2.3 n 40

a) if they are distinguishable you have 12! possible chain. Then you must divide ~~for~~ by 3! for the A's, 3! for the B's .. So you get that the number is

$$\frac{12!}{(3!)^4} = 369600$$

b) The number of sequence of the kind requested is 4! so that the probability is

$$\frac{24}{369600}$$

2.4 n 50

a) 0.05

b) 0.05 + 0.07 = 0.12

c) short: 0.56 long: 0.44

d) Medium: 0.49 Print: 0.25

e) short, Plaid, Medium ~~P~~: 0.08
short, Plaid : 0.17

$$P(M \mid Sh, Pl) = \frac{0.08}{0.15} =$$

f) Sh, M, Pl : 0.08
~~Sh~~, M, Pl : 0.10

M Pl : 0.18

$P(Lo \mid M, Pl) = \frac{0.10}{0.18}$ $P(Sh \mid M, Pl) = \frac{0.08}{0.18}$

2.5 n 78

The system work if

(3 works & 4 works) or (at least 1 between 1, 2 work)

P(at least 1 between 1 & 2 works) =

$0.9 \cdot 0.9 +$ both works

or

$2 \cdot 0.9 \cdot 0.1 =$ only 1 works

0.99

~~Prob system works = 0.9 · 0.9~~

Prob 3 and 4 work = $0.9 \cdot 0.9 = 0.81$

Finally we have prob system works:

$= 0.81 \cdot 0.99 +$ (3 and 4 works) and (1 or 2 work)

$+ 0.81 \cdot 0.01 +$ (3 and 4 work) (1 or 2 do not work)

$0.19 \cdot 0.99 +$ (3 and 4 do not work) (1 or 2 work)

Equivalently

Prob $= 1 -$ Prob ((1 or 2 do not work) and (3 and 4 do not work)) $=$

$1 - 0.01 \cdot 0.18 = 1 - 0.0018$

3.2 n 20

p.d.f.

$P(Y=0) = P(\{W, W\}) = 0.3^2 = 0.09$

$P(Y=1) = P(\{W, Th\}, \{Th, W\} + \{Th, Th\}) = 2 \cdot 0.4 \cdot 0.3 + 0.4^2 = 0.40$

$P(Y=2) = P(\{W, Fr\}, \{Th, Fr\}, \{Fr, Fr\}, \{Fr, Th\}, \{Fr, W\}) =$

$= 2 \cdot 0.2 \cdot 0.3 + 2 \cdot 0.2 \cdot 0.4 + 0.2^2 =$

$= 0.32$

$P(Y=3) = 1 - 0.09 - 0.40 - 0.32 = 0.19$

Alternatively compute c.d.f.

$F(0) = P(\leq 0) = 0.09$

$F(1) = P(Y \leq 1) =$ P(1st arrive $\{W, Th\}$ and 2nd arrive $\{W, Th\}$) $=$

$(0.3 + 0.4)^2 = 0.49$

$F(2) = P(Y \leq 2) = (0.3 + 0.4 + 0.2)^2 = 0.81$

$F(3) = P(Y \leq 3) = 1$

So that

$P(Y=0) = P(Y \leq 0) = 0.09$

$P(Y=1) = P(Y \leq 1) - P(Y \leq 0) = F(1) - F(0) = 0.40$

$P(Y=2) = F(2) - F(1) = 0.32$

$P(Y=3) = F(3) - F(2) = 0.19$