

## You try it

Random variables  $Y_1, Y_2, \dots, Y_n$  are independent with mean 3.2 and variance 6. Find:

- The approximate distribution of  $\bar{Y}$ , the mean of the observations assuming  $n$  is reasonably large.
- $P(Y > 3.7)$  if  $n = 40$ .
- The approximate distribution of  $6(\bar{Y} - 3.2)^2$  if  $n = 36$ .

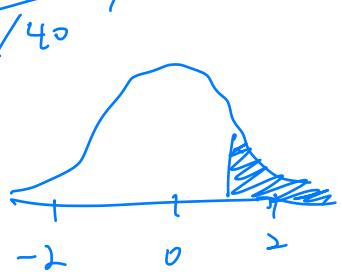
$$(a) \bar{Y} \sim N(3.2, \frac{6}{n})$$

$$(b) P(\bar{Y} > 3.7) = P\left(\frac{\bar{Y} - 3.2}{\sqrt{6/40}} > \frac{3.7 - 3.2}{\sqrt{6/40}}\right)$$

$$= P(Z > 1.291)$$

$$1 - pnorm(1.291)$$

$$\boxed{0.09835}$$



$$(c) \bar{Y} \sim N(3.2, \frac{6}{36})$$

$$\frac{\bar{Y} - 3.2}{\sqrt{1/6}} \sim N(0, 1)$$

$$\sqrt{6}(\bar{Y} - 3.2) \sim N(0, 1)$$

$$6(\bar{Y} - 3.2)^2 \sim \chi^2_1$$