

QUESTION 1

(a) $P(3\text{rd})=(1-0.05)^{3-1} * 0.05=0.0451$

(b) Assume in 100 years, numbers of rupture occurs= $100*0.05=5$ times. The expected number of years until the first rupture= $100/5=20$ years

(c) $P(2 \text{ times in } 10 \text{ years})=(10!/2!*(10-2)!)*0.05^2*(1-0.05)^{10-2}=0.0746$

(d) expected number= $10*0.05=0.5$

(e) $P(1^{\text{st}} \text{ occur in one of the } 1^{\text{st}} 3 \text{ years})=(3!/1!*(3-1)!)*0.05^1*(1-0.05)^{3-1}=0.1354$

QUESTION 2

(a) $E[X] = \sum 200*0.005=1$

(b) Because of $np < 10$, this is poisson model

$$SD[X]=\sqrt{\lambda}=\sqrt{1}=1$$

(c) $np=200*0.005=1$

$$P(0 \text{ town})= (\exp(-1)*1^0)/0!=0.3679$$

$$P(1 \text{ town})=(\exp(-1)*1^1)/1!=0.3679$$

$$P(2 \text{ town})=(\exp(-1)*1^2)/2!=0.1839$$

$$P(3 \text{ town})=(\exp(-1)*1^3)/3!=0.0613$$

$$P=1-0.3679-0.3679-0.1839-0.0613=0.0190$$

QUESTION 3

(a) $E[X] = 300*0.10+500*0.30+600*0.45+800*0.15=570$

(b) $SD[X]=\sqrt{\text{Var}[X]}=\sqrt{(300 - 570)^2 * 0.10 + (500 - 570)^2 * 0.30 + (600 - 570)^2 * 0.45 + (800 - 570)^2 * 0.15} = 130.7670$

(c) i. $MWO=50X+5000$

ii. $E[MWO]=(50*300+5000)*0.10+(50*500+5000)*0.30+(50*600+5000)*0.45+(50*800+5000)*0.15=33500$

iii. $SD[MWO]=\sqrt{Var[MWO]}= \sqrt{(300*50+5000-33500)^2*0.10 +(500*50+5000-33500)^2*0.30 +(600*50+5000-33500)^2*0.45+(800*50+5000-33500)^2*0.15}=6538.3484$

iv. $CV= SD[MWO]/ E[MWO]= 6538.3484/33500=0.1952$

(d).

i. Expected value= $(50*300+5000)*2.50*0.10+(50*500+5000)*2.50*0.30+(50*600+5000)*2.50*0.45+(50*800+5000)*2.50*0.15=83750$

ii. Standard deviation= $2.5* SD[MWO]=2.5*6538.3484=16345.8710$

iii. Coefficient of variation= Standard deviation/ Expected value= $16345.8710/83750=0.1952$

Beware of Academic Fraud

Academic fraud is an act committed by a student to distort the marking of assignments, tests, examinations and other forms of academic evaluation. Academic fraud is neither accepted nor tolerated by the University. Anyone found guilty of academic fraud is liable to severe academic sanctions.

Here are a few examples of academic fraud:

- engaging in any form of plagiarism or cheating;
- presenting falsified research data;
- handing in an assignment that was not authored, in whole or in part, by the student;
- submitting the same assignment in more than one course, without the written consent of the professors concerned

In recent years, the development of the Internet has made it much easier to identify academic plagiarism. The tools available to your professors allow them to trace the exact origin of a text on the Web, using just a few words.

In cases where students are unsure whether they are at fault, it is their responsibility to consult the University's Web site at the following address, where you will find resources, tips and tools for writing papers and assignments:

<http://web5.uottawa.ca/mcs-smc/academicintegrity/home.php>

Persons who have committed or attempted to commit (or have been accomplices to) academic fraud will be penalized. Here are some examples of the academic sanctions, which can be imposed:

- a grade of “F” for the assignment or course in question;
- an additional program requirement of between three and thirty credits;
- suspension or expulsion from the School.

Please be advised that professors have been formally advised to report every suspected case of academic fraud. In most cases of a first offence of academic fraud, the sanction applied to students who have been found guilty is an “F” for the course with an additional three credits added to their program requirements. Repeat offenders are normally expelled from the School of Management.

Finally, the Telfer School of Management asks that students sign and submit with their deliverables the Personal Ethics Agreement form. Two versions of this form exist: one for individual assignments, and one for group submissions. **Assignments will not be accepted or marked if this form is not submitted and signed by all authors of the work.** We hope that by making this personal commitment, all students will understand the importance the School places on maintaining the highest standards of academic integrity.
