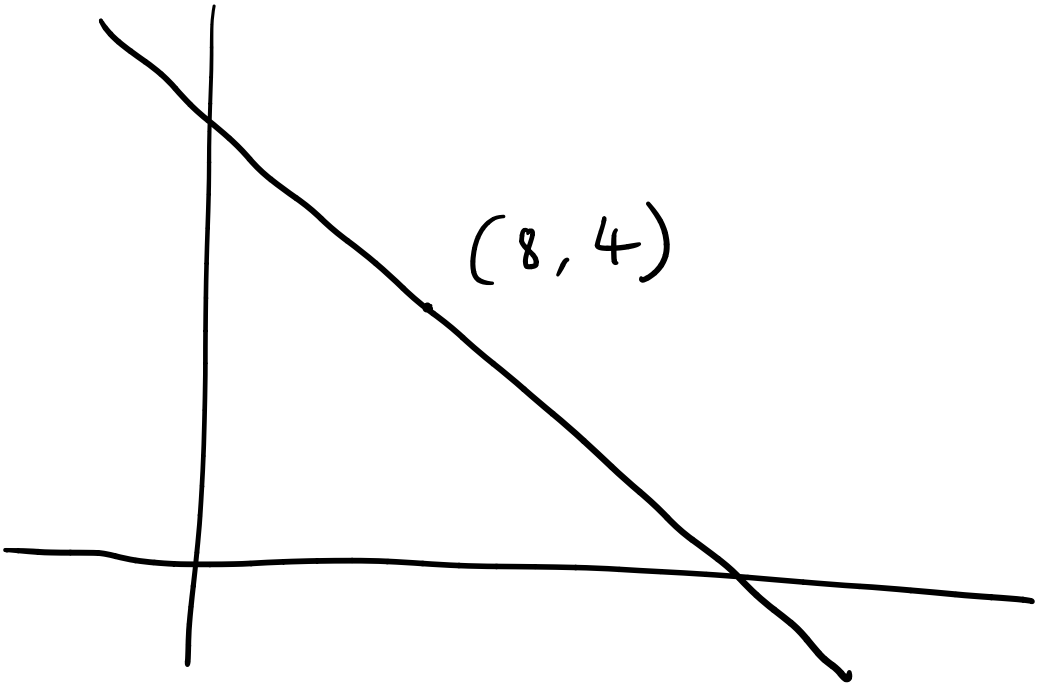
Consider triangles formed by lines passing through the point $(8, 4)$, the x-axis, and the y-axis. Find the dimensions that minimise area.



$$y - 4 = m(x - 8)$$

$y = 0$, $\quad -4 = m(x-8) \Rightarrow$
$-4 = mx - 8m$
$mx = -4 + 8m$
$x = -\frac{4}{m} + 8$

$x = 0$, $\quad y - 4 = -8m \Rightarrow y = -8m + 4$

$$\text{Area} = \frac{1}{2} x y$$
$$= \frac{1}{2} x \left(m(x-8) + 4\right)$$
$$= \frac{1}{2} x \left(mx - 8m + 4\right)$$

$$\text{Area} = \frac{1}{2} x_0 y_0$$
$$= \frac{1}{2}\left(-\frac{4}{m} + 8\right)\left(-8m + 4\right)$$
$$= \frac{1}{2}\left(32 - 64m - \frac{16}{m} + 32\right)$$
$$= \frac{1}{2}\left(64 - 64m - \frac{16}{m}\right)$$

$= \frac{1}{2}mx^2 - 4mx + 2x$

$\frac{dA}{dx} = mx - 4m + 2$

$\frac{dA}{dx} = 0$

$mx - 4m + 2 = 0$

$\left(-\frac{1}{2}\right)x - 4\left(-\frac{1}{2}\right) + 2 = 0$

$-\frac{1}{2}x + 2 + 2 = 0$

$-\frac{1}{2}x + 4 = 0$

$-\frac{1}{2}x = -4$

$x = 8$

$= 32 - 32m - \frac{8}{m}$

$\frac{dA}{dm} = -32 + \frac{8}{m^2}$

$\frac{dA}{dm} = 0$

$-32 + \frac{8}{m^2} = 0$

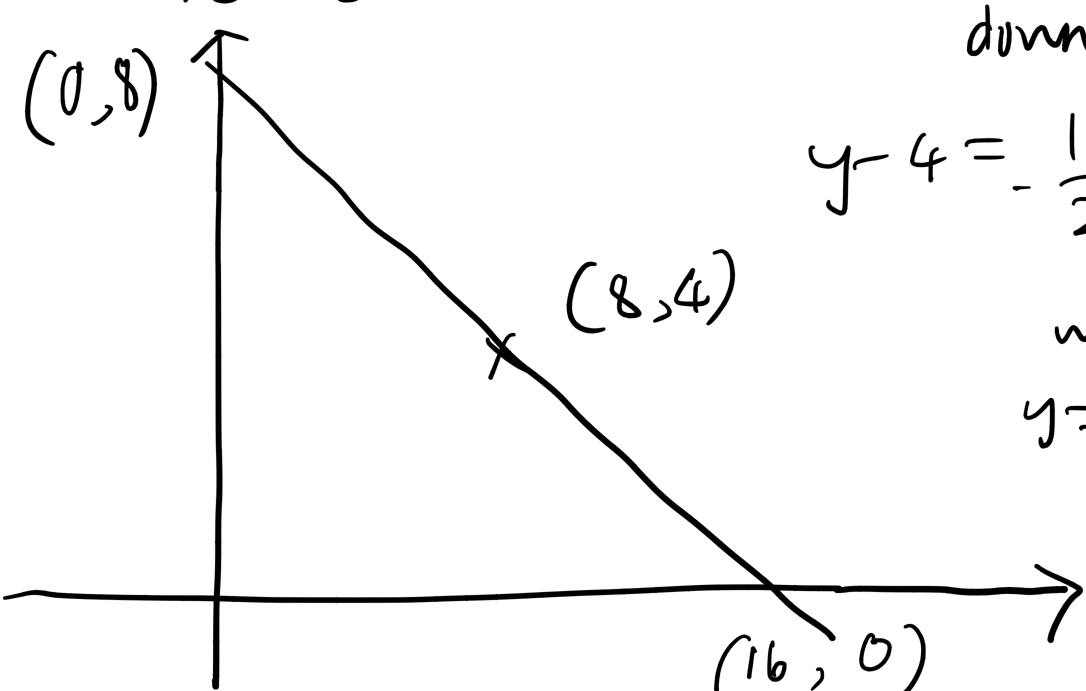
$-32m^2 + 8 = 0$

$-32m^2 = -8$

$m^2 = \frac{1}{4}$

$m = \pm\frac{1}{2}$

$m = -\frac{1}{2}$ because line is sloping downwards



$y - 4 = -\frac{1}{2}(x - 8)$

when $x = 0$,

$y = 8$

when $y = 0$,

$8 = x - 8$

$x = 16$

$A = 8 \times 16 \times \frac{1}{2}$

$= 64$