1/_2$ * 0,83))

= 65,55 kN.m

2) As 3 (B-E)



Gambar bidang D :



Mencari x :

$$\frac{x}{17,05} = \frac{3,225 - x}{68,52}$$

68,52 x = 54,99 – 17,05 x

68,52 x + 17,05 x = 54,99

85,57 x = 54,99

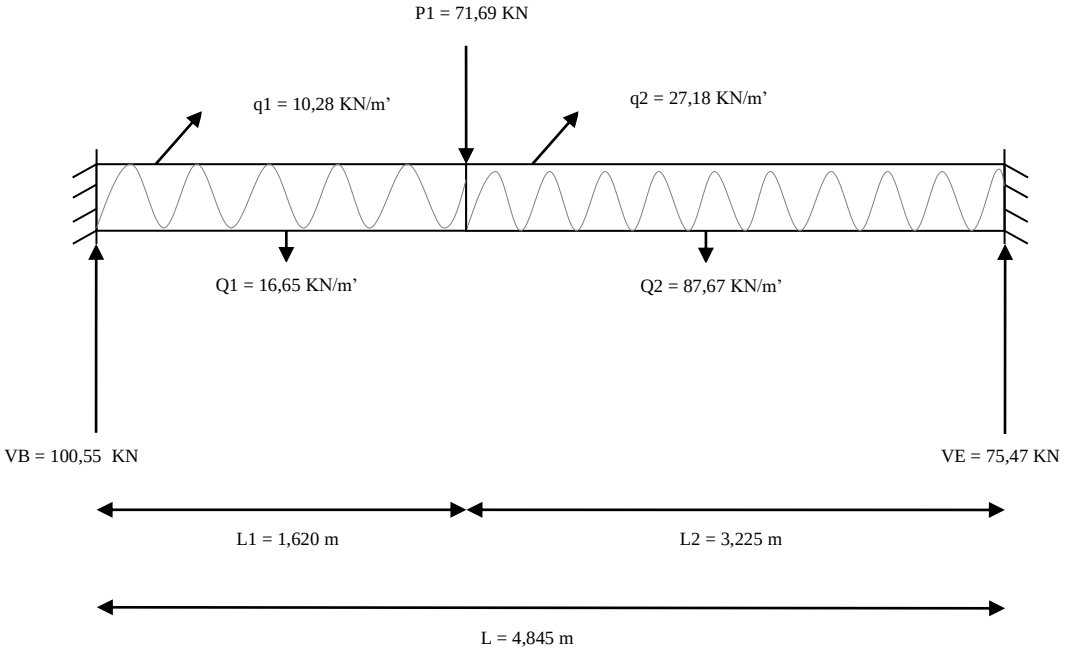
x = 0,64 m

Mmaks = $(V_B * (a + x)) – M_B – ((q_1 * a)*(^1/_2 * a + x)) – (P * x) – ((q_2 * x) * (^1/_2 * x)$

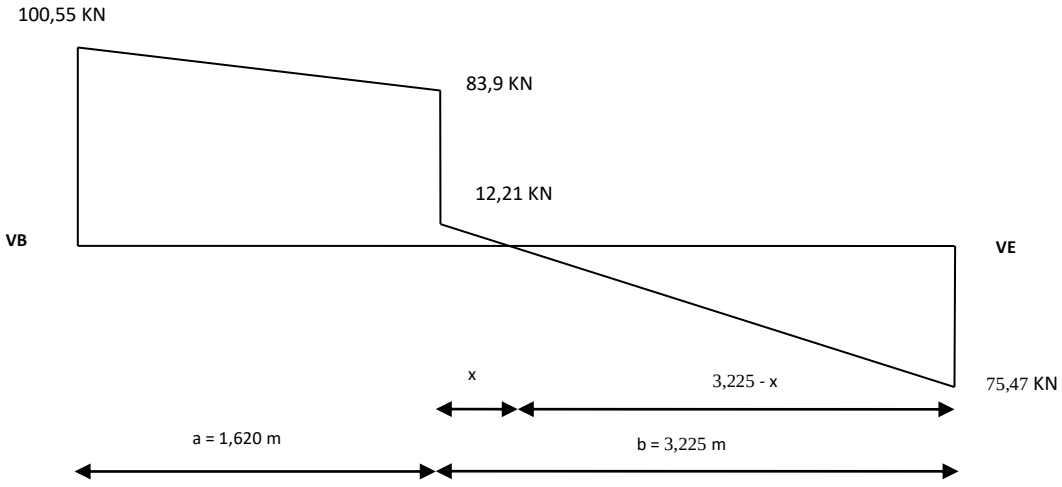
= $(83,79 * (1,620 + 0,64)) – 18,63 – ((16,62) * (^1/_2 * (1,620 + 0,64)) – (50,12 * 0,64) – ((26,53 * 0,64) * (^1/_2 * 0,64))$

= 189,47 kN.m

3) As 4 (B-E)



Gambar bidang D :



Mencari x :

$$\frac{x}{12{,}21} = \frac{3{,}225 - x}{75{,}47}$$

75,47 x = 39,38 – 12,21 x

75,47 x + 12,21 x = 39,38

87,68 x = 39,38

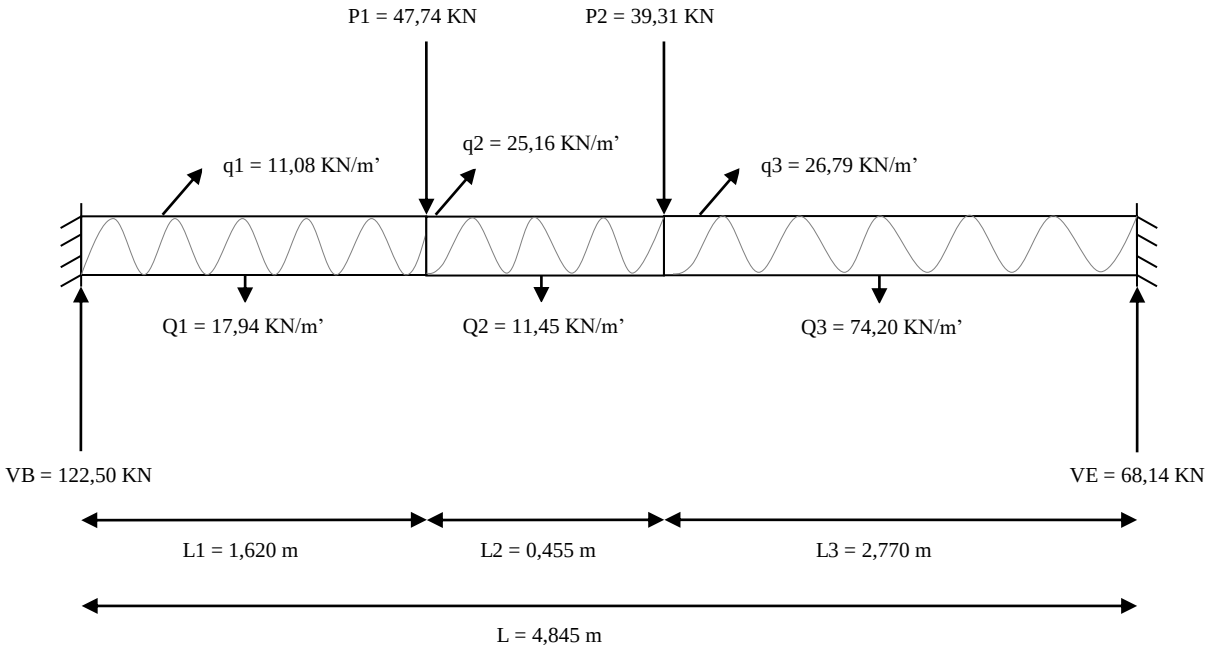
x = 0,45 m

Mmaks = $(V_B * (a + x)) – M_B – ((q_1 * a)*(^1/_2 * a + x)) – (P * x) – ((q_2 * x) * (^1/_2 * x))$

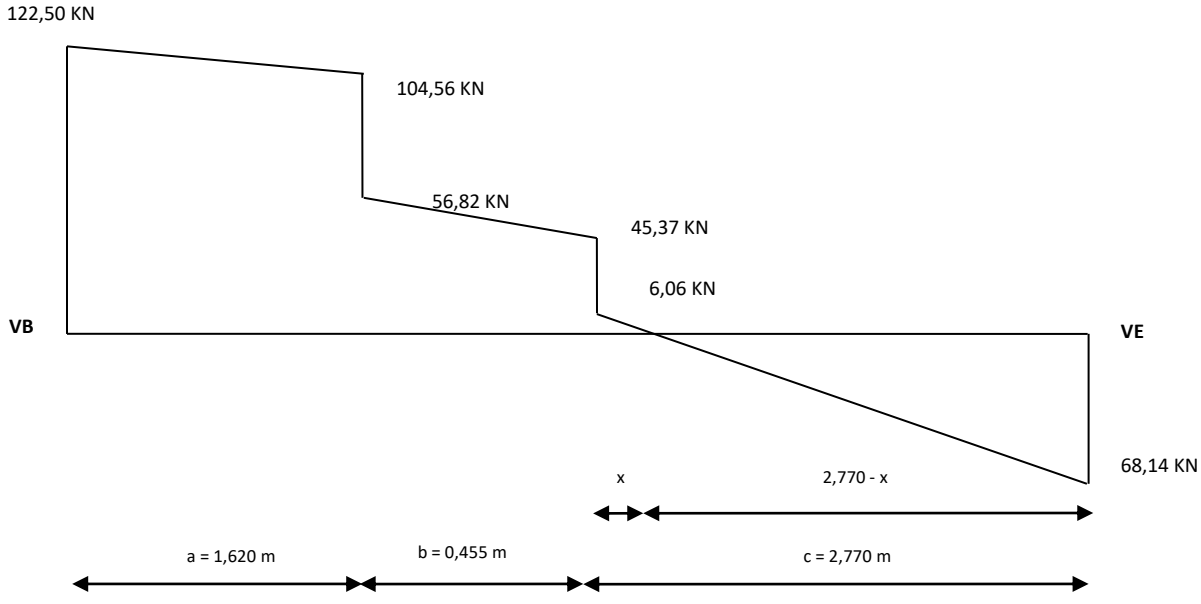
= $(100{,}55 * (1{,}620 + 0{,}45)) – 22{,}07 – ((10{,}28 * 1{,}620) * (^1/_2 * (1{,}620 + 0{,}45)) – (71{,}69 * 0{,}45) – ((27{,}18 * 0{,}45) * (^1/_2 * 0{,}45))$

= 133,82 kN.m

4) As 6 (B-E)



Gambar bidang D



Mencari x :

$$\frac{x}{6{,}06} = \frac{2{,}770 - x}{68{,}14}$$

68,14 x = 16,77 – 6,06 x

68,14 x + 6,06 x = 16,77

74,2 x = 16,77

x = 0,23 m

Mmaks = $(V_B * (a + b + x)) – M_B – ((q_1 * a)*(1/2 * (a + b + x))) – (P_1 * (b + x)) – (q_2 * b)*(1/2 * (b + x)) - (P_2 * x) - ((q_3 * x) * (1/2 * x))$

= (100,55 * (1,620 + 0,455 + 0,23)) – 22,07 – ((11,08 * 1,620) * (1/2 * (1,620 + 0,455 + 0,23)) – (47,74 * (0,455 + 0,23)) – (25,16 * 0,455)*(1/2 * (0,455 + 0,23)) - (39,31* 0,23)) - ((26,79 * 0,23) * (1/2 * 0,23))

= 51,17 kN.m