1.1: 1, 2, 3, 5, 6, 9, 11.

Probability Part 1

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1.1 Probability

1.1.1) $S = \{HHH, HHT, HTH, HTT, THH, THT, TTH, TTT\}$

1.1.2) $S = \{0, 1, 2, \ldots, n\}$

1.1.3) $S = \{0, 1, 2, 3, 4\}$

1.1.5) S = { on time and sashsfactory, on time and unsatisfactory, Late and satisfactory, Late and unsatisfactory }

1.1.6) S = { red and shiny, red and dull, blue and shiny, blue and dull }

1.1.9) Possible values for the probability of outcome V are $0 \le P(V) \le 0.39$. If they are equally likley, $P(IV) = P(V) = 0.195$

1.1.11 $p = 1 - 0.28 - 0.55 = \boxed{0.17}$

Probability part 1 cont.

1,4,6,7,8,11,12,13

1.2 Events

1.2.1 a) $P(b) = 1 - .13 - .22 - .48 - .02 = \boxed{0.15}$

b) $P(A) = .48 + .02 = \boxed{0.5}$

c) $P(A') = 1 - P(A) = \boxed{0.5}$

1.2.4) $P(\text{costs decrease}) = 1 - .03 - .18 = \boxed{0.79}$

$P(\text{costs not increase}) = 1 - .03 = 0.97$

1.2.6) (x, y) x: score of red die, y = score of blue die,

set where red < blue = $\{(2,1), (3,2), (3,1), (4,3), (4,2), (4,1), (5,4), (5,3), (5,2), (5,1), (6,5), (6,4), (6,3), (6,2), (6,1)\}$

Since there are 36 equally likely chances, $p_x = \frac{1}{36}$ Therefore,

$P(\text{red die} < \text{blue die}) = 15 \times \frac{1}{36} = \boxed{\frac{5}{12}}$

its less than 0.5 because of the chance that the die are equal.

1.2.7) $\boxed{P(\text{black suit}) = \frac{1}{2}}$

1.2.8) $P(\text{ace}) = \frac{1}{52} \times 4 = \boxed{\frac{1}{13}}$

1.2.11 a) $\boxed{P(a) = 0.02}$

b) $P(b) = .19 + .21 + .2 + .14 = \boxed{0.74}$

c) $P(c) = .05 + .2 + .19 + .06 + .21 = \boxed{0.71}$

d) $P(d) = .05 + .2 + .06 + .21 = \boxed{0.52}$

Compliment of b: at least one is shut down, $P(b') = 0.26$

compliment of c: neither line at full capacity $P(c') = 0.29$

1.2.12) $P(\text{2 heads in succession}) = \boxed{\frac{3}{8}}$ HHH, HHT, THH

1.2.13) $P(\text{revenue not below expectations}) = .11 + .26 + .36 = 0.73$

1, 2a-f, 3a, 4ab, 5, 7, 11, 12, 14

$\cap$ = and

$\cup$ = or

1.3 combinations of Events

1.3.1) A contains outcome 0, while empty set contains no outcomes.

1.3.2a) $P(B) = .01 + .02 + .05 + .11 + .08 + .06 + .013 = \boxed{0.46}$

b) $P(B \cap C) = .02 + .05 + .11 = \boxed{0.18}$

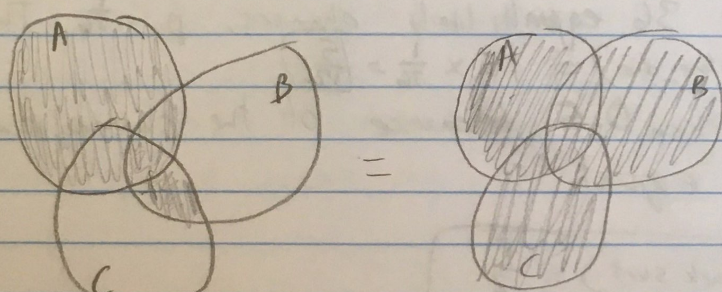
c) $P(A \cup C) = .07 + .05 + .01 + .02 + .05 + .08 + .04 + .11 + .07 + .11 = \boxed{0.61}$

d) $P(A \cap B \cap C) = .02 + .05 = \boxed{0.07}$

e) $P(A \cup B \cup C) = 1 - .03 - .04 - .05 = \boxed{0.88}$

f) $P(A' \cap B) = .08 + .06 + .11 + .13 = \boxed{0.38}$

1.3.3a) $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

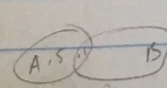


1.3.4a) $A \cap B$: females w/ black Hair.

b) $A \cup C'$: females without brown eyes.

1.3.5) Yes, because it is either Red or Black, but can't be both.

No, because there is the ace of hearts.



1.3.7) $P(B) = 1 - .2 - .5 + .1 = \boxed{0.4}$

late = 1 - .74

1.3.11) $P(\text{Late unsatisfactory}) = 1 - .74 - .41 + .26 = \boxed{0.11}$

1.3.12) $P(\text{shiny} \cup \text{red}) = \frac{91}{200} + \frac{79}{200} - \frac{55}{200} = \boxed{0.575}$ $P(\text{red}) = \frac{79}{200}$ $P(\text{blue}) = \frac{121}{200}$

$P(\text{dull} \cap \text{blue}) = 1 - 0.575 = \boxed{0.425}$ $P(\text{shiny}) = 91/200$

1.3.14) $P(A \cap B) = \boxed{0.26}$

$P(A \cup B) = \boxed{}$

1bdf, 3, 6, 10ab, 12

1.4 conditional probability

1.4.1b) $P(C|A) = \frac{P(A \cap C)}{P(A)} = \boxed{0.1739}$

d) $P(B|A \cup B) = \frac{P((A \cup B) \cap B)}{P(A \cup B)} = \boxed{0.59375}$

f) $P(A \cap B | A \cup B) = \frac{P((A \cup B) \cap (A \cap B))}{P(A \cup B)} = \frac{P(A \cap B)}{P(A \cup B)} = \boxed{0.1143}$

1.4.3a) $P(A\heartsuit | red) = \frac{P(A\heartsuit \cap red)}{P(red)} = \frac{\frac{1}{52}}{\frac{26}{52}} = \boxed{\frac{1}{26}}$

b) $P(heart | red) = \frac{P(heart \cap red)}{P(red)} = \frac{\frac{13}{52}}{\frac{26}{52}} = \boxed{\frac{1}{2}}$

c) $P(red | heart) = \frac{P(red \cap heart)}{P(heart)} = \longrightarrow \frac{P(heart)}{P(heart)} = \boxed{1}$

d) $P(heart | black) =$ 0 heart can't be black

e) $P(king | red) = \frac{P(k \cap red)}{P(red)} = \frac{\frac{2}{52}}{\frac{26}{52}} = \boxed{\frac{1}{13}}$

f) $P(k | red\ P\ card) = \frac{P(k \cap red\ P\ card)}{P(red\ P\ card)} = \frac{2}{52} / \frac{6}{52} = \frac{2}{6} = \boxed{\frac{1}{3}}$

1.4.6) $P(S|O) = .85$, $P(O) = .77$

$P(O \cap S) = P(S|O) \times P(O) = \boxed{0.6545}$

1.4.10a) A = both full, B = neither shut down

$P(A|B) = \frac{P(A \cap B)}{P(B)} = \frac{.19}{.14 + .2 + .21 + .19} = \boxed{0.257}$

b) A = at least 1 full capacity, B = neither shut down

$P(A|B) = \frac{P(C \cap B)}{P(B)} = \frac{.21 + .19 + .2}{.74} = \boxed{0.811}$

1.4.12) $P(D|B) = .31$ $P(B \cap D) = .22$ since A is opposite of B, $P(A) = 1 - P(A')$

$A' = B$

$P(A) = 1 - \frac{.22}{.31} = \boxed{0.290}$