

3-0235 — 50 SHEETS — 5 SQUARES  
 3-0236 — 100 SHEETS — 5 SQUARES  
 3-0237 — 200 SHEETS — 5 SQUARES  
 3-0137 — 200 SHEETS — FILLER

COMET

5) B-3.9)  $X$  = WAITING TIME  $A$  = FIND TAXI OR BUS AFTER 5 MIN  
 $Y$  = ~~Time~~  $Z$  = TAXI AFTER  $< 5$  MIN

$P(\text{TAXI TIME} > 5 \text{ MIN}) = 1/2$

$P(A) = \frac{2}{3} + \frac{1}{3} \cdot \frac{1}{2} = \frac{5}{6}$

$P_Y(y) = \begin{cases} \frac{2}{3P(A)} & \text{if } y=0 \\ \frac{1}{6P(A)} & \text{if } y=5 \end{cases} \quad \text{or} \quad \begin{cases} \frac{12}{15} & y=0 \\ \frac{2}{15} & y=5 \end{cases}$

$P_Y(0) = \frac{P(y=0)}{P(A)} = \frac{2}{3P(A)} = \frac{12}{15}$

$P_Y(5) = \frac{1}{15}$

$f_Z(z) = \begin{cases} 1/5 & 0 \leq z \leq 5 \\ 0 & \text{else} \end{cases}$

$F_X(x) = P(A)F_Y(x) + (1-P(A))F_Z(x)$

$$F_X(x) = \begin{cases} 0 & x < 0 \\ \frac{5}{6} \cdot \frac{12}{15} + \frac{1}{6} \cdot \frac{x}{5} & 0 \leq x \leq 5 \\ 1 & 5 \leq x \end{cases}$$

$E(X) = P(A)E(Y) + (1-P(A))E(Z) = \frac{5}{6} \cdot \frac{3}{5} \cdot 5 + \frac{1}{6} \cdot \frac{5}{2} = \frac{15}{12}$

6) B-3.10)  $U \in [0,1]$   $u = \begin{cases} 1 & x=0 \\ 0 & x=1 \end{cases}$   $F_X(x) = u$   $S = \{x | 0 < F_X(x) < 1\}$

a)  $X \leq x$  iff  $F(X) \leq F(x)$   
 $P(X \leq x) = P(F(X) \leq F(x)) = P(U \leq F(x)) = F(x)$  since  $U$  is UNIFORM

b)  $F(x) = 1 - e^{-\lambda x}$   $x \geq 0$   $u \in (0,1)$   $1 - e^{-\lambda x} = u \Rightarrow x = \frac{\ln(1-u)}{-\lambda} = \frac{-\ln(1-u)}{\lambda}$

c) FOR EACH  $u \in (0,1)$  THERE IS  $x_u$  s.t.  $F(x_{u-1}) < u < F(x_u)$


FOR ALL INTEGERS  $k$ :

$P(X=k) = P(F(k-1) < U < F(k)) = F(k) - F(k-1)$

- MATLAB: SEE MATLAB PROBLEM #6 ON <sup>PREV</sup> NEXT PAGE

7) B-3.11)  $X = \begin{matrix} \text{triangle} \\ 0 \end{matrix}$   $\text{var}=1$   $Y = \begin{matrix} \text{triangle} \\ -1/3 \end{matrix}$   $\text{var}=4$   $\sigma=2$

a) Find  $P(X \leq 1.5)$  &  $P(X \leq 1)$   
 $P(X \leq 1.5) = \sigma=1 \Rightarrow \Phi(1.5) = .9332$   
 $P(X \leq 1) = 1 - \Phi(1) = 1 - .8413 = .1587$   
 $\Phi(0) - \Phi(1) = .5 - .1587$

b) PDF of  $(Y-1)/2$  = STANDARD NORMAL = 

c)  $P(-1 \leq Y \leq 1) = \Phi(0) - [1 - \Phi(1)] = .5 - .1587 = .3413$