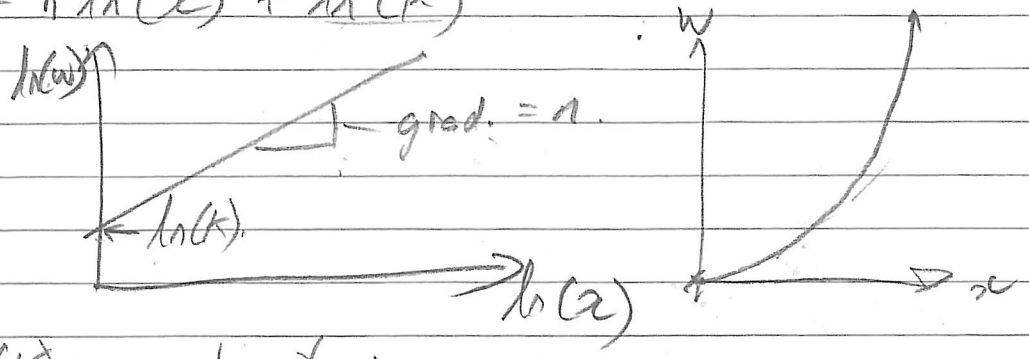
Sigm Ed 2
18.5

(4) $W = kx^n$ x = area of X-section
W = max safe weight

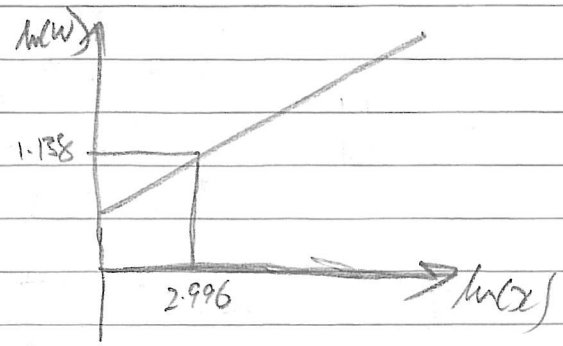
$\ln(W) = \ln(kx^n)$ 2 factors,
$= \ln(k) + \ln(x^n)$ exp becomes coeff.
$= \ln(k) + n\ln(x)$
(linear $y = mx + c$)

$\ln(W) = n\ln(x) + \ln(k)$



(c) $\ln(k)$ = y-intercept ie $x = 0$

x =	20	80	$\ln(x)$ 2.996	4.382
W =	3.12	5.66	$\ln(W)$ 1.138	1.733



$\delta \ln(W) = 0.595$
$\delta \ln(x) = 1.386$ $n = 0.429$

to find $\ln(k)$, $2.996 \times 0.429 = 1.285$
$1.138 - 1.285 = -0.147$
$k = e^{-0.147}$
$k = 0.863$

$W = 0.863 x^{0.429}$

ii) $W_0 = 0.863 \cdot 10^{0.429}$
$= 2.32$ tonnes.

iii) $6 = 0.863 \cdot x^{0.429}$
$\frac{6}{0.863} = x^{0.429}$
$6.952 = x^{0.429}$
$\frac{\ln(6.952)}{0.429} = \ln(x)$
$4.520 = \ln(x)$
$x = e^{4.520}$
$= 91.8\ cm^2$