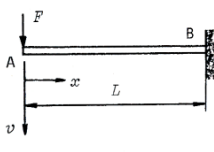
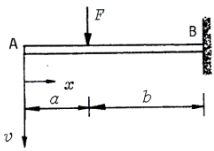
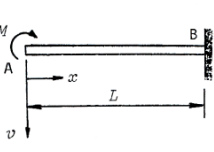
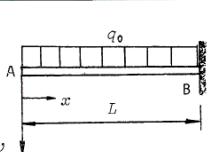
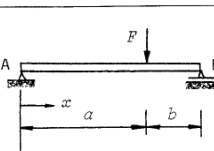
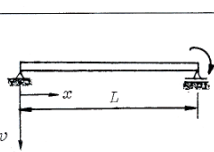
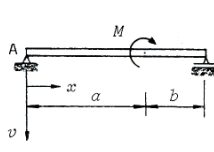
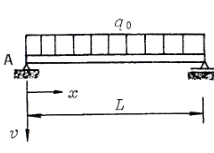
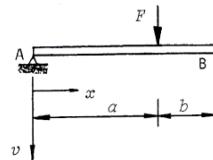
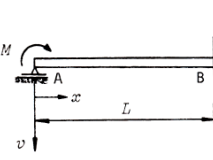
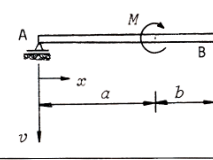
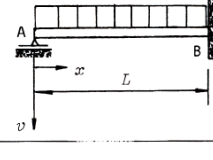
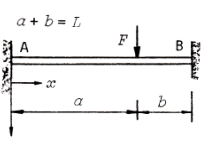
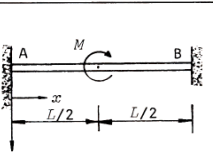
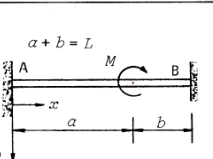
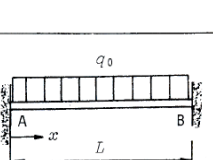


	Tukireaktiot ja taivutusmomentti	Kimmoiviiva ja käänntymät tuilla
1	 <p> $B = F$ $M_B = -FL$ $M(x) = -Fx$ $M_{\min} = M(L) = -FL$ </p>	<p> $v(x) = \frac{FL^3}{6EI} \left[2 - 3\frac{x}{L} + \left(\frac{x}{L}\right)^3 \right]$ $v_{\max} = v(0) = \frac{FL^3}{3EI}$ $v'_A = -\frac{FL^2}{2EI}$ $v'_B = 0$ </p>
2	 <p> $B = F$ $M_B = -Fb$ $M(x) = -F(x-a)$ $M_{\min} = M(L) = -Fb$ </p>	<p> $v(x) = \frac{Fb^2}{2EI} \left[L - \frac{1}{3}b - x + \frac{(x-a)^3}{3b^2} \right]$ $v_{\max} = v(0) = \frac{Fb^3}{6EI} \left(3\frac{L}{b} - 1 \right)$ $v'_A = -\frac{Fb^2}{2EI}$ $v'_B = 0$ </p>
3	 <p> $B = 0$ $M_B = M$ $M(x) = M$ $M_{\max} = M_{\min} = M$ </p>	<p> $v(x) = -\frac{M}{2EI} (L-x)^2$ $v_{\min} = v(0) = -\frac{ML^2}{2EI}$ $v'_A = \frac{ML}{EI}$ $v'_B = 0$ </p>
4	 <p> $B = q_0L$ $M_B = -\frac{1}{2}q_0L^2$ $M(x) = -\frac{1}{2}q_0x^2$ $M_{\min} = M(L) = -\frac{1}{2}q_0L^2$ </p>	<p> $v(x) = \frac{q_0L^4}{24EI} \left[3 - 4\frac{x}{L} + \left(\frac{x}{L}\right)^4 \right]$ $v_{\max} = v(0) = \frac{q_0L^4}{8EI}$ $v'_A = -\frac{q_0L^3}{6EI}$ $v'_B = 0$ </p>
8	 <p> $A = \frac{b}{L}F$ $B = \frac{a}{L}F$ $M(x) = F \left(b\frac{x}{L} - (x-a) \right)$ $M_{\max} = M(a) = \frac{ab}{L}F$ </p>	<p> $v(x) = \frac{FL^2}{6EI} \left[\frac{ab}{L^2}(L+b)\frac{x}{L} - b\left(\frac{x}{L}\right)^3 + \frac{1}{L^2}(x-a)^3 \right]$ $v_{\max} = v(a) = \frac{Fa^2b^2}{3LEI}$ $v'_A = \frac{Fab(L+b)}{6LEI}$ $v'_B = \frac{-Fab(L+a)}{6LEI}$ </p>
9	 <p> $A = -B = -\frac{M}{L}$ $M(x) = -\frac{M}{L}x$ $M_{\min} = M(L) = -M$ </p>	<p> $v(x) = \frac{ML^2}{6EI} \left[-\frac{x}{L} + \left(\frac{x}{L}\right)^3 \right]$ $v_{\min} = v\left(\frac{1}{3}L\right) = -\frac{ML^2}{9\sqrt{3}EI}$ $v'_A = -\frac{ML}{6EI}$ $v'_B = \frac{ML}{3EI}$ </p>
10	 <p> $A = -B = -\frac{M}{L}$ $M(x) = -M \left(\frac{x}{L} - (x-a)^0 \right)$ $M_{\min} = M(a) = -\frac{a}{L}M$ </p>	<p> $v(x) = \frac{ML^2}{6EI} \left[\left(3\frac{b^2}{L^2} - 1 \right) \frac{x}{L} + \left(\frac{x}{L}\right)^3 - \frac{3}{L^2}(x-a)^2 \right]$ $v_M = v(a) = \frac{Mab(b-a)}{3LEI}$ $v'_A = \frac{M(3b^2 - L^2)}{6LEI}$ $v'_B = \frac{M(3a^2 - L^2)}{6LEI}$ </p>
11	 <p> $A = B = \frac{1}{2}q_0L$ $M(x) = \frac{1}{2}q_0L^2 \left[\frac{x}{L} - \left(\frac{x}{L}\right)^2 \right]$ $M_{\max} = M\left(\frac{1}{2}L\right) = \frac{1}{8}q_0L^2$ </p>	<p> $v(x) = \frac{q_0L^4}{24EI} \left[\frac{x}{L} - 2\left(\frac{x}{L}\right)^3 + \left(\frac{x}{L}\right)^4 \right]$ $v_{\max} = v\left(\frac{1}{2}L\right) = \frac{5q_0L^4}{384EI}$ $v'_A = -v'_B = \frac{q_0L^3}{24EI}$ </p>

19	 <p> $A = \frac{Fb^2}{2L^2} \left(2 + \frac{a}{L} \right)$ $B = \frac{Fa}{2L} \left[3 - \left(\frac{a}{L}\right)^2 \right]$ $M_B = \frac{Fab}{2L} \left(\frac{b}{L} - 2 \right)$ $M(x) = Ax - F(x-a)$ </p>	<p> $v(x) = \frac{F}{12EI} \left[3ab^2\frac{x}{L} - b^2(2L+a)\left(\frac{x}{L}\right)^3 + 2(x-a)^3 \right]$ $v_F = v(a) = \frac{Fa^2b^2}{12LEI} \left(3 - 2\frac{a}{L} - \frac{a^2}{L^2} \right)$ $v'_A = \frac{Fb^2}{4LEI}$ $v'_B = 0$ </p>
20	 <p> $A = -B = -\frac{3M}{2L}$ $M_B = -\frac{1}{2}M$ $M(x) = \frac{1}{2}M \left(2 - 3\frac{x}{L} \right)$ $M_{\max} = M(0) = M$ </p>	<p> $v(x) = \frac{ML}{4EI} x \left(1 - \frac{x}{L} \right)^2$ $v_{\max} = v\left(\frac{1}{3}L\right) = \frac{ML^2}{27EI}$ $v'_A = \frac{ML}{4EI}$ $v'_B = 0$ </p>
21	 <p> $A = \frac{3Mb}{2L^2} \left(\frac{b}{L} - 2 \right)$ $B = \frac{3Mb}{2L^2} \left(2 - \frac{b}{L} \right)$ $M_B = M \left(1 - 3\frac{b}{L} + \frac{3b^2}{L^2} \right)$ $M(x) = Ax + M(x-a)^0$ </p>	<p> $v(x) = \frac{ML}{4EI} \left[b \left(3\frac{b}{L} - 2 \right) \frac{x}{L} - b \left(\frac{b}{L} - 2 \right) \left(\frac{x}{L}\right)^3 - \frac{2}{L}(x-a)^2 \right]$ $v_M = v(a) = \frac{Mab}{4L^3EI} \left[L^2(3b-2L) + a^2(2L-b) \right]$ $v'_A = \frac{Mb}{4EI} \left(3\frac{b}{L} - 2 \right)$ $v'_B = 0$ </p>
22	 <p> $A = \frac{3}{8}q_0L$ $B = \frac{5}{8}q_0L$ $M_B = -\frac{1}{8}q_0L^2$ $M(x) = \frac{1}{8}q_0L^2 \left(3\frac{x}{L} - 4\left(\frac{x}{L}\right)^2 \right)$ $M_{\min} = M(L) = -\frac{1}{8}q_0L^2$ </p>	<p> $v(x) = \frac{q_0L^4}{48EI} \left[\frac{x}{L} - 3\left(\frac{x}{L}\right)^3 + 2\left(\frac{x}{L}\right)^4 \right]$ $v_{\max} = v(0,4215L) = 0,005416 \frac{q_0L^4}{EI}$ $v'_A = \frac{q_0L^3}{48EI}$ $v'_B = 0$ </p>
35	 <p> $A = \frac{Fb^2}{L^2} \left(1 + 2\frac{a}{L} \right)$ $B = \frac{Fa^2}{L^2} \left(1 + 2\frac{b}{L} \right)$ $M_A = -\frac{Fab^2}{L^2}$ $M_B = -\frac{Fa^2b}{L^2}$ $M(x) = Ax + M_A - F(x-a)$ </p>	<p> $v(x) = \frac{F}{6EI} \left[3ab^2\left(\frac{x}{L}\right)^2 - b^2(L+2a)\left(\frac{x}{L}\right)^3 + (x-a)^3 \right]$ $v_F = v(a) = \frac{Fa^3b^2}{6L^2EI} \left[3 - 3\frac{a}{L} - \frac{b}{L} \right]$ $v'_A = v'_B = 0$ </p>
36	 <p> $A = -B = -\frac{3M}{2L}$ $M_A = -M_B = \frac{1}{4}M$ $M(x) = M \left(\frac{1}{4} - \frac{3x}{2L} + (x - \frac{1}{2}L)^0 \right)$ $M_{\max} = -M_{\min} = M\left(\frac{1}{2}L\right) = \frac{1}{2}M$ </p>	<p> $v(x) = \frac{ML^2}{8EI} \left[-\left(\frac{x}{L}\right)^2 + 2\left(\frac{x}{L}\right)^3 - \frac{4}{L^2}(x - \frac{1}{2}L)^2 \right]$ $v_{\max} = v\left(\frac{2}{3}L\right) = \frac{ML^2}{216EI}$ $v_{\min} = v\left(\frac{1}{3}L\right) = -\frac{ML^2}{216EI}$ $v'_A = v'_B = 0$ </p>
37	 <p> $A = -B = -\frac{6Mab}{L^3}$ $M_A = \frac{Mb}{L} \left(3\frac{a}{L} - 1 \right)$ $M_B = -\frac{Ma}{L} \left(3\frac{b}{L} - 1 \right)$ $M(x) = \frac{Mb}{L} \left(3\frac{a}{L} - 1 - \frac{6a}{L^2}x \right) + M(x-a)^0$ </p>	<p> $v(x) = \frac{M}{2EI} \left[-b(3a-L)\left(\frac{x}{L}\right)^2 + 2ab\left(\frac{x}{L}\right)^3 - (x-a)^2 \right]$ $v_M = v(a) = \frac{Ma^2b^2}{2L^3EI} (b-a)$ $v'_A = v'_B = 0$ </p>
38	 <p> $A = B = \frac{1}{2}q_0L$ $M_A = M_B = -\frac{1}{12}q_0L^2$ $M(x) = \frac{1}{12}q_0L^2 \left[-1 + 6\frac{x}{L} - 6\left(\frac{x}{L}\right)^2 \right]$ $M_{\min} = M(0) = M(L) = -\frac{1}{12}q_0L^2$ </p>	<p> $v(x) = \frac{q_0L^4}{24EI} \left[\left(\frac{x}{L}\right)^2 - 2\left(\frac{x}{L}\right)^3 + \left(\frac{x}{L}\right)^4 \right]$ $v_{\max} = v\left(\frac{1}{2}L\right) = \frac{q_0L^4}{384EI}$ $v'_A = v'_B = 0$ </p>