Department of Mathematics
MTL 601 (Probability and Statistics)
Tutorial Sheet 2
Answers to selected problems

4. Minimal sigma field $= \{\phi, \{a,b,c\}, \{d\}, \Omega\}$.

8. 11.

9. $P(X=i) = \binom{5}{i} \frac{1}{10}^{i} \frac{9}{10}^{5-i}$

29. $f_X(x) = 4x+1, \quad for\ x \in (0,1/2)$
$P(X > 1/2) = 0, \quad P(1/4 < x < 1/2) = 5/8, \quad P(X < 1/2 | X > 1/4) = 1$

32. $P(X=x) = \frac{\binom{n-x}{m-1}}{\binom{n}{m}}, \quad for\ x = 1,2,3,\ldots,n-m+1$
$P(X \geq 3/2) = \frac{n-m}{n}$.

33. $F_2(x) = \begin{cases} \frac{2x}{r^2}, & 0 < x < r \\ 0, & \text{elsewhere} \end{cases}$

37. $F_1(x) = \begin{cases} 0, & x < 0 \\ \frac{1}{4}, & 0 \leq x < 1 \\ 1, & x \geq 1 \end{cases}$ and

$F_2(x) = \begin{cases} 0, & x < 0 \\ x, & 0 \leq x < 1 \\ 1, & x \geq 1 \end{cases}$

$\alpha = \frac{2}{3}$ and $P(1/2 \leq X \leq 1 | X > 1/4) = \frac{2}{3}$.

39. (i) $\frac{1}{b\sqrt{2\pi}} e^{-\frac{(y-a)^2}{2b^2}}, \quad -\infty < y < \infty.$
(ii) $\frac{1}{\sqrt{2\pi}} e^{-\frac{e^{2y}}{2}} . e^{y}, \quad -\infty < y < \infty.$
(iii) $\frac{1}{\sqrt{2zpi}} e^{-z/2}, \quad 0 < z < \infty.$