Q2. $X =$ lifetime of component. $X \sim \exp(\lambda)$.

$$p = P(X > 24) = 1 - P(X \leq 24)$$
$$= 1 - F(24; \lambda)$$
$$= 1 - (1 - e^{-24\lambda})$$
$$= e^{-24\lambda}.$$

$Y =$ number that survive 24h $Y \sim$ binomial (n, p).

$$\hat{p} = \frac{y}{n} = \frac{15}{18} \qquad (y = 15, \; n = 18)$$

by invariance principle,
$$\Longrightarrow \quad \hat{p} = e^{-24\hat{\lambda}}$$
$$\Longrightarrow \quad \hat{\lambda} = -\frac{\ln \hat{p}}{24}$$