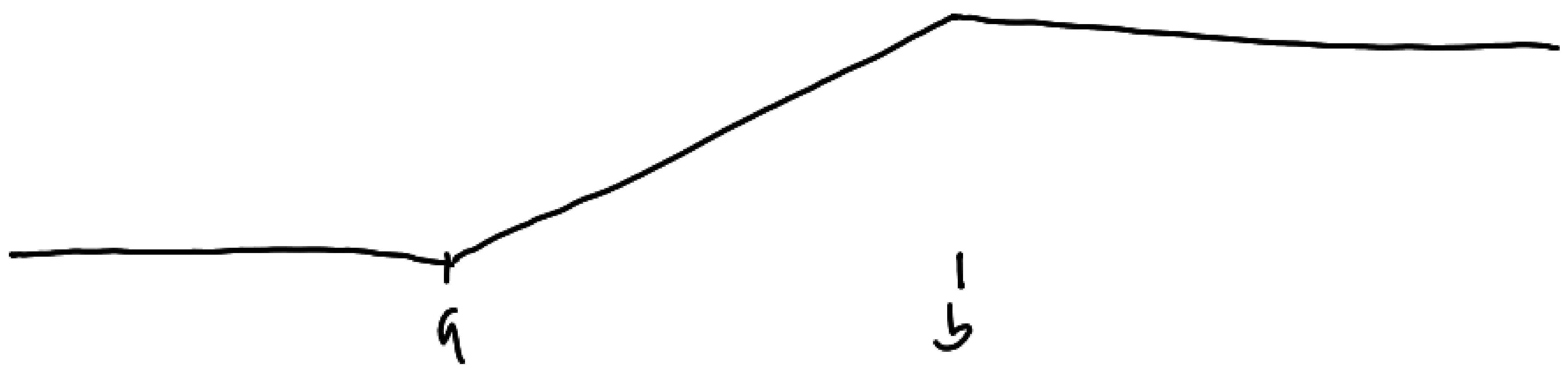
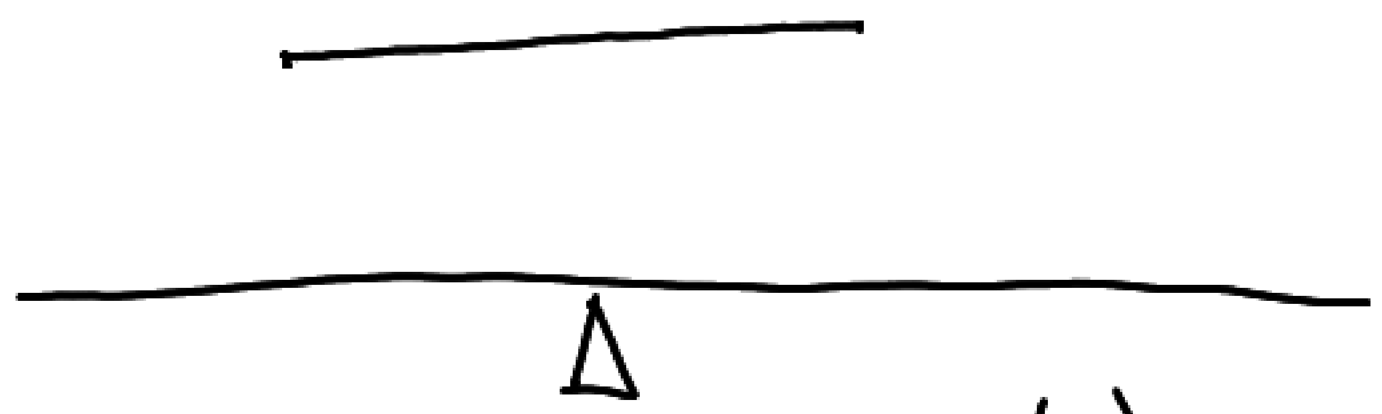
$$F(x) = P(X \le x) = \int_{-\infty}^{x} \frac{I_{(a,b)}(x)}{b-a}\,du = \int_{a}^{x} \frac{1}{b-a}\,du = \frac{1}{b-a}\left(u\Big|_{a}^{x}\right) = \frac{x-a}{b-a}$$





$$M_X(t) = E\left(e^{Xt}\right)$$

$$\lim_{t \to 0} M_X(t) = 1$$ ¿por qué?

$$F_X(x) = P(X \le x) = 1 - e^{-1/2\,x}$$

$$Y = g(X) = (1 - e^{-\frac{1}{2}X})$$
$F_X(X)$

$$f(x) = \frac{1}{2} e^{-x/2} I_{(0,\infty)}(x),$$

$$F(x) = \int_0^x \frac{1}{2} e^{-u/2}\,du = -e^{-u/2}\Big|_0^x =$$

$$-e^{-x/2} - (-e^0)$$

$$= 1 - e^{-x/2}$$

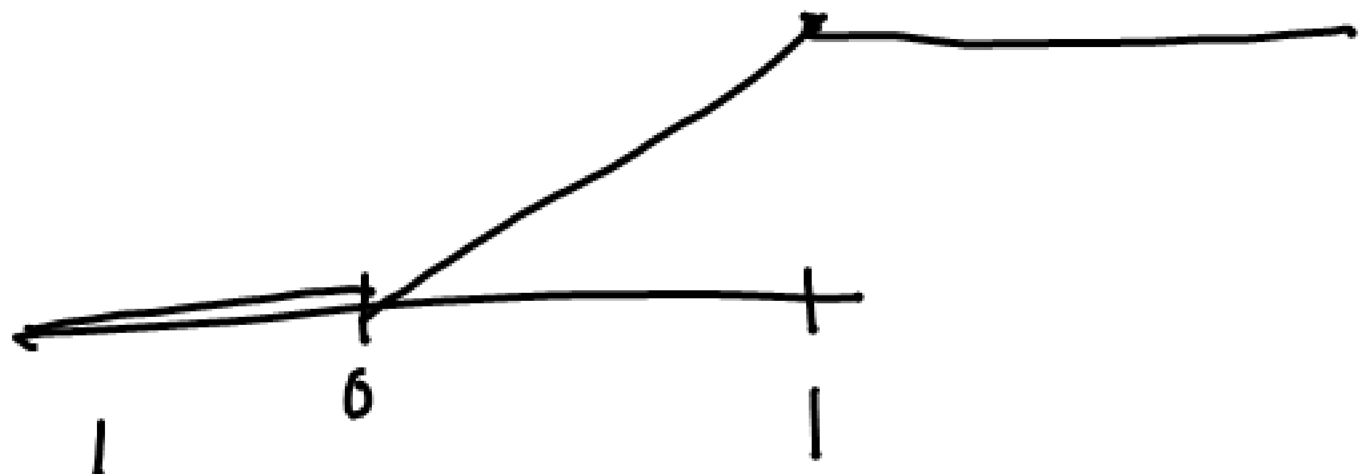
$$F_Y(y) = P(Y \le y) = P(g(X) \le y)$$

$$= P(1 - e^{-1/2X} \le y)$$

$$= P(1 - y \le e^{-1/2X}) = P(\log(1-y) \le -\tfrac{1}{2}X)$$

$$= P(-\log(1-y) \ge \tfrac{1}{2}X) = P(-2\log(1-y) \ge X)$$

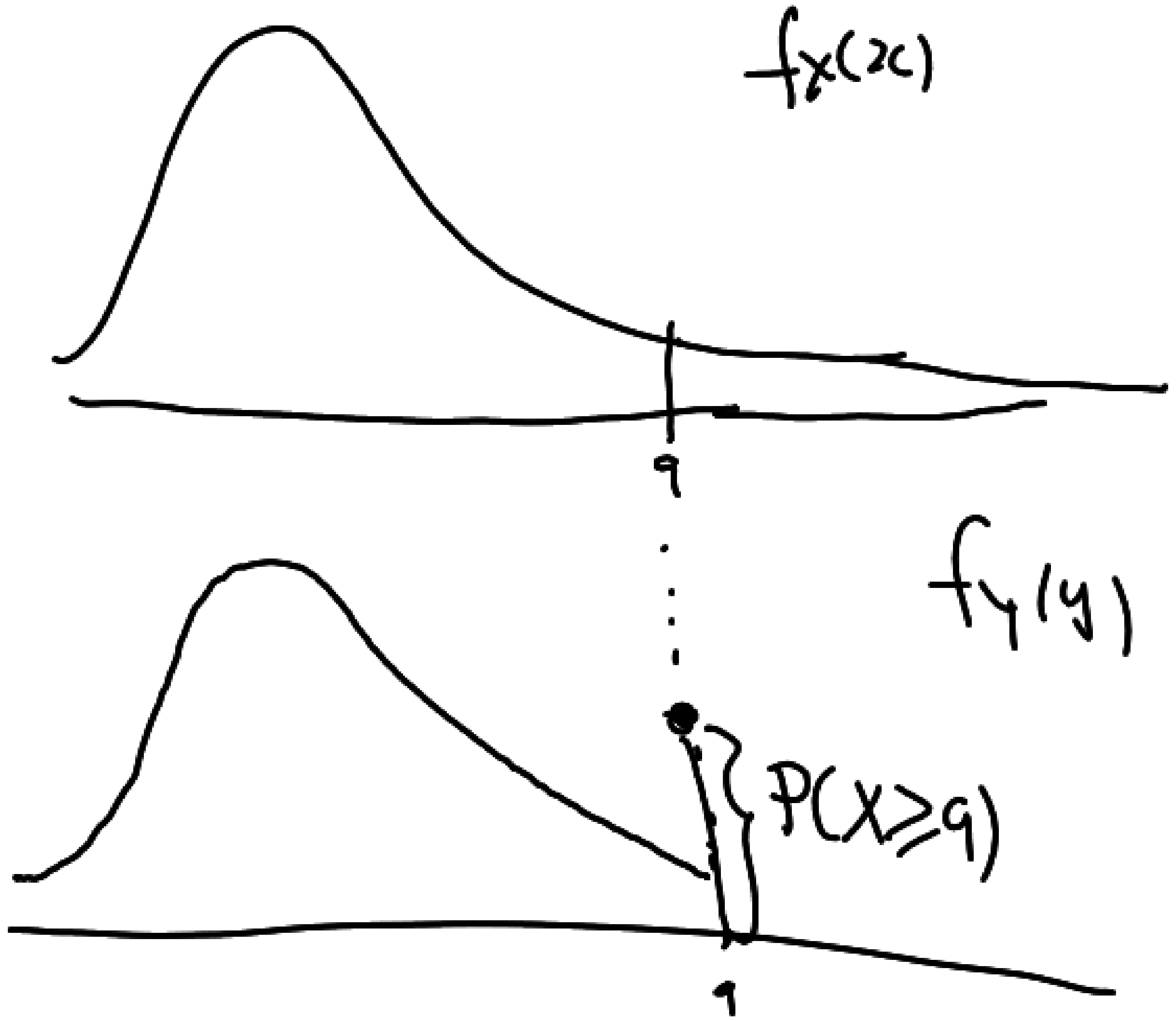
$$= 1 - e^{-1/2(-2\log(1-y))} = 1 - 1 + y = y$$



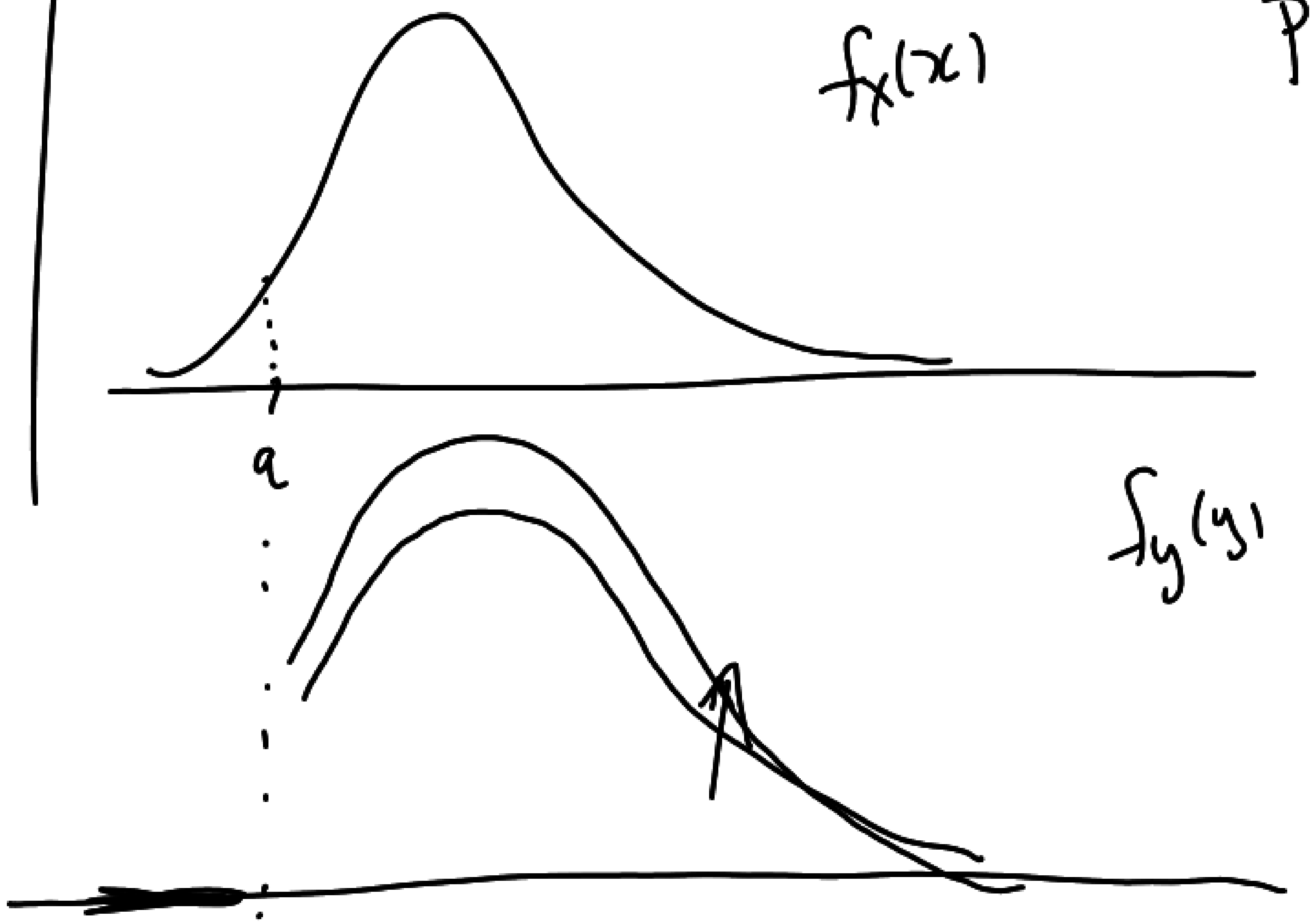
$X \sim N(\mu, \sigma^2) \quad \mu \in \mathbb{R} \quad \sigma^2 > 0$

$$f(x) = \frac{1}{\sqrt{2\pi}\,\sigma} \exp\left(-(x-\mu)^2/2\sigma^2\right) I_{\mathbb{R}}(x), \quad \mu \in \mathbb{R},\ \sigma^2 > 0$$

Censura (por la derecha)



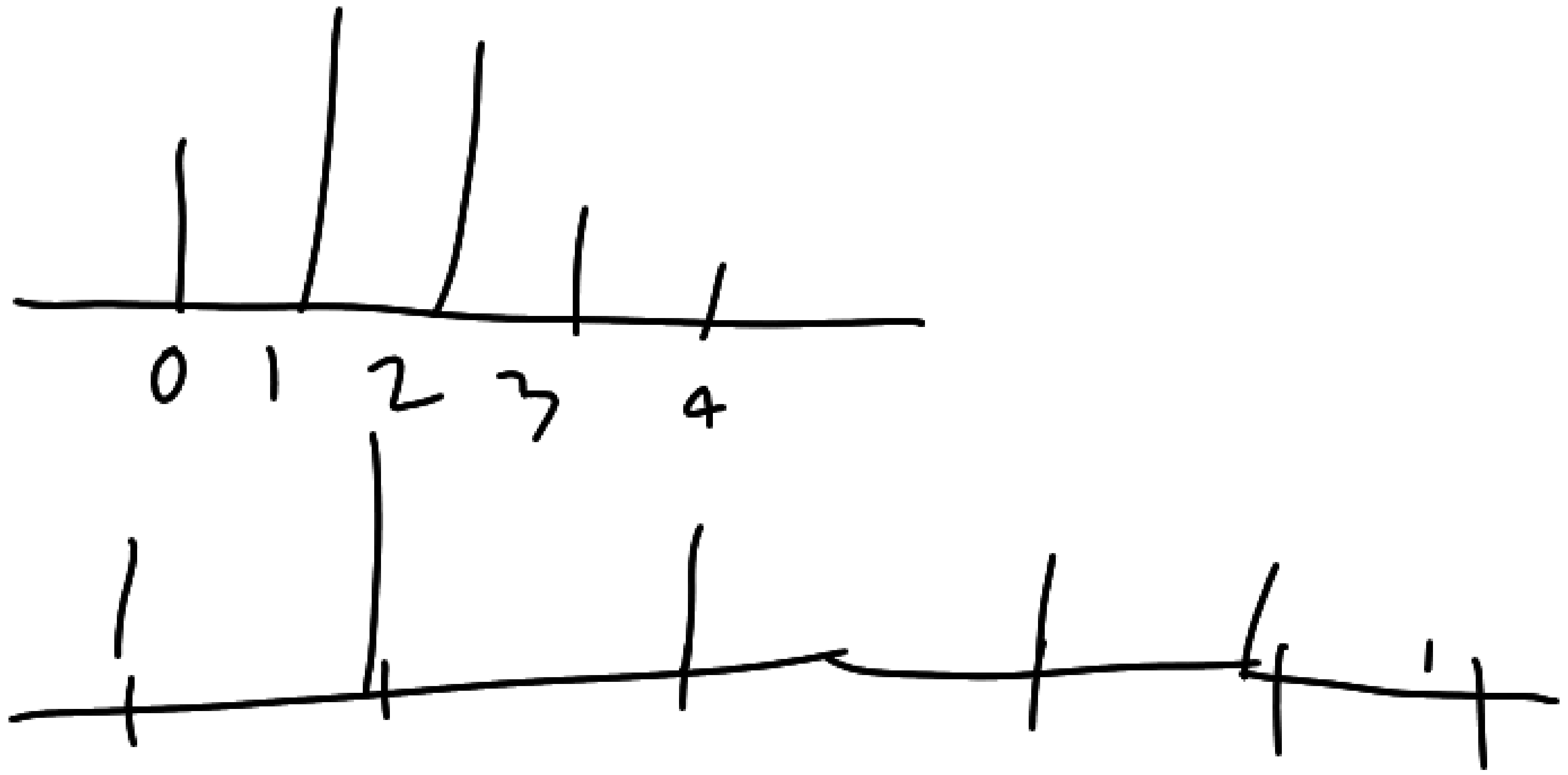
Truncamiento (por la izquierda)



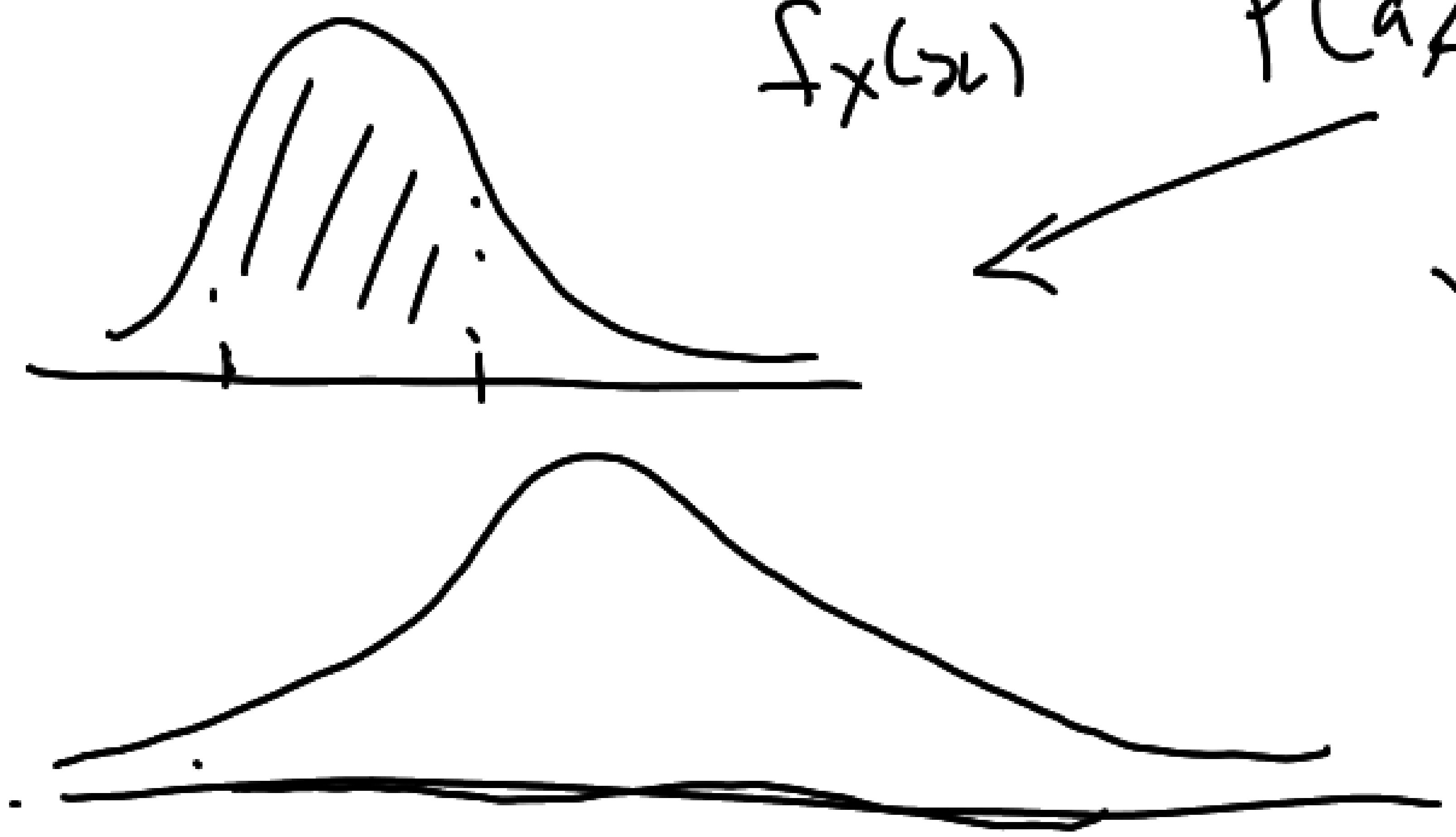
$$P(Y=y) = P(X=y \mid X \geq a) = \frac{f_X(y)}{P(X \geq a)}$$

$X \sim Pois(\lambda)$ $\qquad f(x) = \frac{\lambda^{x} e^{-\lambda}}{x!} I_{\{0,1,\ldots\}}(x), \quad \lambda > 0$

$Y = 2X$ $\qquad P(Y=y) = \frac{\lambda^{y} e^{-\lambda}}{y!} I_{\{0,2,\ldots\}}(y), \quad \lambda > 0$



$f_X(x)$ $\qquad P(a < X < b) = \int_a^b f_X(x)$



$Y = 2X$

$\int$

$X \sim \exp(\lambda) \quad \lambda > 0 \qquad f(x) = \cancel{\frac{\lambda^x e^{-\lambda}}{x!}} \frac{1}{\lambda} e^{-x/\lambda} I_{(0,\infty)}(x), \quad \lambda > 0$

$Y = cX \quad c > 0$

$Y = X^2$

$X = \frac{1}{c} Y, \quad x = \frac{1}{c} y \Rightarrow w(y) = \frac{1}{c} y$

$w'(y) = \frac{1}{c}, \quad x \to 0 \Rightarrow y \to 0$

$\qquad\qquad\quad x \to \infty \Rightarrow y \to \infty$

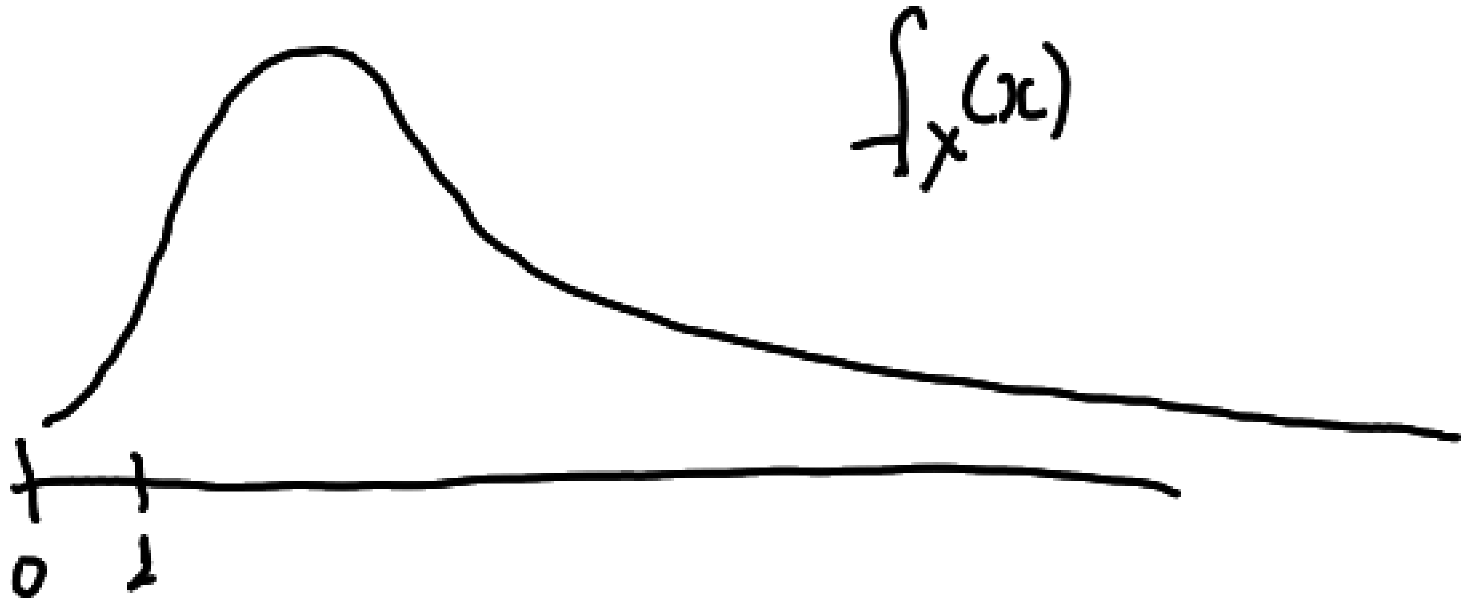
$f_Y(y) = f_X(w(y)) \, |w'(y)| = \frac{1}{\lambda} e^{-\frac{1}{\lambda}(\frac{1}{\lambda} y)} I_{(0,\infty)}(y) \frac{1}{c}$

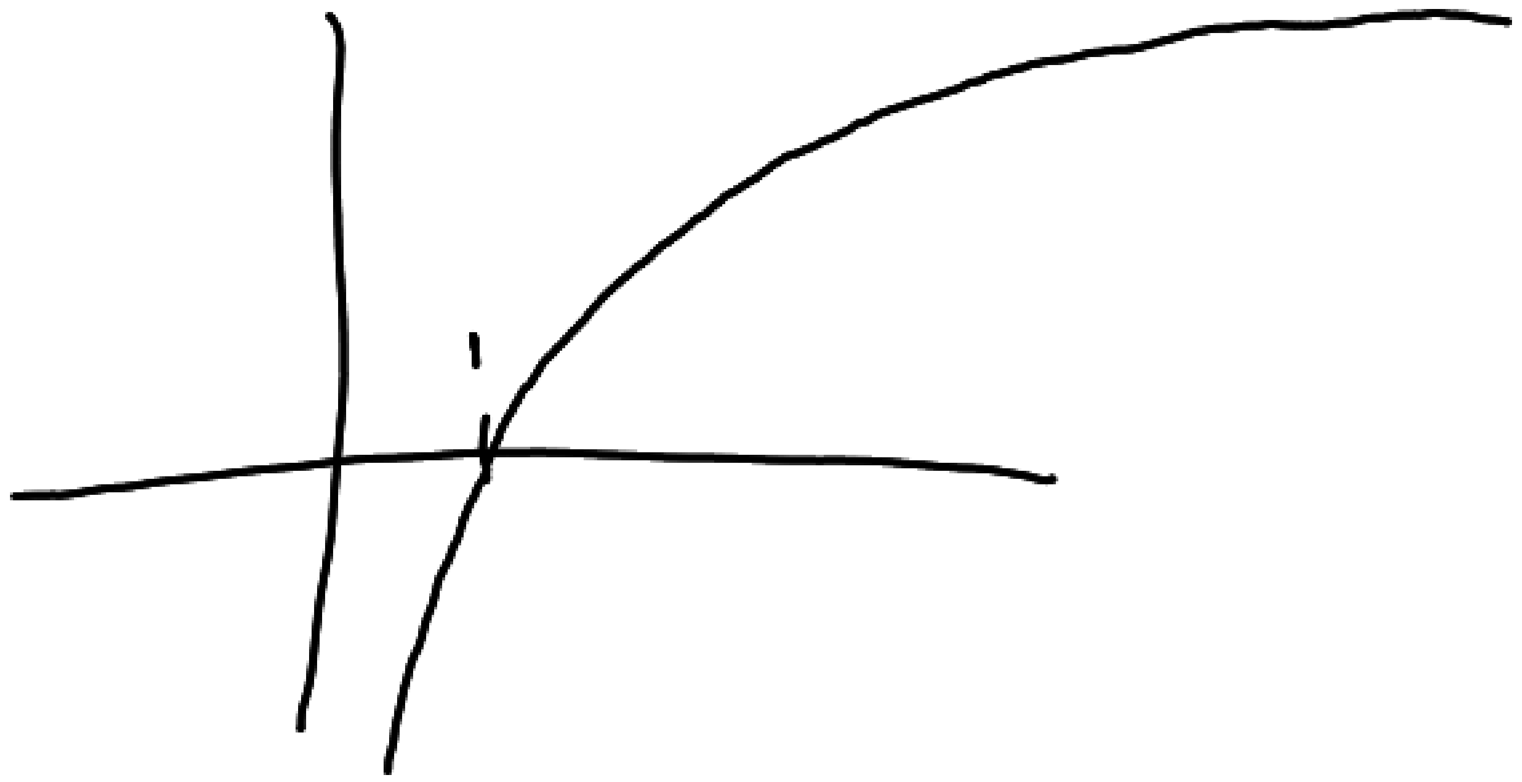
$= \frac{1}{c\lambda} e^{-\frac{1}{c\lambda} y} I_{(0,\infty)}$

$=$

$$Y = X^2 \quad \begin{cases} W(Y) = \sqrt{Y} & x \geq 0 \\ W(Y) = -\sqrt{Y} & x \leq 0 \end{cases} \longrightarrow \begin{cases} W'(Y) = \dfrac{1}{2\sqrt{Y}} & x \geq 0 \\ W'(Y) = \dfrac{-1}{2\sqrt{Y}} & x \leq 0 \end{cases}$$

$$f_Y(y) = \Big\{ \cancel{\frac{1}{\lambda} \cdot e} \quad \frac{1}{\lambda} \cdot e^{-\sqrt{y}/\lambda} \cdot \frac{1}{2\sqrt{y}} = \frac{1}{2\sqrt{y}\,\lambda} \cdot e^{-\sqrt{y}/\lambda} \quad I_{(0,\infty)}$$





$Y=\log(X)$