JOHN ADAMSKI
2/10/2017

§ 4.3 CALCULATING PROBABILITIES USING SIMPLE EVENTS

\# 1, 2, 4, 5, 7 - 10, 14, 15

4.1 (a) SIMPLE EVENTS: 1, 2, 3, 4, 5, 6

(b) A: $\{2\}$

B: $\{2, 4, 6\}$

C: $\{3, 4, 5, 6\}$

D: $\{2\}$

E: $\{2, 4, 6\}$

F: $\emptyset$ (EMPTY SET) $= \{\}$

(c) $\frac{1}{6}$ EACH

(d) A: $\frac{1}{6}$ D: $\frac{1}{6}$

B: $\frac{3}{6} = \frac{1}{2}$ E: $\frac{3}{6} = \frac{1}{2}$

C: $\frac{4}{6} = \frac{2}{3}$ F: 0

4.2 (a) REMEMBER THAT THE PROBABILITES OF ALL SIMPLE EVENTS MUST ADD UP TO 1.

$$\therefore \quad P(E_1) + P(E_2) + P(E_3) + P(E_4) + P(E_5) = 1$$

$$.15 + .15 + .4 + 2P(E_5) + P(E_5) = 1$$

$$.7 + 3P(E_5) = 1$$

$$3P(E_5) = .3$$

$$P(E_5) = .1 \quad \text{AND} \quad P(E_4) = 2P(E_5) = 2(.1) = .2$$

$$\therefore \boxed{\begin{array}{lll} P(E_1) = .15 & P(E_2) = .15 & P(E_3) = .4 \\ P(E_4) = .2 & P(E_5) = .1 & \end{array}}$

(b) $A = \{E_1, E_3, E_4\}$

$P(A) = P(E_1) + P(E_3) + P(E_4)$

$= .15 + .4 + .2 = .75$

$B = \{E_2, E_3\}$

$P(B) = P(E_2) + P(E_3)$

$= .15 + .4 = .55$

(c) $\{E_1, E_2, E_3, E_4\}$

(d) $\{E_3\}$

4.4 (a) $.49 + ? + .21 + .09 = 1$

$\Rightarrow ? = 1 - .49 - .21 - .09 = .21$

(b) $P(\text{HIT AT LEAST ONE})$

$= P(\underbrace{HH, HM, \text{OR } MH}_{\text{SIMPLE EVENTS}})$

$= P(HH) + P(HM) + P(MH) = .49 + .21 + .21 = .91$

4.5 (a) $S = NDQ, DQH, NQH, NDH$ ALL EQUALLY LIKELY

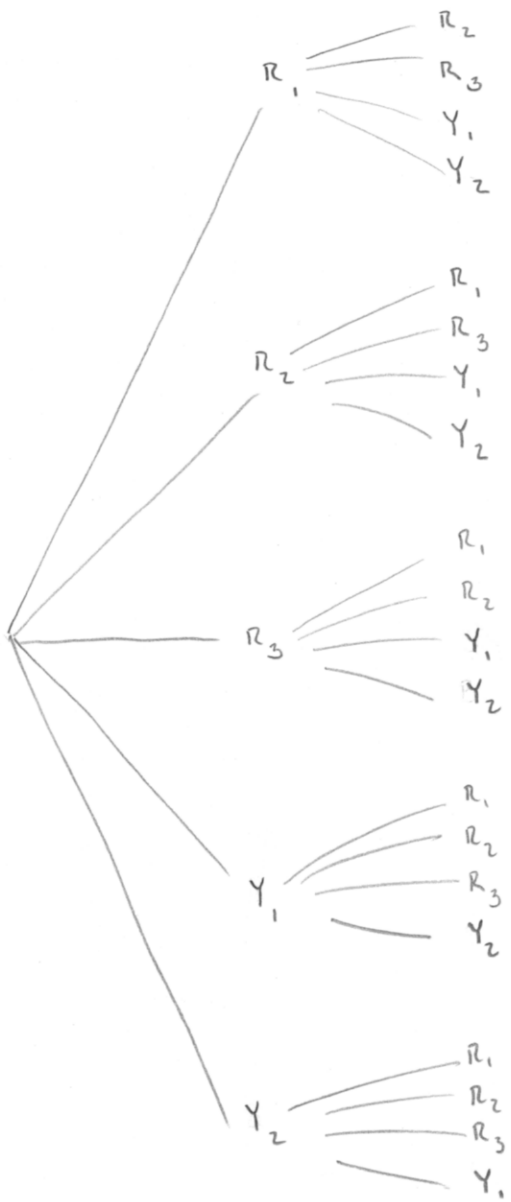
(b) $P(\text{CONTAINS HALF DOLLAR}) = P(DQH, NQH, \text{OR } NDH)$

$= P(DQH) + P(NQH) + P(NDH) = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4}$

(c) $P(60\text{ & or more}) = P(DQH, NQH, NDH)$

$= P(DQH) + P(NQH) + P(NDH) = \boxed{\frac{3}{4}}$

4.7



$\therefore \quad S = R_1R_2, R_1R_3, R_1Y_1, R_1Y_2,$

$R_2R_1, R_2R_3, R_2Y_1, R_2Y_2,$

$R_3R_1, R_3R_2, R_3Y_1, R_3Y_2,$

$Y_1R_1, Y_1R_2, Y_1R_3, Y_1Y_2,$

$Y_2R_1, Y_2R_2, Y_2R_3, Y_2Y_1,$

4.8 ADD $R_1R_1, R_2R_2, R_3R_3, Y_1Y_1, Y_2Y_2$

SAME BALL SELECTED TWICE.

4.9 (a) P(NEED EYEGLASSES)

= P(NEED GLASSES & USE GLASSES) + P(NEED GLASSES & DON'T USE GLASSES)

= .44 + .14 = **.58**

(b) P(NEED GLASSES & DON'T USE THEM) = **.14**

(c) P(USE GLASSES) = P(NEED GLASSES, USE GLASSES) + P(DON'T NEED GLASSES, USE GLASSES)

= .44 + .02 = **.46**

4.10 (a) $S = 1, 2, 3, \ldots, 35, 36, 0, 00$.

(b) EACH SIMPLE EVENT EQUALLY LIKELY. 38 SIMPLE EVENTS.

PROBABILITY OF EACH = $\frac{1}{38}$

(c) $A = \{0, 00\}$

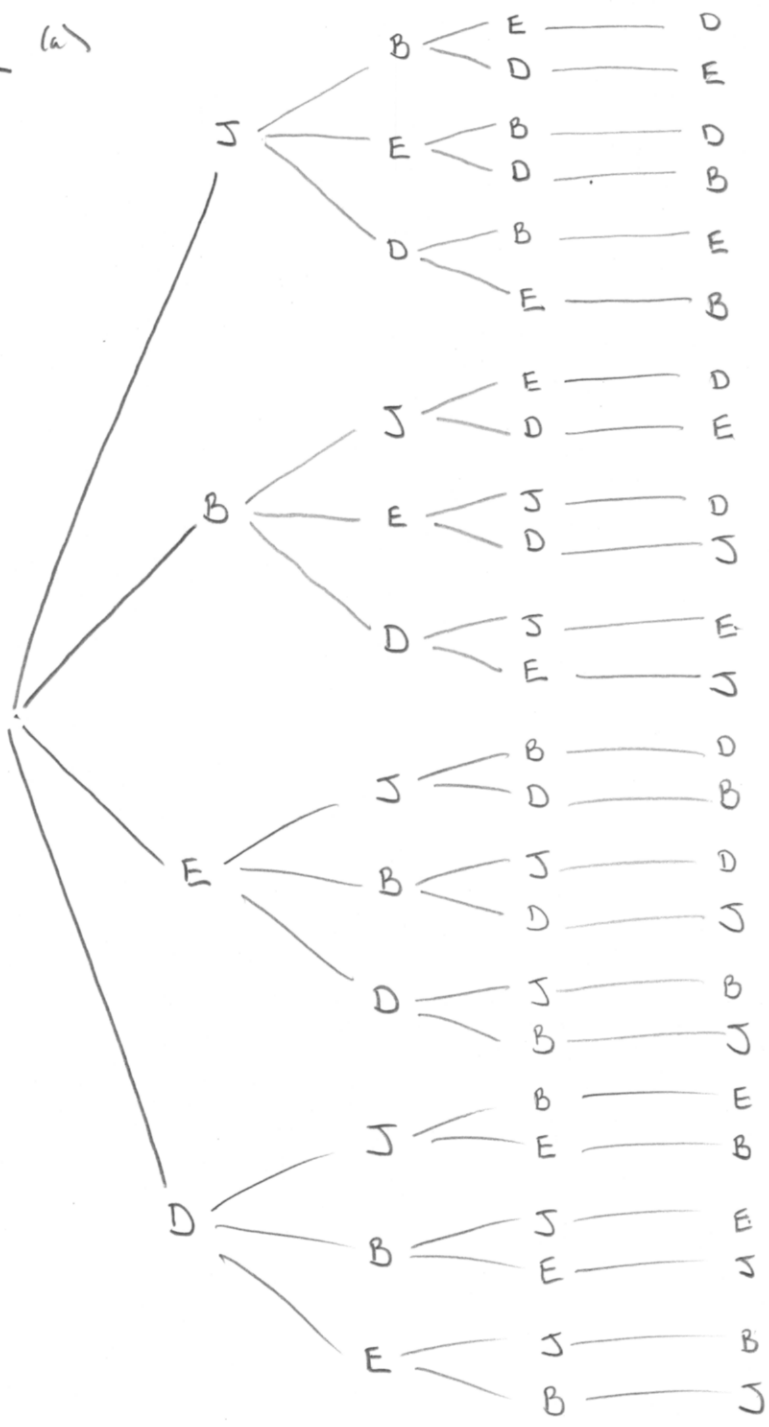
$P(A) = P(0) + P(00) = \frac{1}{38} + \frac{1}{38} = \frac{2}{38} = \boxed{\frac{1}{19}}$

(d) $P(1-18) = P(1) + P(2) + \ldots + P(18)$

$= 18 \times \frac{1}{38} = \frac{18}{38} = \boxed{\frac{9}{19}}$

1ST 2ND 3RD 4TH

4.14 (a)



24 SIMPLE EVENTS IN SAMPLE SPACE

(b) $\boxed{\frac{1}{24}}$ (c) $\frac{6}{24} = \boxed{\frac{1}{4}}$ (d) $\frac{2}{24} = \boxed{\frac{1}{12}}$ (e) $\frac{6}{24} = \boxed{\frac{1}{4}}$

4.15 (a) $P(\text{NORMAL COLOR, NORMAL SIZE}) = \frac{140}{300} = \boxed{\frac{7}{15}}$

(b) $P(\text{VERMILLION COLOR})$

$= P(\text{VERMILLION COLOR, NORMAL SIZE}) + P(\text{VERMILLION COLOR, MINI SIZE})$

$= \frac{3}{300} + \frac{151}{300} = \frac{154}{300} = \boxed{\frac{77}{150}}$

(c) $P(\text{V. COLOR, MINI SIZE, OR BOTH})$

$= P(\text{V. COLOR, MINI-SIZE}) + P(\text{V. COLOR, NORMAL SIZE})$

$+ P(\text{NORMAL COLOR, MINI-SIZE})$

$= \frac{151}{300} + \frac{3}{300} + \frac{6}{300} = \frac{160}{300} = \boxed{\frac{8}{15}}$