

**RTEK-2012 Rakenteiden mekaniikan perusteet**

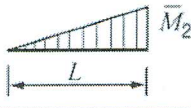
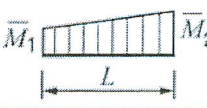

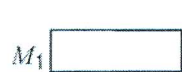


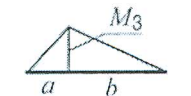


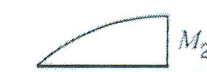



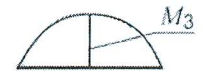




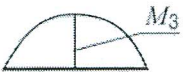
**TENTTI**

14.5.2013

Tenteissä saa olla oma käsinkirjoitettu A4-kokoinen muistilappu molemmin puolin kirjoitettuna, joka kerätään pois. Matematiikan taulukkokirja (esim. MAOL tai Tammertekniikka) ja ohjelmoitava taskulaskin sallittu

**LIITE I**

Taulukko 1 MOHRin integraalitulokset

		$\int_0^L \bar{M} M dx$			$\int_0^L \bar{M} M dx$
1		$\frac{1}{3} L \bar{M}_2 M_2$	1		$\frac{1}{2} L (\bar{M}_1 + \bar{M}_2) M_1$
2		$\frac{1}{6} L \bar{M}_2 M_1$	2		B
3		A	3		C
4		$\frac{1}{6} L \bar{M}_2 (M_1 + 2M_2)$	4		D
5		$\frac{1}{2} L \bar{M}_2 M_1$	5		E
6		$\frac{5}{12} L \bar{M}_2 M_2$	6		$\frac{1}{3} L (\bar{M}_1 + \bar{M}_2) M_3$
7		$\frac{1}{4} L \bar{M}_2 M_1$	7		F
8		$\frac{1}{4} L \bar{M}_2 M_2$	$A = \frac{1}{6} L \bar{M}_2 M_3 (1 + a/L)$ $B = \frac{1}{6} L [ \bar{M}_1 (2M_1 + M_2) + \bar{M}_2 (M_1 + 2M_2) ]$ $C = \frac{1}{3} L (M_1^2 + M_1 M_2 + M_2^2), M = \bar{M}$ $D = \frac{1}{12} L (3\bar{M}_1 + 5\bar{M}_2) M_2$ $E = \frac{1}{12} L (\bar{M}_1 + 3\bar{M}_2) M_2$ $F = \frac{1}{6} [ \bar{M}_1 (a + 2b) + \bar{M}_2 (2a + b) ] M_3$		
9		$\frac{1}{12} L \bar{M}_2 M_1$			
10		$\frac{1}{3} L \bar{M}_2 M_3$			

	$\bar{M}$ -pinta	M-pinta	(a)	(b)	(c)	(d)
(1)			$s \cdot y \cdot \bar{y}$	$\frac{1}{2} s \cdot y \cdot \bar{y}_2$	$\frac{1}{2} \cdot s \cdot y \cdot \bar{y}_3$	$\frac{1}{2} s y (\bar{y}_1 + \bar{y}_2)$
(2)			$\frac{1}{2} \cdot s \cdot y_2 \cdot \bar{y}$	$\frac{1}{3} s \cdot y_2 \cdot \bar{y}_2$	$\frac{1}{6} (s+n) y_2 \bar{y}_3$	$\frac{1}{6} s y_2 \cdot (\bar{y}_1 + 2\bar{y}_2)$
(3)			$\frac{1}{2} \cdot s \cdot y_1 \cdot \bar{y}$	$\frac{1}{6} \cdot s \cdot y_1 \cdot \bar{y}_2$	$\frac{1}{6} (s+m) y_1 \bar{y}_3$	$\frac{1}{6} \cdot s \cdot y_1 \cdot (2\bar{y}_1 + \bar{y}_2)$
(4)			$\frac{1}{2} \cdot s \cdot y_3 \cdot \bar{y}$	$\frac{1}{6} (s+n) y_3 \bar{y}_2$	$\frac{1}{3} \cdot s \cdot y_3 \cdot \bar{y}_3$	$\frac{1}{6} y_3 \cdot [(s+m) \cdot \bar{y}_1 + (s+n) \cdot \bar{y}_2]$
(5)			$\frac{s}{2} (y_1 + y_2) \bar{y}$	$\frac{s}{6} (y_1 + 2y_2) \bar{y}_2$	$\frac{\bar{y}_3}{6} \cdot [(s+m) y_1 + (s+n) y_2]$	$\frac{s}{6} [y_1 (2\bar{y}_1 + \bar{y}_2) + y_2 (\bar{y}_1 + 2\bar{y}_2)]$
(6)			$\frac{2}{3} \cdot s \cdot y_3 \cdot \bar{y}$	$\frac{1}{3} s y_3 \bar{y}_2$	$\frac{y_3 \bar{y}_3}{3s} (s^2 + nm)$	$\frac{s y_3}{3} (\bar{y}_1 + \bar{y}_2)$
(7)			$\frac{2}{3} \cdot s \cdot y_2 \cdot \bar{y}$	$\frac{5}{12} \cdot s \cdot y_2 \cdot \bar{y}_2$	$\frac{y_2 \bar{y}_3}{12 \cdot s} \cdot (5s^2 - ns - m^2)$	$\frac{s y_2}{12} (3\bar{y}_1 + 5\bar{y}_2)$
(8)			$\frac{2}{3} \cdot s \cdot y_1 \cdot \bar{y}$	$\frac{1}{4} \cdot s \cdot y_1 \cdot \bar{y}_2$	$\frac{y_1 \bar{y}_3}{12 \cdot s} \cdot (5s^2 - ns - n^2)$	$\frac{s y_1}{12} (5\bar{y}_1 + 3\bar{y}_2)$
(9)			$\frac{1}{3} \cdot s \cdot y_2 \cdot \bar{y}$	$\frac{1}{4} \cdot s \cdot y_2 \cdot \bar{y}_2$	$\frac{y_2 \bar{y}_3}{12s} \cdot (s^2 + ns + n^2)$	$\frac{s y_2}{12} (\bar{y}_1 + 3\bar{y}_2)$
(10)			$\frac{1}{3} \cdot s \cdot y_1 \cdot \bar{y}$	$\frac{1}{12} \cdot s \cdot y_1 \cdot \bar{y}_2$	$\frac{y_1 \bar{y}_3}{12 \cdot s} \cdot (s^2 + ms + m^2)$	$\frac{s y_1}{12} \cdot (3\bar{y}_1 + \bar{y}_2)$
(11)	$\int \bar{M}^2 ds$	$s \cdot \bar{y}^2$	$\frac{1}{3} \cdot s \cdot \bar{y}_2^2$	$\frac{1}{3} \cdot s \cdot \bar{y}_3^2$	$\frac{1}{3} s (\bar{y}_1^2 + \bar{y}_1 \bar{y}_2 + \bar{y}_2^2)$	