10E P. 511
1-2

① $X \sim B(8, 0.4)$

a.) $P(X=5) = \binom{8}{5}(0.4)^5(0.6)^3 = \boxed{0.124}$

b.) $P(x \le 5) = \sum_{x=0}^{5} \binom{8}{x}(0.4)^x(0.6)^{8-x} = \boxed{0.950}$

c.) $P(x<5) = P(x \le 5) - P(x=5) = 0.950 - 0.124 = \boxed{0.826}$

d.) $\mu = E(X) = np = 8 \cdot 0.4 = 0.32$

x	$P(X=x)$	$x \cdot P(X=x)$	$x^2 \cdot P(X=x)$
0	0.01680	0	0
1	0.08958	0.08958	0.08958
2	0.20902	0.41804	0.83608
3	0.27870	0.83608	2.5082
4	0.23224	0.92897	3.7159
5	0.12386	0.61932	3.0966
6	0.04129	0.24773	1.4864
7	0.00786	0.05505	0.38535
8	0.00066	0.00524	0.04194
	1	$E(X) = 3.2$	$E(X^2) = 12.16$

d.) $E(X) = np = \boxed{3.2}$

c.) $E(x^2) = npq = \boxed{1.92}$

$Var(X) = 12.16 - 3.2^2 = 1.92$

② $Y \sim B(7, 0.3)$

a.) $P(Y=1) + P(Y=2) = \binom{7}{1}(0.3)^1(0.7)^6 + \binom{7}{2}(0.3)^2(0.7)^5$

$= 0.24706 + 0.31765 = \boxed{0.56472}$

b.) $P(Y \le 2) = 0.56472 + P(0)$

$= 0.56472 + \binom{7}{0}(0.3)^0(0.7)^7$

$= 0.56472 + 0.0823543 = \boxed{0.64707}$

c.) $P(Y \ge 2) = P(0 \le Y \le 7) - P(0) - P(1)$

$= 1 - 0.085235 - 0.24706 = \boxed{0.67058}$

d.) $\boxed{\text{MEDIAN} = 2}$

10E P. 511 #3, 5

(3) $T \sim B(5, \frac{1}{2})$

a.) $P(T=5) = \binom{5}{5}\left(\frac{1}{2}\right)^5\left(\frac{1}{2}\right)^0 = 1 \cdot \frac{1}{32} \cdot 1 = \boxed{\frac{1}{32}}$

b.)

t	0	1	2	3	4	5
$P(T=t)$	0.03125	0.15625	0.3125	0.3125	0.15625	0.03125
$F(t)$	0.03125	0.1875	0.5	0.8125	0.96875	1

BIMODAL $\Rightarrow$ $T = 2$ or 3

c.) SEE $F(t)$ ABOVE

d.) MEDIAN $= \frac{2+3}{2} = \boxed{2.5}$

(5) $R \sim B(n, p)$

MEAN $= E(X) = \mu = np = 2$

VARIANCE $= Var(X) = npq = np(1-p) = 1.5$

$n = \frac{2}{p}$ SUBSTITUTE $\frac{2}{p} \cdot p(1-p) = 1.5$

$2 - 2p = 1.5$

$2p = 0.5$

$\boxed{p = \frac{1}{4} \quad n = 8}$

(OE P.512 #7

(7) $L_1 \sim B(10, 0.18)$

a.) $P(L_1 = 2) = \binom{10}{2}(0.18)^2(0.82)^8 = \boxed{0.298}$

b.) $P(L_1 \geq 1) = 1 - P(L_1 = 0) = 1 - \binom{10}{0}(0.18)^0(0.82)^{10} = \boxed{0.863}$

c.) FROM TABLE GDC

ℓ	0	1	2
$P(L=\ell)$	0.13745	0.30172	0.29804
		MODE	

$L_2 \sim B(25, 0.18)$

d.) $E(L) = np = 25 \cdot 0.18 = \boxed{4.5}$

e.) $Var(L) = npq = 25 \cdot 0.18 \cdot 0.82 = \boxed{3.69}$

$L_3 \sim B(n, 0.18)$

f.) $P(L_3 \geq 2) \geq 0.95 \implies P(L_3 = 0) + P(L_3 = 1) < 0.05$

$P(L_3 = 0) = \binom{n}{0}(0.18)^0(0.82)^n$

$P(L_3 = 1) = \binom{n}{1}(0.18)^1(0.82)^{n-1}$

$0.82^n + 0.18n(0.82)^{n-1} = 0.82^{n-1}(0.82 + 0.18n)$

$0.82^{n-1}(0.82 + 0.18n) < 0.05$

FROM GDC

n	$f(n)$
23	0.01301
24	0.00354
25	−0.0046 ↓

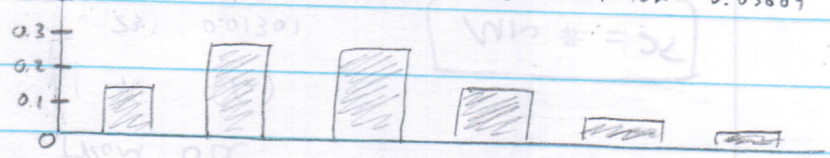
MIN # = 25

$X \sim Po(m)$ $\quad f(x) = P(X=x) = \frac{e^{-m} m^x}{x!}$ (PDF)

$F(x) = P(X \leq x) = \sum_{t=0}^{x} \frac{e^{-m} m^t}{t!}$

EX. 13 P. 514 $\quad X \sim Po(2) \quad P(X=x) = \frac{e^{-2} \cdot 2^x}{x!}$

x	0	1	2	3	4	5
$P(X=x)$	0.1353	0.2707	0.2707	01805	0.0902	0.03609



EX. 14 P. 514

$X \sim Po(m)$ AND $P(X=0) = 0.2$

a.) $0.2 = \frac{e^{-m} \cdot m^0}{0!}$

$0.2 = e^{-m}$

$\ln 0.2 = -m$

$m = -\ln 0.2$ or 1.61

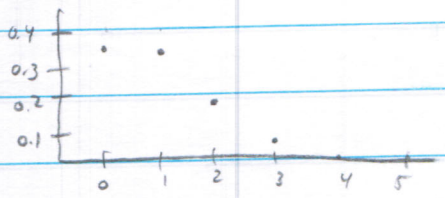
b.) $P(X \leq 4) = \sum_{x=0}^{4} \frac{e^{\ln 0.2} \cdot \ln 0.2^x}{x!}$

$= 0.976$

of P. 514
1, 2

① $X \sim P_o(1)$

x	0	1	2	3	4	5
$P(X=x)$	0.36788	0.36788	0.18394	0.06131	0.01533	0.00307



$X \sim P_o(3)$

x	0	1	2	3	4	5
$P(X=x)$	0.04979	0.14936	0.22404	0.22404	0.16803	0.10082

$X \sim P_o(5)$

x	0	1	2	3	4	5
$P(X=x)$	0.00674	0.03369	0.08422	0.14034	0.17547	0.17547

② $Y \sim P_o(3)$

a.) $P(Y=3) = \frac{e^{-3} \cdot 3^3}{3!} = \boxed{0.2240}$

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

$= 0.0498 + 0.1494 + 0.2240$ (FROM #1 ABOVE)

$= \boxed{0.4232}$

c.) $P(Y>3) = 1 - P(Y<3) - P(Y=3)$

$= 1 - 0.4232 - 0.2240$

$= \boxed{0.3528}$

d.) $P(Y=4 \mid Y>3) = \frac{P(Y=4)}{P(Y>3)} = \frac{0.1680}{0.3528} = \boxed{0.4763}$

EX. 15 P.

a.) $X \sim P_o(0.5)$

$P(X=2) = \frac{e^{-0.5} \cdot .05^2}{2!}$

$= \boxed{0.0758}$

b.) $P(X \geq 2) = 1 - P(X<2)$

$= 1 - P(X=0) - P(X=1)$

$= 1 - 0.6065 - 0.3033$

$= \boxed{0.0902}$

10S P. 516 #1, 2

(1) a.) $P(X=2) = \frac{e^{-0.7} \cdot 0.7^2}{2!} = \boxed{0.1217}$

b.) $P(X \geq 2) = 1 - P(X=0) - P(X=1)$

$= 1 - \frac{e^{-0.7} \cdot 0.7^0}{0!} - \frac{e^{-0.7} \cdot 0.7^1}{1!}$

$= 1 - 0.4966 - 0.3476 = \boxed{0.1558}$

(2) a.) $P(X \geq 4) = 1 - P(X<4)$

$= 1 - P(X=0) - P(X=1) - P(X=2) - P(X=3)$

$= 1 - 0.0499 - 0.1494 - 0.2240 - 0.2240 = \boxed{0.3527}$

b.) $P(X \leq 2) = P(X=0) + P(X=1) + P(X=2)$

$= \boxed{0.4233}$

(3) $0.1 = \frac{e^{-m} \cdot m^1}{1!}$

$e^m = 10m$

$\boxed{m \approx 3.5771529}$ CALC SOLVE / GUESS N CHECK