1.

Mean= Sum of observations / Number of observations

Sum of observations =

$x + (x + 4) + (x + 6) + (x + 8) + (x + 12) = 5x + 30$

mean = (5x + 30) / 5 = 16

5x + 30 = 80

x = 10

2.

Sum of observations=Mean * Number of observations

= 38 * 40 = 1520

Corrected sum = 1520 – 36 + 56 = 1540

Corrected mean = 1540 / 40 = 38.5

3.

Z-score = X – μ / σ

Mean μ = 30 & standard deviation σ = 4

a) P(x < 40)

Z for (x = 40) = 40 – 30 / 4 = 2.5

P(z < 2.5) ≈ 0.9938 => P(x<40) ≈ 0.9938

b) P(x > 21)

Z for (x = 21) = 21 – 30 / 4 = -2.25

P(z < -2.25) ≈ 0.0122

P(x>21)= 1- P(z < -2.25) =1−0.0122=0.9878

c) $P(30 < x < 35)$

Z for (x=30) = 30 -30 / 4 = 0

$P(Z < 0) = 0.5$

Z for (x=35) = 35 – 30 / 4 = 1.25

$P(Z < 1.25) \approx 0.8944$

$P(30<x<35)=P(Z<1.25)-P(Z<0)$ = 0.8944 – 0.5 = 0.3944

4.

Mean μ=90 km/h

Standard deviation σ=10 km/h

- P(x>100)

Z for (x=100) = 100 – 90 / 10 = 1

$P(Z<1) \approx 0.8413$

$P(x>100)=1-P(Z<1)$ = 1- 0.8413 = 0.1587

5.

Mean μ=50 hours

Standard deviation σ=15 hours

- P(50<X<70)

Z for (x=50) = 50 – 50 / 15 = 0

$P(Z<0) = 0.5$

Z for (x=70) = 70 – 50 / 15 = 1.33

$P(Z<1.33) \approx 0.9082$

$P(50<X<70)=P(Z<1.33)-P(Z<0)$ = 0.9082 – 0.5 = 0.4082

6.

Mean μ=5 cm

Standard deviation σ=0.02 cm

a) P(4.98<X<5.02)

Z for (x = 4.98) = 4.98 - 5 / 0.02 = -1

Z for (x = 5.02) = 5.02 – 5 / 0.2 = 1

P(Z<−1) ≈ 0.1587 , P(Z<1) ≈ 0.8413

P(4.98<X<5.02)=P(Z<1)−P(Z<−1) = 0.8413 - 0.1587 = 0.6826

b) P(4.96<X<5.04)

Z for (x = 4.96) = 4.96 – 5 / 0.02 = -2

Z for (x =5.04) = 5.04 – 5 / 0.02 = 2

P(Z<−2) ≈ 0.0228 , P(Z<2) ≈ 0.9772

P(4.96<X<5.04) = P(Z<2)−P(Z<−2) = 0.9772 – 0.0228 = 0.9544

7.

Mean μ=20 hours

Standard deviation σ=2 hours

a) P(X<19.5)

Z for (x=19.5) = 19.5 – 20 / 2 = -0.25

P(Z<−0.25) ≈ 0.4013

b) P(20<X<22)

Z for (x=20) = 20 -20 /2 = 0

Z for (x=22) = 22 – 20 /2 = 1

$P(Z<0)=0.5$, $P(Z<1)\approx0.8413$

$P(20<X<22)=P(Z<1)-P(Z<0) = 0.8413 - 0.5 =$ 0.3413

8.

Mean $\mu=50{,}000$ dollars

Standard deviation $\sigma=20{,}000$ dollars

a) $P(X<40{,}000)$

Z for (x = 40,000) = 40.000 – 50.000 / 20.000 = -0.5

$P(Z<-0.5)\approx$0.3085 = 30.85%

b) $P(45{,}000<X<65{,}000)$

Z for (x=45.000) = 45.000 – 50.000 / 20.000 = -0.25

Z for (x=65.000) = 65.000 – 50.000 / 20.000 = 0.75

$P(Z<-0.25)\approx0.4013$, $P(Z<0.75)\approx0.7734$

$P(45{,}000<X<65{,}000)=P(Z<0.75)-P(Z<-0.25) = 0.7734 - 0.4013 =$ 0.3721 = 37.21%

c) $P(X>70{,}000)$

Z for (x=70.000) = 70.000 – 50.000 / 20.000 = 1

$P(Z<1)\approx0.8413$

$P(X>70{,}000)=1-P(Z<1)=1-0.8413=$0.1587 = 15.87%