1. ..

(a)

$$\Pr[(A\cap\bar{B})\cup(B\cap C)\cup(C\cap\bar{D})]=\Pr(A)\Pr(\bar{B})+\Pr(B)\Pr(C)+\Pr(C)\Pr(\bar{D})-$$
$$-\Pr(A)\Pr(\bar{B})\Pr(C)\Pr(\bar{D})-\Pr(B)\Pr(C)\Pr(\bar{D})=...$$

(b)

$$\Pr[(\bar{A}\cup B)\cap\overline{B\cup C}\cap(\bar{C}\cup D)]=1-\Pr[(A\cap\bar{B})\cup B\cup C\cup(C\cap\bar{D})]$$
$$=1-\Pr[(A\cap\bar{B})\cup B\cup C]=1-\Pr(A)\Pr(\bar{B})-\Pr(B)-\Pr(C)+$$
$$+\Pr(A)\Pr(\bar{B})\Pr(C)+\Pr(B)\Pr(C)=...$$

2.

(a)

$$\sum_{i=-1}^{2}\sum_{j=\max(1,i)}^{|i|+2}(2i^2+j+1)=71$$
$$\frac{1}{71}\sum_{i=-1}^{2}\sum_{j=\max(1,i)}^{|i|+2}i(2i^2+j+1)=\frac{72}{71}$$
$$\frac{1}{71}\sum_{i=-1}^{2}\sum_{j=\max(1,i)}^{|i|+2}j(2i^2+j+1)=\frac{182}{71}$$
$$\frac{1}{71}\sum_{i=-1}^{2}\sum_{j=\max(1,i)}^{|i|+2}(i-\frac{72}{71})(j-\frac{182}{71})(2i^2+j+1)=0.4991$$

(b)

$X \mid Y=2$	-1	1	2
Pr	$\frac{6}{24}$	$\frac{6}{24}$	$\frac{12}{24}$

$$-3\cdot\frac{6}{24}-3\cdot\frac{6}{24}+0\cdot\frac{12}{24}=-1.5$$

3.

(a) Introducing A, B and C for this happening in rolls $(1,2)$, $(2,3)$ and $(3,4)$, we get

$$\Pr(A\cup B\cup C)=\frac{1}{36}+\frac{1}{36}+\frac{1}{36}-\frac{1}{6^4}=8.256\%$$

(b) Breaking it down according to where the first 6 occured:

$$\frac{1}{6}(1-\frac{5^3}{6^3})+\frac{5}{6}\cdot\frac{1}{6}(1-\frac{5^2}{6^2})+(\frac{5}{6})^2\frac{1}{6}\cdot\frac{1}{6}=13.19\%$$

4.

(a)

$$\begin{aligned}\mu &= 1.35\\ \sigma &= 2.475\\ \text{skewness} &= 0.9212\end{aligned}$$

(b)

$$20.10$$

5.

0S, >3	$\frac{\binom{39}{3}}{\binom{52}{3}}\cdot 0=0$
1S, >3	$\frac{\binom{39}{2}\cdot 13}{\binom{52}{3}}\cdot\frac{3}{6}=\frac{741}{3400}$
2S, >3	$\frac{39\cdot\binom{13}{2}}{\binom{52}{3}}\cdot(1-\frac{3}{36})=\frac{429}{3400}$
3S, >3	$\frac{\binom{13}{3}}{\binom{52}{3}}\cdot(1-\frac{1}{6^3})=\frac{473}{36\,720}$

(a)

$$\frac{741}{3400}+\frac{429}{3400}+\frac{473}{36\,720}=35.70\%$$

(b)

$$\frac{\frac{429}{3400}+\frac{473}{36\,720}}{\frac{741}{3400}+\frac{429}{3400}+\frac{473}{36\,720}}=38.95\%$$

6. ..

(a)

$$\begin{aligned}\mu &= -0.5385 \quad \text{dollars}\\ \sigma &= 2.713 \quad \text{dollars}\end{aligned}$$

(b)

$$65.31\%$$

7.

(a)

$$-5$$
$$8.660$$

(b)

$$59.16\%$$