

i.i 4, 7, 9, 9, 11, 15, 18, 18, 18, 21

$$\bar{x} = \frac{4+7+9+9+11+15+18+18+18+21}{10}$$

$$= 13.4$$

Median

$$n = 10$$

$$\therefore \text{Median} = \frac{n}{2} = \frac{10}{2} = 5^{\text{th}} \text{ term}$$

$$\therefore \text{Median} = \frac{\left(\frac{n}{2} + \frac{n}{2} + 1\right)^{\text{th}} \text{ term}}{2}$$

$$= \frac{11 + 15}{2} = 13$$

$$\text{Mode} = 18$$

Std Deviation

4	1	-9.4	88.36	88.36
7	1	-6.4	40.96	40.96
9	2	-4.4	19.36	38.72
11	1	-2.4	5.76	5.76
15	1	1.6	2.56	2.56
18	3	4.6	21.16	63.48
21	1	7.6	57.76	57.76
				297.60

$$\sigma = \sqrt{\frac{297.60}{10}} = 5.455272679$$

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x	f	f_n	$c.f$	$(x - \bar{x})$	$(x - \bar{x})^2$	$f(x - \bar{x})^2$	$f(x - \bar{x})^3$
0	5	0	5	-2	4	-10	20
1	11	11	16	-1	1	-11	11
2	26	52	42	0	0	0	0
3	15	67	57	1	1	15	15
4	3	70	60	2	4	12	24
	<u>60</u>	<u>120</u>				<u>62</u>	<u>58</u>

$$\bar{x} = \frac{\sum fx}{\sum f} = \frac{120}{60} = 2$$

$$\text{Median} = \left(\frac{n}{2} + \frac{n+1}{2} \right)^{\text{th}} \text{ term}$$

$$= \frac{30^{\text{th}} + 31^{\text{th}}}{2} \text{ term}$$

$$= \frac{2+2}{2} = \underline{2}$$

$$\text{Mode} = \underline{2} \quad (26 \text{ times})$$

$$\text{Std } \sigma = \sqrt{\frac{58}{60}} = \underline{0.98314208}$$

2. $P(X=0)$ $X \sim \text{Poisson}(0.5) = 0.60653$

ii. $Y = \text{no. of years with a claim}$
 then $Y \sim \text{binomial}(3, 0.3935)$
 $P(Y=1) = 3(0.3935)(0.6065)^2$
 $= 0.434$

iii. $\{P(X=0)\}^2 = 0.60653^2$
 $= 0.368$

3. i. $\text{Mean} = 2 \times \frac{1}{2} = 1$

$\sigma = \sqrt{\text{Var}} = \sqrt{2 \times \left(\frac{1}{2}\right)^2} = \sqrt{\frac{2}{4}} = \sqrt{\frac{1}{2}} = 0.7071$

ii. Positively skewed

iii.

$$4. \quad P(M) = \frac{10}{18} = \frac{5}{9}$$

$$P(F) = \frac{8}{18} = \frac{4}{9}$$

$$P(A \cap M) = \frac{6}{18} = \frac{1}{3}$$

$$P(A \cap F) = \frac{7}{18}$$

$$= \frac{7/18}{4/9} = \frac{7}{18} \times \frac{9}{4} = \frac{7}{8}$$

$$P(1) = \frac{2}{5} \quad P(2) = \frac{1}{2} \quad P(3) = \frac{1}{10}$$

$$P(L/1) = \frac{1}{5} \quad P(L/2) = \frac{2}{5} \quad P(L/3) = \frac{1}{10}$$

$$P(2/L) = \frac{1}{2} \times \frac{2}{5} = \frac{1}{5}$$

$$\frac{2}{5} \times \frac{1}{5} + \frac{1}{2} \times \frac{2}{5} + \frac{1}{10} \times \frac{1}{10}$$

$$= \frac{1}{5} = \frac{1}{5} \times \frac{100}{29} = \frac{20}{29}$$

$$X \sim U(1, 2) \quad Y = \frac{3}{6-X}$$

pdf

$$\therefore Y = \frac{3}{6-1}, \frac{3}{6-2}$$
$$= \frac{3}{5}, \frac{3}{4}$$

$$\therefore pdf = \frac{1}{\frac{3}{5} - \frac{3}{4}} = -\frac{20}{3}$$

7. i $f(3) = 0.35$

ii $E(x) = \frac{5+1}{2} = 3$

iii $V(x) = E(x^2) - [E(x)]^2 = \frac{5^2 - 1}{12} = 2$

8

9

10

11

12.
$$\frac{e^{-\lambda} \lambda^x}{x!} = \frac{e^{-0.1} 0.1^{10}}{10!}$$

$$= \frac{0.904837418 \times 0.1^{10}}{3628800}$$

$$= 2.493489357 \times 10^{-17}$$

13.
$$\frac{80-75}{120-25} + \frac{100-75}{120-75}$$

$$\frac{5}{45} + \frac{25}{45}$$

$$\frac{30}{45} = \frac{2}{3}$$

$$X \sim G(5, 0.4)$$

$$\lambda^x e^{-\lambda x} \frac{x^{\lambda-1}}{\Gamma(\lambda)}$$

$$P(X < 22.89)$$

$$0.4^5 e^{-0.4 \cdot 22.89}$$

$$\frac{4!}{22.89^4}$$

$$0.01024 e^{-9.156}$$

$$\frac{24}{274525.8031}$$

$$0.012367206$$

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