$x(t) = x_1 + t(x_2 - x_1)$
$y(t) = y_1 + t(y_2 - y_1)$

GREENS THEOREM
$$\int P\,dx + Q\,dy = \iint \left(\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y} \right) dA$$

$dx = (x_2 - x_1)\,dt$
$dy = (y_2 - y_1)\,dt$

$P = f(x,y) = 0.85 F'_c$ $\qquad$ $M_{xx} = y\, f(x,y) = y \cdot 0.85 F'_c$ $\qquad$ $M_{yy} = x \cdot f(x,y) = x \cdot 0.85 F'_c$

$Q = 0.85 F'_c x \quad P = 0$ $\qquad$ $Q = y \cdot 0.85 F'_c x \quad P = 0$ $\qquad$ $Q = \frac{1}{2} 0.85 F'_c x^2 \quad P = 0$

$\frac{\partial Q}{\partial x} = f(x,y) \quad \frac{\partial P}{\partial y} = 0$ $\qquad$ $\frac{\partial Q}{\partial x} = y\, 0.85 F'_c \quad \frac{\partial P}{\partial y} = 0$ $\qquad$ $\frac{\partial Q}{\partial x} = x\, 0.85 F'_c \quad \frac{\partial P}{\partial y} = 0$

$\int 0.85 F'_c x\, dy$

$\int_0^1 0.85 F'_c (x_1 + t(x_2 - x_1)) \cdot (y_2 - y_1)\, dt$

$P = -\frac{1}{2} 0.85 F'_c (x_1 + x_2)(y_1 - y_2)$

$\int 0.85 F'_c x y\, dy$

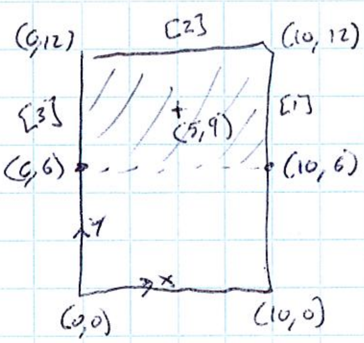
$\int_0^1 0.85 F'_c (x_1 + t(x_2 - x_1))(y_1 + t(y_2 - y_1))(y_2 - y_1)\, dt$

$M_{xx} = \frac{1}{6} 0.85 F'_c (y_2 - y_1)(x_1(2y_1 + y_2) + x_2(y_1 + 2y_2))$

$\int \frac{1}{2} 0.85 F'_c x^2\, dy$

$\int_0^1 \frac{1}{2} 0.85 F'_c [x_1 + t(x_2 - x_1)]^2 (y_2 - y_1)\, dt$

$M_{yy} = \frac{1}{6} 0.85 F'_c (x_1^2 + x_1 x_2 + x_2^2)(y_2 - y_1)$



$F'_c = 3$ ksi $\qquad 0.85 F'_c = 2.55$ ksi

$P = 2.55 \text{ ksi} \cdot 10'' \cdot 6'' = 153$ k

$M_{yy} = 153 \cdot 5 = 765$
$M_{xx} = 153 \cdot 9 = 1377$

	P	M_{xx}	M_{yy}
[1]	153	1377	765
[2]	0	0	0
[3]	0	0	0
	153	1377	765 ✓

$x(t) = x_1 + t(x_2 - x_1)$
$y(t) = y_1 + t(y_2 - y_1)$

GREEN THEOREM
$$\int P\,dx + Q\,dy = \iint \left(\frac{\partial Q}{\partial x} - \frac{\partial P}{\partial y}\right) dA$$

$dx = (x_2 - x_1)\,dt$
$dy = (y_2 - y_1)\,dt$

ASSUME COORD TRANSLATED SO POINT OF $\sigma = 0$ IS AT $y=0$

$f(x,y) = \frac{\sigma_{MAX}}{y_{MAX}} y$ $\qquad M_{xx} = y\,f(x,y) = \frac{\sigma_{MAX}}{y_{MAX}} y^2$ $\qquad M_{yy} = x\,f(x,y) = \frac{\sigma_{MAX}}{y_{MAX}} y x$

$P = -\frac{1}{2}\frac{\sigma_{MAX}}{y_{MAX}} y^2 \quad Q = 0$ $\qquad P = -\frac{1}{3}\frac{\sigma_{MAX}}{y_{MAX}} y^3 \quad Q=0$ $\qquad P = -\frac{1}{2}\frac{\sigma_{MAX}}{y_{MAX}} y^2 x \quad Q = 0$

$\frac{\partial Q}{\partial x} = 0 \quad \frac{\partial P}{\partial y} = -f(x,y)$ ✓ $\qquad \frac{\partial Q}{\partial x} = 0 \quad \frac{\partial P}{\partial y} = -y\,f(x,y)$ ✓ $\qquad \frac{\partial Q}{\partial x} = 0 \quad \frac{\partial P}{\partial y} = -x\,f(x,y)$ ✓

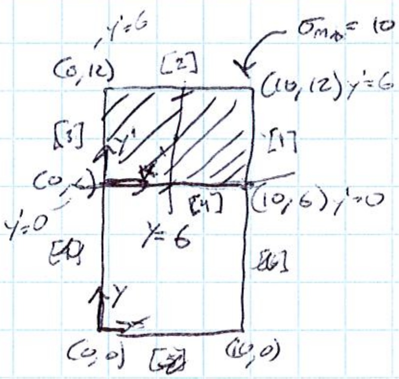
$$\int -\frac{1}{2}\frac{\sigma_m}{y_m} y^2\,dx$$

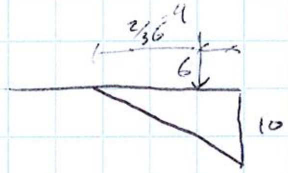
$$\int_0^1 -\frac{1}{2}\frac{\sigma_m}{y_m}\left[y_1 + t(y_2 - y_1)\right]^2 (x_2 - x_1)\,dt \qquad \int_0^1 -\frac{1}{3}\frac{\sigma_m}{y_m}\left[y_1 + t(y_2-y_1)\right]^3 (x_2 - x_1)\,dt$$

$$F = \frac{1}{6}\frac{\sigma_m}{y_m}\left[y_1^2 + y_1 y_2 + y_2^2\right](x_1 - x_2) \qquad M_{xx} = \frac{1}{12}\frac{\sigma_m}{y_m}(y_1 + y_2)(y_1^2 + y_2^2)(x_1 - x_2)$$

$$\int_0^1 -\frac{1}{2}\frac{\sigma_{MAX}}{y_{MAX}}\left[y_1 + t(y_2 - y_1)\right]^2 \cdot (x_1 + t(x_2 - x_1)) \cdot (x_2 - x_1)\,dt$$

$$M_{yy} = \frac{1}{24}\frac{\sigma_m}{y_m}(x_1 - x_2)\left[y_1^2(3x_1 + x_2) + 2y_1 y_2 (x_1 + x_2) + y_2^2(x_1 + 3x_2)\right]$$





$A = \frac{1}{2} \cdot 6 \cdot 10 = 30$
$V = A \cdot 6 = 30 \cdot 10 = 300 = F$
$M_{yy}' = 300 \cdot 5 = 1500$
$M_{xx}' = 300 \cdot (4) = 1200$

	F	M_{xx}'	M_{yy}'
[1]	0	0	0
[2]	300	1200	1500
[3]	0	0	0
	300 ✓	1200 ✓	1500 ✓