

①

Females



$$\mu = 165$$

$$\sigma = 9$$

$$P(X < 177)$$

Normal CD

$$\text{lower} = 0$$

$$\text{upper} = 177$$

$$\sigma = 9$$

$$\mu = 165$$

$$= 0.909$$

males



$$\mu = 178$$

$$\sigma = 10$$

$$P(X < 190)$$

Normal CD

$$\text{lower} = 0$$

$$\text{upper} = 190$$

$$\sigma = 10$$

$$\mu = 178$$

$$= 0.885$$

$0.909 > 0.885 \therefore$ Females are relatively taller

2

a)



$$\mu = 900$$
$$\sigma = 100$$

$$P(m < 850)$$

Normal CD

$$\text{lower} = 0$$

$$\text{Upper} = 850$$

$$\sigma = 100$$

$$\mu = 900$$

$$= 0.3085$$

b)



Inverse Normal

$$\text{Area} = 0.1$$

$$\sigma = 100$$

$$\mu = 900$$

$$\text{min} = 772$$

Inverse Normal

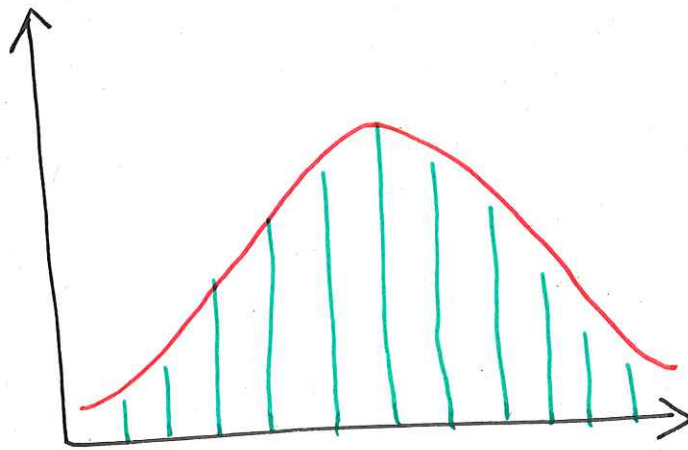
$$\text{Area} = 0.9$$

$$\sigma = 100$$

$$\mu = 900$$

$$\text{max} = 1028$$

(3)



$$X \sim B(200, 0.54)$$

$$Y \sim N(np, \sqrt{np(1-p)})$$
$$(108, \sqrt{49.68})$$

Discrete $P(X > 100)$

Continuous $P(X > 100.5)$

$$P(X > 100.5)$$

$$\text{Lower} = 100.5$$

$$\text{Upper} = 200$$

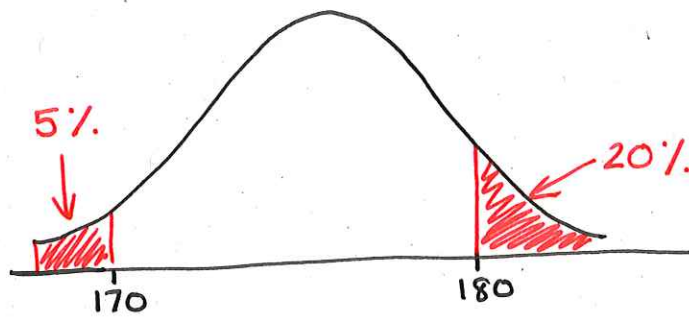
$$\sigma = \sqrt{49.68}$$

$$\mu = 108$$

$$= 0.856$$

4

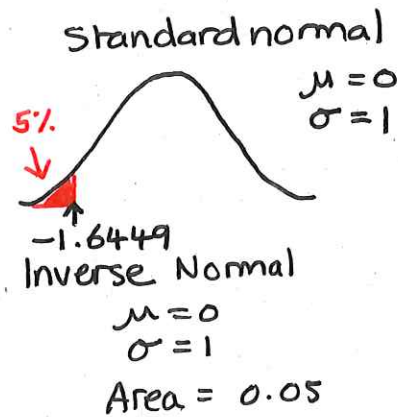
a)



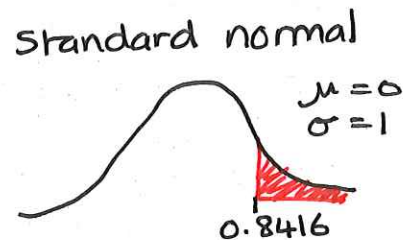
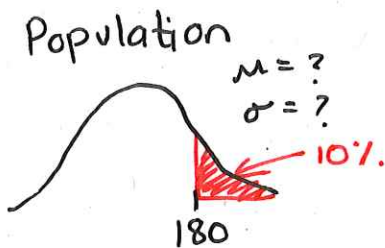
b)



⇒



Equation A
$$\frac{170 - \mu}{\sigma} = -1.6449$$



0.8416
Inverse normal
 $\mu = 0$
 $\sigma = 1$
Area = 0.80

Equation B
$$\frac{180 - \mu}{\sigma} = 0.8416$$

(A)

$$170 - \mu = -1.6449\sigma$$

(B)

$$180 - \mu = 0.8416\sigma$$

B - A

10

$$= 2.4865\sigma$$

$$\sigma = 4.02$$

$$\therefore \mu = 176.6$$

④

c) $P(X > 175)$

Normal CD

$$\text{lower} = 175$$

$$\text{upper} = 500$$

$$\sigma = 4.021$$

$$\mu = 176.615$$

$$= 0.656$$

$$P(\text{All } 3 > 175) = 0.656^3 = 0.282$$

⑤

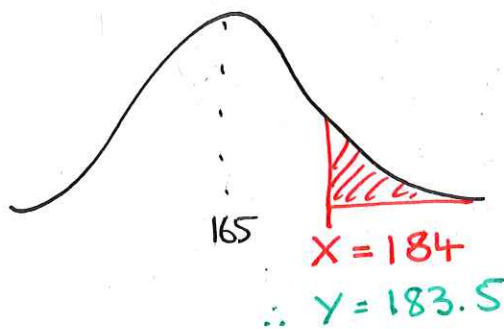
a) n is large
 p is close to 0.5

b) mean = np
variance = $np(1-p)$

c) There would be no batteries left

d) $H_0: p = 0.55$
 $H_1: p > 0.55$

e) $\mu = np = 300 \times 0.55 = 165$
 $\sigma = \sqrt{np(1-p)} = \sqrt{300(0.55)(1-0.55)} = \sqrt{74.25}$



$$P(Y > 183.5) = 0.0159$$

⑥

a)

$$\mu = 36.73$$

$$\sigma = \sqrt{0.1482}$$

$$P(X > 38.1)$$

Normal CD

lower = 38.1

upper = 100

$$= 0.000186$$

b) she should call the doctor as very unlikely the temp should be so high.