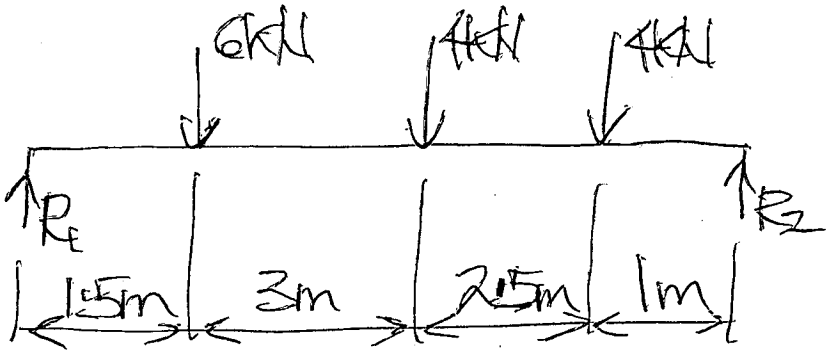
Unit II Assignment 1 Contd

3/



To determine R_1, take moments about R_2.

CWM = ACWM

$(R_1 \times 8) = (4 \times 1) + (4 \times 3.5) + (6 \times 6.5)$

$8R_1 = 4 + 14 + 39$

$8R_1 = 18 + 39$

$R_1 = \frac{57}{8}$

$\therefore R_1 = 7.125KN$ ✓

To determine R_2, take moments about R_1

CWM = ACWM

$(6 \times 1.5) + (4 \times 4.5) + (4 \times 7) = (R_2 \times 8)$

$9 + 18 + 28 = 8R_2$

$53 = 8R_2$

$\frac{53}{8} = R_2$

$\therefore R_2 = 6.875KN$ ✓

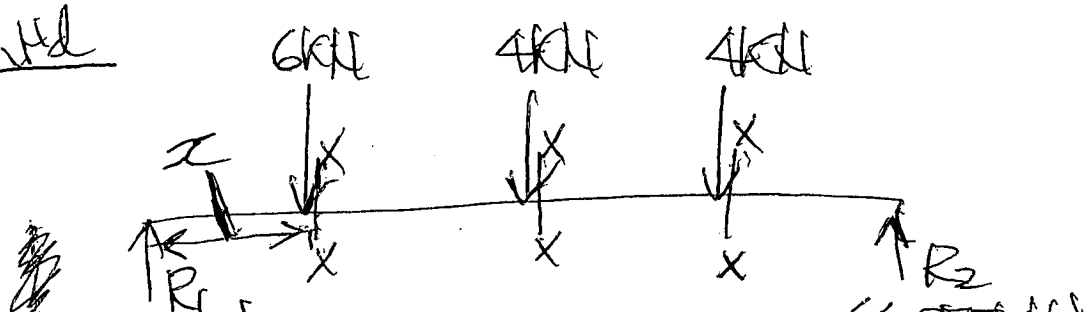
check: Upward Forces = Downward Forces

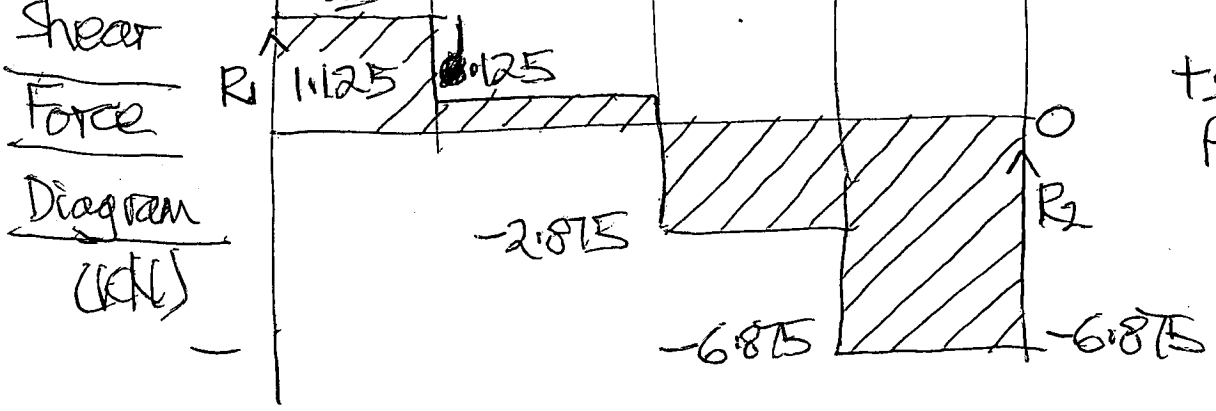
$R_1 + R_2 = 6KN + 4KN + 4KN$

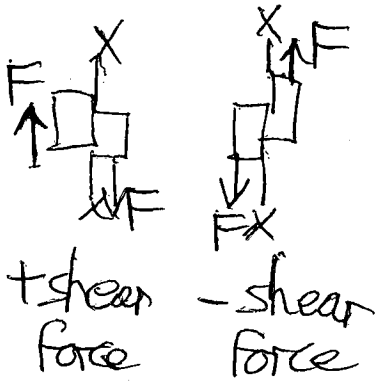
$7.125KN + 6.875KN = 14KN$

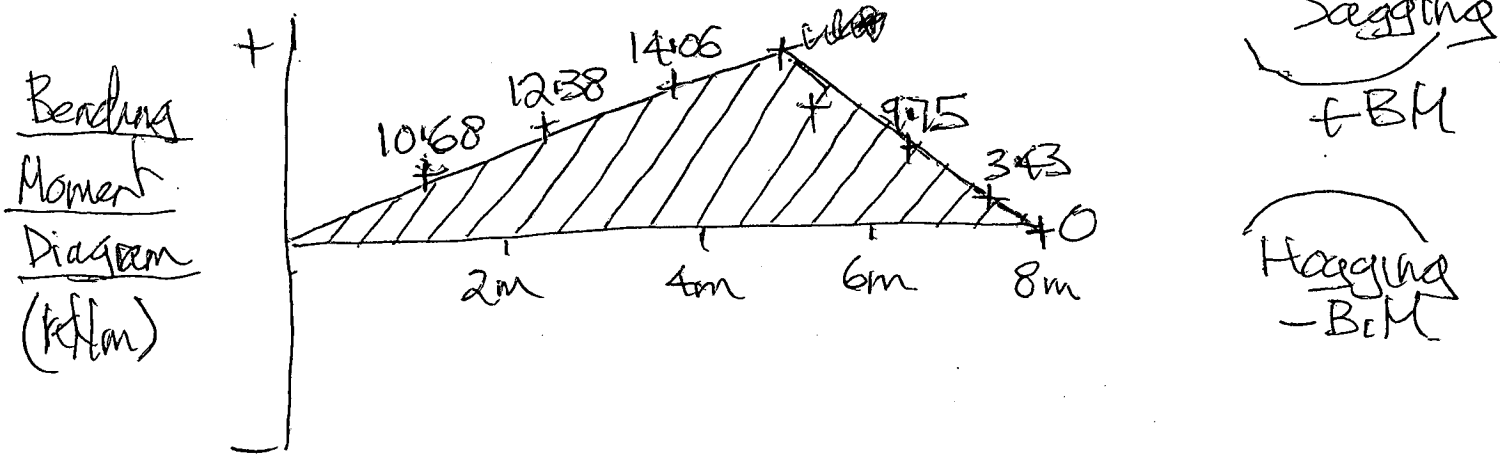
$14KN = 14KN$ ✓

3, Contd









When $x = 0$, BM = 0 ✓

When $x = 1{\cdot}5m$, B.M. $= +7{\cdot}125 \times 1{\cdot}5m = 10{\cdot}68$ KNm ✓

When $x = 3m$, B.M $= +7{\cdot}125 \times 3m$ ~~$(-6 \times 1{\cdot}5)$~~ ~~$= +12{\cdot}38$ KNm~~ 21·38 − 9·00 = 12·38 KNm ✓

When $x = 4{\cdot}5m$, B.M $= +7{\cdot}125 \times 4{\cdot}5m =$ ~~$32{\cdot}06$ KNm~~ $32{\cdot}06 - (6 \times 3) = 32{\cdot}06$ 48·00 − 14·06 KNm ✓

When $x = 6m$, BM = ~~$42{\cdot}75$~~

$= (7{\cdot}125 \times 6) - (4 \times 1{\cdot}5) - (6 \times 4{\cdot}5)$

$= 42{\cdot}75 - 6{\cdot}27 =$ ~~$36{\cdot}75$ KNm~~ 9·75 KNm ✓

~~When $x = 7{\cdot}5m$, BM =~~

~~$= (7{\cdot}125 \times 7{\cdot}5) - (4 \times 6) - (6 \times 4{\cdot}5) = 53{\cdot}43 - 51 = 2{\cdot}43$ KNm~~

PTO for further calculations

Unit 11 Assignment 1 Contd

3, Contd

When $x = 6m$

$BM = (7.125 \times 6) - (6 \times 4.5) - (4 \times 1.5)$

$= 42.75 - 27 - 6$

$BM = 9.75 kNm$ ✓

When $x = 5m$

$BM = (7.125 \times 5) - (6 \times 3.5) - (4 \times 0.5)$

$= 35.625 - 21 - 2 \quad = 35.625 - 23$

$BM = 12.63 kNm$ ✓

When $x = 7m$

$BM = (7.125 \times 7) - (6 \times 5.5) - (4 \times 2.5)$

$= 49.875 - 33 - 10 \quad = 49.875 - 43$

$BM = 6.875 kNm$ ✓

When $x = 8m$

$BM = (7.125 \times 8) - (6 \times 6.5) - (4 \times 3.5) - (4 \times 1)$

$= 57 - 39 - 14 - 4$

$= 57 - 57$

$BM = 0$ ✓

Take moments to the left hand side of the x-x section (which is the imaginary pivot point).

3, Cont'd

When $x = 7.5m$

$BM = +(7.175 \times 7.5) - (6 \times 6) - (4 \times 3) - (4 \times 0.5)$

$= 53.43 - 36 - 12 - 2$

$= 53.43 - 50$

$BM = 3.43 kNm$