Q2.

5 random number: 1310, 1311, 1312, 1310, 1311

$$\bar{X} = \frac{1310+1311+1312+1310+1311}{5} = \frac{6554}{5} = 1310.8$$

$$(1310-1310.8)^2+(1311-1310.8)^2+(1312-1310.8)^2+(1310-1310.8)^2$$
$$+(1311-1310.8)^2 = 2.8$$

$$\therefore S^2 = \frac{2.8}{5-1} = \frac{2.8}{4} = 0.7 \quad , \quad S \approx 0.8366$$

confidence interval:

$(80+Y)\% = 93\% \quad \therefore \quad z = 1.814$

$100\% - 93\% = 7\% \quad \therefore \quad 1.814 \cdot \left(\frac{0.8366}{\sqrt{5}}\right) \approx 0.6786$

$\frac{7}{2} = 3.5\%$ $\quad \therefore$ Confidence interval:

$100 - 3.5 = 96.5\%$ $\quad 1310.8 \pm 0.6786$

Q3. $Y=13$

$17+Y=30$ independent per page

$30-15+1=16$

$P(X=x)=\frac{1}{16}$

$E(X)=\frac{360}{16}=22.5$

$\mu=30\cdot E(X)=30\cdot 22.5=675$

$\therefore S^2=30\cdot\frac{256}{12}=640$

$S=\sqrt{640}\approx 25.30$

$\therefore Z=\frac{210-675}{25.3}\approx -18.38$

$\therefore P(Bug>210)=P(Z>-18.38)$

$\therefore P(Bug>210)\approx 100\%$

Q4.

$$1002+13=1015$$

a.

The expected value is: $E(X)=1015$

$n=14$ days

$\because$ st.dev $=5$

$\therefore 5^2=25$

$\therefore$ Variance of average is: $\frac{25}{14}\approx 1.79$

b.

$$1000+\frac{13}{2}=1006.5$$

$$S=\frac{5}{\sqrt{14}}\approx 1.336$$

$$Z=\frac{1006.5-1015}{1.336}\approx -6.362$$

$$P(Z<-6.362)\approx 0$$

c. Total $E(X)$ of per day (two weeks):

$$14\cdot E(X)=14\cdot 1015=14210$$

The total VAR: $14\cdot 5^2=14\cdot 25=350$

Q5.

$73+13=86\%$

$90+13=103$

1.

$103 \cdot 86\% = 88.58$

$$z = \frac{88.58-103}{5} = -2.884$$

$P(z \le -2.884) = 0.0020$

$P(X \le 86) = 1-0.002 = 99.8$

2. $73+13=86$

$P(X<86 \mid X>75)$

Q6.

-13 and 13

$$f_X(x) = \begin{cases} cx^2 & -13 \le x \le 13 \\ 0 & \text{otherwise} \end{cases}$$

a.

use $\int_{-\infty}^{\infty} f_X(u)\,du = 1$

$$1 = \int_{-\infty}^{\infty} f_X(u)\,du$$

$$= \int_{-13}^{13} cu^2\,du$$

$$= \frac{4394}{3}c$$

$$1 = \frac{4394}{3}c$$

$$\therefore c = \frac{3}{4394}$$

b.

$$E(X) = \int_{-13}^{13} u f_X(u)\,du$$

$$= \frac{3}{4394}\int_{-13}^{13} u^3\,du$$

$$= 0$$