Probability

1. Two Dies rolled at once, find out the probability for sum of numbers being Even and one of the die shows 6.

Possible Event : ~~(2,6) (4,6)~~, ~~(6,6)~~

probability sum of numbers being Even ~~(1,6)~~ (2,6) (3,6) (4,6) (5,6) (6,6)
~~pd~~ ~~(6,1) (6,2) (6,3) (6,4) (6,5)~~

$n(A) = 11$

$n(B) =$ Sum of ~~tossed being~~ Even $= \{(2,6), (4,6) (6,6)$
$(6,2) \quad (6,4)\}$.

$n(B) = 5$ $\quad P(A/B) = n(B/A)/n(A) = 5/11$ //

2. Sum of numbers being less than 7

Possible Event = (1,1), (1,2), (1,3) (1,4), (1,5)

(2,1) (2,2), (2,3), (2,4)

(3,1) (3,2) (3,3) ~~(3,4)~~

(4,1) (4,2)

(5,1)

no. of possible Events = 15

Total Events = 36

$P = 15/36 = \frac{5}{12}$

3. P(atleast one heads)
$= HTT$, THT, TTH, ~~HHT~~, ~~HTH~~
HHT, HTH, THH
~~HHH~~ ~~THH~~ HHH

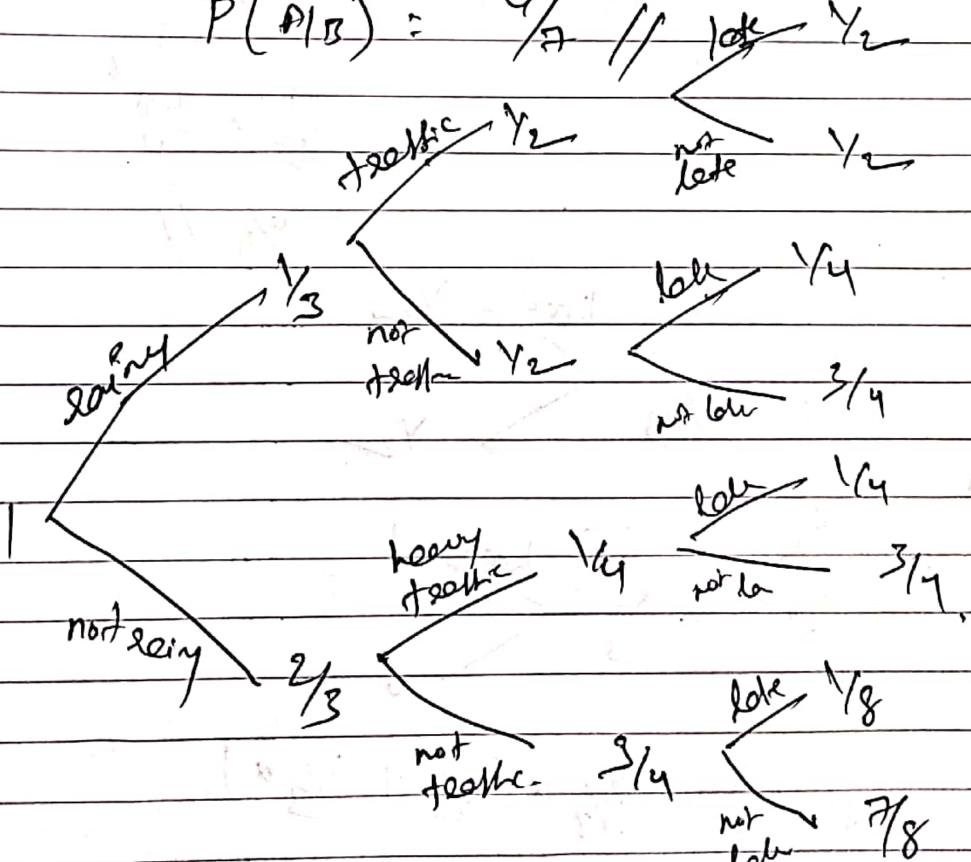
3. P(atleast one heads)

b) $\left.\begin{matrix} HTT, THT, TTH \\ HHT, HTH, THH \\ HHH \end{matrix}\right\} = 7$

P(atleast two heads) $= HHT, HTH, THH, HHH\} = 4$

$P(A|B) = 4/7$ //

4.
a)



(a) P(not rainy, heavy traffic, Not late) $= 3/4 * 1/4 * 2/3 = \frac{1}{16}$

(b) $P(\text{late}) = 1/2 * 1/2 * 1/3 + 1/4 * 1/2 * 1/3 + 1/4 * 1/4 * 2/3 + 1/8 * 3/4 * 2/3$
$= \frac{1}{12} + 1/24 + \frac{1}{24} + \frac{1}{16}$
$= 11/48$

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4) (a) (b) p(late at work) = $^{11}/_{48}$

c) $p(\text{rained that day} \mid \text{late at work}) = p(R \cap L) + p(R^c \cap L)$

$= \frac{1}{3} * \frac{1}{2} * \frac{1}{2} + \frac{1}{3} * \frac{1}{2} * \frac{1}{4}$

$= \frac{1}{12} + \frac{1}{24}$

$= \frac{1}{8}$

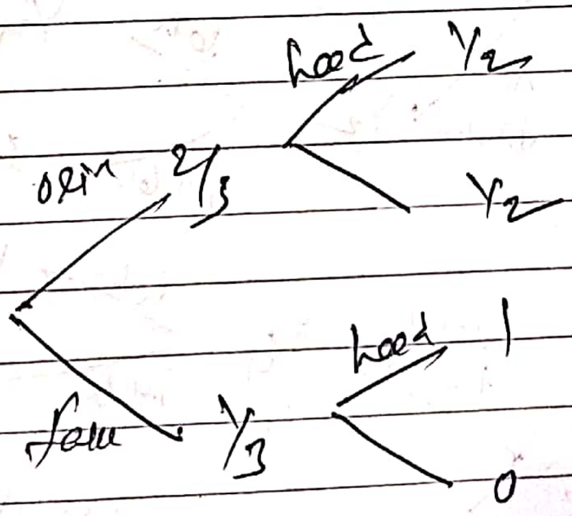
$p(R/L) = \frac{1/8}{\frac{11}{48}}$

$= \frac{1}{8} * \frac{48}{11}$

$= 6/11$ //

5.

(a)



$p(H) = 2/3 * 1/2 + 1/3 * 1$

$= 1/3 + 1/3 = 2/3$ //

080 411 2522 6 //

C_1 = normal coin
C_2 = fake coin.

5(b) $= P(H/C_1) = 1/2$

$P(H/C_2) = 1$

$$P(C_2/H) = \frac{P(H/C_2)\,P(C_2)}{P(H)}$$ by Bayes theorem

$$= \frac{1 \cdot 1/3}{2/3}$$

$= 1/2$ //

6)

$P(\text{Coffee}) = 0.7$

$P(\text{Coke}) = 0.4$

$P(\text{Coffee} \cap \text{Coke}) = 0.2$

$$P(A/B) = \frac{P(A \cap B)}{P(B)}$$

$$= \frac{0.2}{0.4}$$

$= 1/2$ //

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7. $\text{mean}^{\mu} = 50$

$\sigma = 6$

(a) mean of sample dis = 50

$SD = \frac{6}{\sqrt{16}}$

$= \frac{6}{4} = \frac{3}{2} = 1.5$

(b) mean of SD = ~~30~~ 50

$SD = \frac{6}{\sqrt{20}} \quad \frac{2 \times 3}{2\sqrt{5}} = \frac{3}{\sqrt{5}} = 1.345$

8) mean = 100

$\sigma = 12$

$z = \frac{x - \mu}{\sigma}$

a) $z = \frac{110 - 100}{12}$

$= \frac{10}{12}$

$= \frac{5}{6}$

$= 0.833 = 0.06 \times 100$

$= 6\%$

8 b) $\frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}}$

$z = \frac{105 - 100}{\frac{12}{\sqrt{25}}}$

$= \frac{+5}{12/5}$

$= \frac{+5 \times 5}{12}$

$= \frac{+25}{12}$

$= \cancel{00} + 2.08$

$= 0.\cancel{9826} = 0.98124$

c) $\frac{105 - 100}{\frac{12}{\sqrt{64}}}$

$= \frac{5}{12/8}$

$= \frac{5 \times 8}{12}$

$= \frac{40^{10}}{12_3} = 10/3 = 3.33$

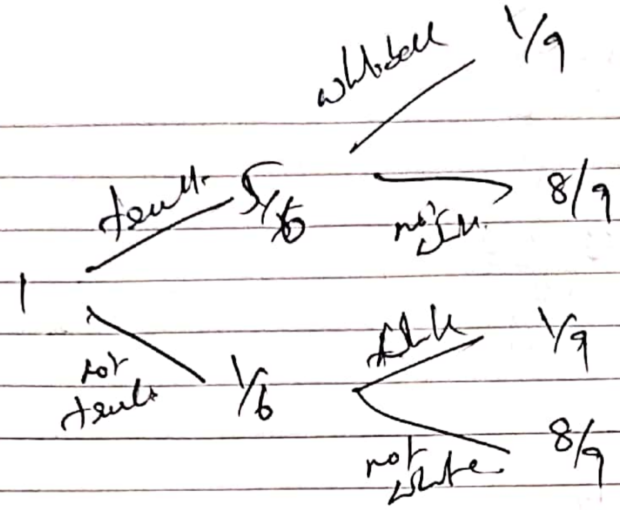
$= 0.99957$

d) less than 9.5 $\frac{95 - 100}{12/\sqrt{16}} = \frac{-5}{12/4} = -5/3 = -1.66 = 0.4746$

~~less th~~ greater than 105 $= 0.99957$

$= 0.99957 - 0.4746 = 0.5$

11)

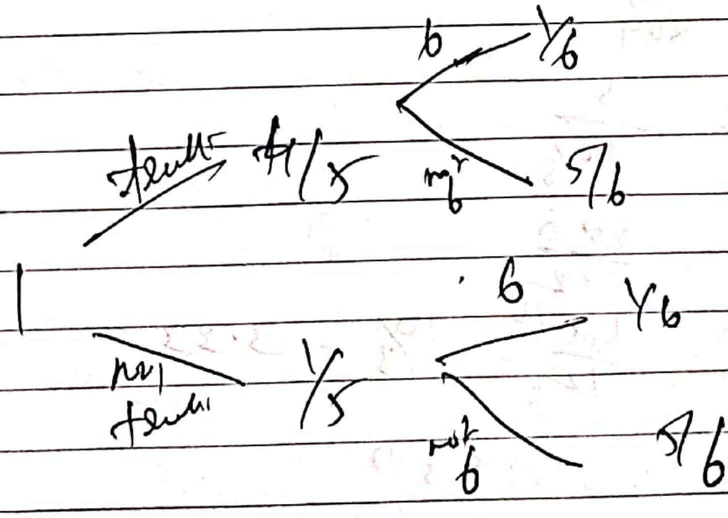


$$P(W/T) = \frac{P(T/W)\,(PW)}{P(T/W)\,P(W) + P(T/W)\,(PW)}$$

$$= \frac{5/6 * 1/9}{5/6 * 1/9 + 1/6 * 8/9} = \frac{5}{5+8}$$

$$= 5/13$$

12)



$$P(6/T) = \frac{1/6 * 4/5}{1/6 * 4/5 + 5/6 * 1/5} = \frac{4}{20} = 1/5$$

$= 0.2$