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Question 1.

1a. sample space = {BF, LF, BW, LW}

1b. P[W] = 1 – P[L ∩ F] – P[B ∩ F] = 1 – 0.5 – 0.2 = 0.3

P[B] = P[B ∩ F] + P[B ∩ W] = 0.2 + 0.2 = 0.4

P[W ꓴ B] = P[W] + P[B] – P[B ∩ W] = 0.3 +0.4 – 0.2 = 0.5

Question 2

2a. sample space = {HF, MF, HW, MW}

2b. P[W] = 1- P[F] = 1 – 0.5 = 0.5

P[M ∩ F] = P[F] – P[H ∩ F] = 0.5 – 0.2 = 0.3

P[H] = 1 – P[M ∩ F] – P[M ∩ W] = 1 – 0.3 – 0.1 = 0.6

Question 3

3a. P[A] = P[9] + P[10] =

3b. P[F] = P[0] + P[1] + P[2] + P[3] =

Question 4

4a. P[H0] = P[LH0] + P[BH0] = 0.1 + 0.4 = 0.5

4b. P[B] = P[BH0] + P[BH1] + P[BH2] = 0.4 + 0.1 + 0.1 = 0.6

4c. P[L U H2] = P[LH0] + P[LH1] + P[LH2] + P[BH2] = 0.1 + 0.1 + 0.2 + 0.1 = 0.5

Question 5

5a. P[R3 | G1] = P[R3G1] / P[G1] =

5b. P[R6 | G3] = P[R6G3] / P [G3] =

5c. P[G3 | E] = P[G3E] / P[E] =

5d. P[E | G3] = P[EG3] / P[G3] =

Question 6

6a P[E2 | E1] = P[E2E1] / P[E1] =

6b P[E1E2E3] = 0

6c P[E2 | O1] = P[E2O1] / P[O1] =

6d P[O1O2] = 0

Question 7

7a P[LH] = P[L] + P[H] - P[L U H] =0.16 + 0.1 – 0.1 = 0.16

7b. P[LH] / P[L] = (0.16)/(0.16) = 1

Question 8

8a. 1 =

c =

8b. P[X = 4] =

8c. P[X < 4] = P[X = 2] + 0 =

8d. P[3 ≤ X ≤ 9] = 1- P[X = 2] =

Question 9

let a be the probability of single

P[B = 1] + P[B = 2] + P[B = 3] + P[B = 4] = P[B > 0]

a + 0.5a + 0.25a + 0.125a = 0.3

1.875a = 0.3

1875a = 300

a = 4/25

Question 10

10a.

10b. T = 2

PB(3) = = 0.0072

10c. T = 10

PB(0) = = 0.135

10d. P[B > 0] = 1- P[B = 0]

0.99 = 1 –

T = 23minutes

Question 11.

11a. P[T > 32] = 1 – P[T ≤ 32] = 1 – f

11b. P[T < 0] =

Question 12.

1 = 2πr

r =

12a. = Y

= Y

12b. FY(y) = FX(

12c. fY(y) =

12d. E[Y] =

Question 13.

13a. FX(x) =

E[X] =

E[=

Var[X] = E[

13b. FY(y) =

E[Y] =

E

Var[Y] = E[

13c E[XY] =

Cov[X,Y] = E[XY] – E[X]E[Y] =

Question 14.

14a. PX(x)=

14a. PY(y)=

14b. The event is independent. The probability of flipping a head/tail is always 0.5, event result

Does not affect the next event.

14c. PXY(x,y)