Date

Group 3

1. Heng Xing Yu A21EC0183
2. Gan Jia Hui A21EC0177
3. Tan Kai Yuan A21EC0230
4. Sondos Tamer Mustafa A21EC0277

Tan Kai Yuan

A21EC0230

Question 1

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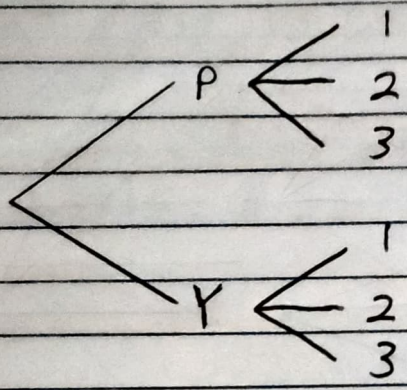
1 a) $S = \{(P,1), (P,2), (P,3), (P,4), (G,1), (G,2), (G,3), (G,4), (Y,1), (Y,2), (Y,3), (Y,4)\}$

b)



c) $P2 = \frac{1}{3} \times \frac{1}{4}$

$= \frac{1}{12}$

$= 0.0833$

2. a) i. $P(S) = \frac{8}{25}$

$= 0.32$

ii. $P(X) = \frac{10}{25}$

$= \frac{2}{5}$

$= 0.4$

$P(S \cup X)' = \frac{10}{25}$

$= \frac{2}{5}$

$= 0.4$

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b) $S \cup X = 25 - 10$
$= 15$

c) $S \cap X = (10 + 8) - 15$
$= 18 - 15$
$= 3$

d) $S = 8 - 3$
$= 5$

3. a) $P(B) = \frac{8}{30}$
$= \frac{4}{15}$
$= 0.2667$

b) $P(M|B) = \frac{\frac{3}{30}}{\frac{4}{15}}$
$= \frac{3}{8}$
$= 0.375$

c) $P(M \cup B) = \frac{12}{30} + \frac{8}{30} - \frac{3}{30}$
$= \frac{17}{30}$
$= 0.5667$

Question 2

Heng Xing Yu

1.a) $P(x=2) = 3/8 = 0.3750$

b) $P(x \geq 2) = P(x=2) + P(x=3)$

$= 3/8 + 1/8$

$= 4/8$

$= \frac{1}{2}$

$= 0.5000$

c) $P(x \leq 2) = P(x=0) + P(x=1) + P(x=2)$

$= 1/8 + 3/8 + 3/8$

$= 7/8$

$= 0.8750$

d) $P(x=0) + P(x=3) = 1/8 + 1/8$

$= 2/8$

$= 1/4$

$= 0.2500$

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2)a) $P(X \geq 10) = 0.05 + 0.12 + 0.06$

$= 0.2300$

b. $P(X > 10) = 0.12 + 0.06$

$= 0.1800$

c. $P(X < 4) = 0.11 + 0.07$

$= 0.1800$

d. $P(4 \leq X \leq 9) = 0.13 + 0.28 + 0.18$

$= 0.5900$

e. $P(3 < X < 10) = 0.13 + 0.28 + 0.18$

$= 0.5900$

f. $P(7 < X < 9) = 0.0000$

3a) $P(X \geq 1) = 1 - P(X = 0)$

$= 1 - 0.05$

$= 0.9500$

b) $P(X \geq 3) = 0.25 + 0.15 + 0.1 + 0.05$

$= 0.5500$

c) $P(X \leq 5) = 1 - P(X = 6)$

$= 1 - 0.05$

$= 0.9500$

d) $P(2 \leq X \leq 4) = 0.3 + 0.25 + 0.15$

$= 0.7000$

e) $P(X = 0) + P(X = 2) + P(X = 4) + P(X = 6) = 0.05 + 0.3 + 0.15 + 0.05$

$= 0.5500$

Sondos Tamer Moustafa A21EC0277 Section: 9

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Q3 Binomial

1. a. i. 1/50 $n = 50, p = 0.02$

ii. P(rejected) $P(X>1) = 1 - P(X \leq 1)$

$= 1 - [P(X=0) + P(X=1)]$

$= 1 - [({}^{50}C_0 \times 0.02^0 \times (1-0.02)^{50-0}) + ({}^{50}C_1 \times (0.02)^1 \times (1-0.02)^{50-1})]$

$= 1 - [0.364 + 0.371]$

$= 0.261$ //

$\lambda = 20$

b. $X \sim P_0(20) \rightarrow P(X \geq 3)$

$= 1 - P(X \leq 2)$

$= 1 - 0.0000 \rightarrow$ from tabel

$= 1$ //

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2. a. $P(\text{folding bike}) = 0.60$ $\quad n = 12$

$P(\text{mountain bike}) = 0.40$

$$P(X=4) = {}^{12}C_4 \times 0.60^4 \times (1-0.60)^{12-4}$$

$$= 0.0420 //$$

b. $P(4 \leq X \leq 7)$

$$P(X=4) + P(X=5) + P(X=6) + P(X=7)$$

$$\left({}^{12}C_4 \times 0.60^4 \times (1-0.60)^{12-4}\right) + \left({}^{12}C_5 \times 0.60^5 \times (1-0.60)^{12-5}\right) +$$

$$\left({}^{12}C_6 \times 0.60^6 \times (1-0.60)^{12-6}\right) + \left({}^{12}C_7 \times 0.60^7 \times (1-0.60)^{12-7}\right)$$

$$= 0.5466 //$$

c. $P(X=2)$ $\quad P = 0.40$

$$= {}^{12}C_2 \times (0.4)^2 \times (1-0.4)^{12-2}$$

$$= 0.0639 //$$

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3.a. binomial $n = 15$ $p = 0.25$

$P(3 \le x \le 6) = P(x=3) + P(x=4) + P(x=5) + P(x=6)$

$= ({}^{15}C_3 \times 0.25^3 \times (1-0.25)^{15-3}) + ({}^{15}C_4 \times 0.25^4 \times (1-0.25)^{15-4}) +$
$({}^{15}C_5 \times 0.25^5 \times (1-0.25)^{15-5}) + ({}^{15}C_6 \times 0.25^6 \times (1-0.25)^{15-6})$

$= 0.7073$ //

b. $P(x<4) = P(x=3) + P(x=2) + P(x=1) + P(x=0)$

$= ({}^{15}C_3 \times 0.25^3 \times (1-0.25)^{15-3}) + ({}^{15}C_2 \times 0.25^2 \times (1-0.25)^{15-2})$
$+ ({}^{15}C_1 \times 0.25^1 \times (1-0.25)^{15-1}) + ({}^{15}C_0 \times 0.25^0 \times (1-0.25)^{15-0})$

$= 0.4613$ //

c. $P(x>5) = 1 - P(x \le 5)$

$= 1 - [P(x=4) + P(x=3) + P(x=2) + P(x=1) + P(x=0)$
$+ P(x=5)]$

$= 1 - [({}^{15}C_4 \times 0.25^4 \times (1-0.25)^{15-4}) + ({}^{15}C_3 \times 0.25^3 \times (1-0.25)^{15-3})$
$+ ({}^{15}C_2 \times 0.25^2 \times (1-0.25)^{15-2}) + ({}^{15}C_1 \times 0.25^1 \times (1-0.25)^{15-1})$
$+ ({}^{15}C_0 \times 0.25^0 \times (1-0.25)^{15-0}) + ({}^{15}C_5 \times 0.25^5 \times (1-0.25)^{15-5})]$

$= 1 - 0.8516 = 0.1484$ //

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Question 4

Heng Xing Yu

1a) $P(x=3) = (0.80)^{3-1}(0.20)$

$= 0.1280$

b) $P(x=7) = {}^{7-1}C_{3-1}(0.2)^3(0.8)^4$

$= 0.0492$

c) $\mu = \frac{1}{p}$

$= \frac{1}{0.20}$

$= 5$

$\sigma^2 = \frac{(1-p)}{p^2}$

$= \frac{1-0.20}{0.20^2}$

$= 20$

2a) It is Geometry Experiment. It is because not sure how many of the number of other participants and it looks infinite for the other participant. We need to ask them until the first participant who brings the charger appears.

b) X is a random variable with probability of success to find a participant who brings the laptop charger for each trial.

c) $P(X=1) = (1-0.40)^{1-1}(0.40)^1$

$= 0.40$

d) $P(X=1) = 0.40$

$P(X=2) = (1-0.40)^{2-1}(0.40)$

$= 0.24$

$P(X=3) = (1-0.40)^{3-1}(0.40)$

$= 0.144$

$P(X \leq 3) = 0.40 + 0.24 + 0.144 = 0.784$

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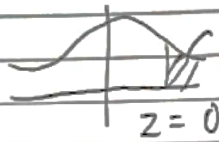
Name : Gan Jia Hui
Matric no: A21EC0177
Section : 09

1. a) $P(x=178) = P(z = \frac{178-163}{8})$ $P(x=178) = 0.0301 \times 100$
$= 3.01\%$ ✱

$= P(z = 1.88)$
$= 0.0301$

b) $5000 \times 0.0301 = 151$ ppl ✱

c) 

$0.95 = \frac{x-163}{8}$

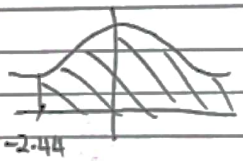
$x = 170.6$ cm ✱

2. a) $P(x=30) = {}^{180}C_{30}\,(0.21)^{30}(0.79)^{150} = 0.0271$ ✱

b) $P(30<x<35) = P(30)+P(31)+P(32)+P(33)+P(34)+P(35)$
$= {}^{180}C_{30}\,(0.21)^{30}(0.79)^{150} +$
${}^{180}C_{31}\,(0.21)^{31}(0.79)^{149} +$
${}^{180}C_{32}\,(0.21)^{32}(0.79)^{148} +$
${}^{180}C_{33}\,(0.21)^{33}(0.79)^{147} +$
${}^{180}C_{34}\,(0.21)^{34}(0.79)^{146} +$
${}^{180}C_{35}\,(0.21)^{35}(0.79)^{145} +$
$= 0.0271 + 0.0349 + 0.0432 + 0.0514 + 0.0591 + 0.0656$
$= 0.2813$ ✱

c) Mean, $\mu = np$ Std, $\sigma = \sqrt{npq}$
$= (180)(0.21)$ $= \sqrt{(180)(0.21)(0.79)}$ $N(37.8, 5.46)$
$= 37.8$ $= 5.46$

$P(x \geq 25) = P(x \geq 25 - 0.5)$
$= P(z > \frac{24.5-37.8}{5.46})$
$= P(z > -2.44)$
$= 1 - 0.0073$
$= 0.9927$ ✱



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d) $P(x \leq 28) = P(x \leq 28+0.5)$

$= P\left(z \leq \frac{28.5-37.8}{5.46}\right)$

$= P(z \leq -1.70)$

$= 0.0446$ ✱

3.9)

$P(X>5) = P\left(z > \frac{5-2.50}{0.83}\right)$

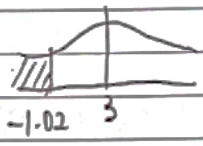
$= P(z > 3.01)$ ✱

b) $P(X>5) = P\left(z > \frac{5-2.50}{0.83}\right)$

$= P(z > 3.01)$

$= 0.0013$ ✱

c) $P(X<1.47) = P\left(z < \frac{1.47-3}{1.50}\right)$



$= P(z < -1.02)$

$= 0.1539$

$= 15.39\%$