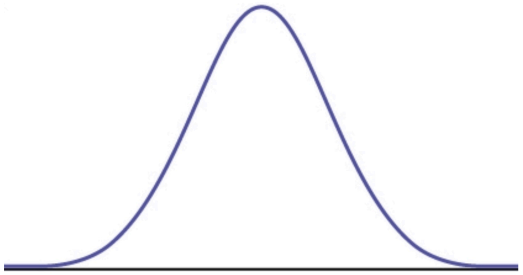
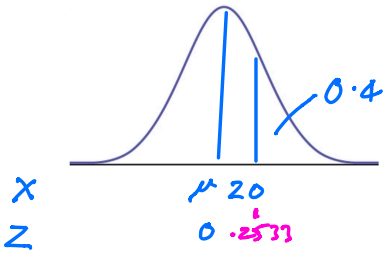


$$f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

$\mu \pm \sigma$	68% of data
$\mu \pm 2\sigma$	95% of data
$\mu \pm 3\sigma$	99.75% of data
$\mu \pm 6\sigma$	1 in 500 million chance of being outside this range

---

Example 1



$X \sim N(\mu, 5^2)$

and $P(X > 20) = 0.4$

Find μ

$$Z = \frac{X - \mu}{\sigma}$$

$$Z = \Phi^{-1}(0.6) = 0.2533$$

$$Z\sigma = X - \mu$$

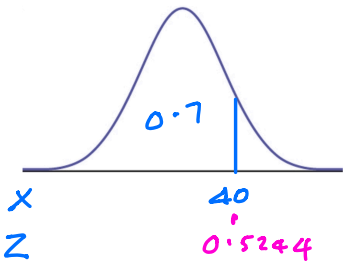
$$\mu = X - Z\sigma$$

$$\mu = 20 - 0.2533 \times 5$$

$$\mu = 18.7235$$

$\mu = 18.7$ to 3 s.f.

Example 2



$X \sim N(25, \sigma^2)$

If $P(x < 40) = 0.7$ find σ

$Z = \Phi^{-1}(0.7)$

$$Z = \frac{X - \mu}{\sigma}$$

$$\sigma Z = X - \mu$$

$$\sigma = \frac{X - \mu}{Z}$$

$$\sigma = \frac{40 - 25}{0.5244} = 28.6$$

Hwk Read pages 37 - 47