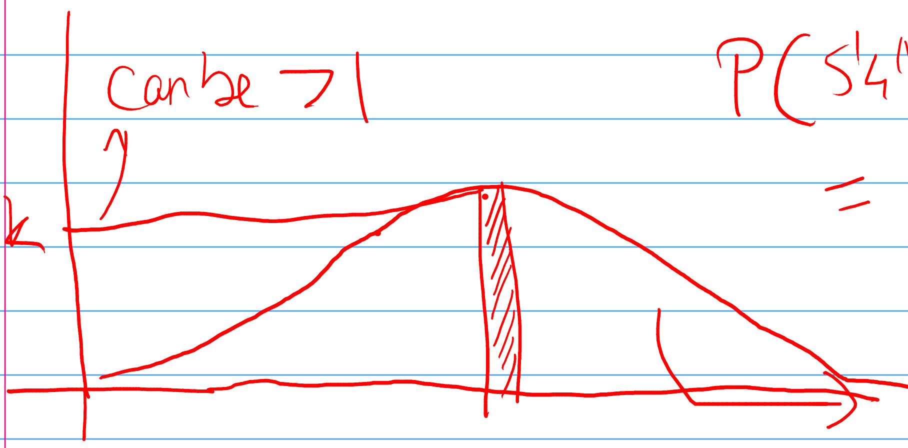
$p : \mathbb{D} \to \mathbb{R}$



$P(5'4'' < x < 5'6'')$

$= \int_{5'4''}^{5'6''} p(x)\,dx$

total area ≤ 1

$$p(x) = \frac{1}{\sqrt{2\pi}\,\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

$$E(x) = \int_{-\infty}^{\infty} \frac{x}{\sqrt{2\pi}\,\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}\,dx = \mu$$

mean = mode = median

$V(x) = \sigma^2$ $\quad \int \frac{(x-\mu)^2}{\sqrt{2\pi}\,\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}\,dx$

eg.

x	1	0
ω	μ	$1-\mu$

$V = (1-\mu)^2 \cdot 1 + (\mu-1)^2 \cdot 0$

$= (1-\mu)^2$

$$\int_{\mu-\sigma}^{\mu+\sigma} \frac{1}{\sqrt{2\pi}\,\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}} = 0.68$$

$$P(\mu - 2\sigma \le x \le \mu + 2\sigma) = 0.95$$

$$P(\mu - 3\sigma \le x \le \mu + 3\sigma) = 0.997$$

(6σ limit)