**Question 2**

X ~ N(98.2, 0.5184)

i.

P(X ≥ 99)

P( X ≥ 99) = 1- p(X < 99)

$$z= \frac{x-µ}{σ}= \frac{99-98.2}{0.5184}=1.54$$

P( X < 99) = P(Z < 1.54) = 0.9382

P(X ≥ 99) = 1- 0.9382 = 0.0681

ii.

P(Z < z) = 0.10

P(Z < -1.28) = 0.10

$$x= σ\*z+ µ$$

$x= 0.5184\*-1.28+98.2=97.54 $

iii.

W = 5/9(X-32)

X ~ N(98.2, 0.5184)

E(W) = E(5/9(X-32))

E(W) = 5/9\*E(X) – 160/9

E(W) = 36.78

Var(W) = 5/9 ^2 Var(X)

Var(W) = 0.16

W ~ (36.78, 0.16)

iv.

W ~ (36.78, 0.16)

P(36 < X < 36.8)

$$z= \frac{x- µ}{σ}$$

$$z= \frac{36.8- 36.78}{0.16}=0.13$$

$$z= \frac{36- 36.78}{0.16}=-4.88$$

P(36 < X < 36.8) = P( Z < 0.13) – P(Z < -4.88)

P(36 < X < 36.8) = 0.5517 – 0 = 0.5517

Proportion of people with body temperature between 36 ◦C and 36.8 ◦C = 0.5517

b.

A histogram is appropriate to investigate whether a normal distribution fits the data well. An approximately symmetric distribution of the observations is an indication that the data meets the assumption of normality.



Observe that the histogram displays a distribution that is symmetric about the mean. Therefore, the assumption of normality is met by the data. Normal distribution is a plausible model for these data.

C.

i.

sample distribution of sample means $µ\_{\overbar{x}} = µ and µ\_{σ}= \frac{σ}{\sqrt{n}}$

$$µ\_{\overbar{x}} = 155$$

$$µ\_{σ}=\frac{24}{6}=4$$

The sample mean weight of the 36 samples is ~ N(155,4)

ii.

P(150 < x < 157.7)

**Cumulative Distribution Function**

Normal with mean = 155 and standard deviation = 4

 x P( X ≤ x )

157.5 0.734014

**Cumulative Distribution Function**

Normal with mean = 155 and standard deviation = 4

 x P( X ≤ x )

150 0.105650

P(150 < x < 157.5) = 0.734014 - 0.105650 = 0.628364