

Q1

a)

If there are  $m$  ways of doing one thing and there are  $n$  ways of doing another, there are  $m \times n$  ways of doing both.

b)

$$3 \times 5 = \boxed{15}$$

c)

$$\overline{4} \times \overline{9} = \boxed{36}$$

d)

$$4 \times 3 \times 2 = \boxed{24}$$

e)

- i)  $\frac{4}{52} = \boxed{\frac{1}{13}}$
- ii)  $\frac{13}{52} = \boxed{\frac{1}{4}}$
- iii)  $\frac{6}{52} = \boxed{\frac{3}{26}}$
- iv)  $\frac{12}{52} = \boxed{\frac{3}{13}}$

f)

$$\boxed{\frac{2}{11}}$$

g)

- i)  $\frac{120}{400} = \boxed{\frac{3}{10}}$
- ii)  $\frac{140}{400} = \boxed{\frac{7}{20}}$

h)

i)	(1,H)	(2,H)	(3,H)	(4,H)	(5,H)	(6,H)
	(1,T)	(2,T)	(3,T)	(4,T)	(5,T)	(6,T)

ii)  $\frac{3}{12} = \boxed{\frac{1}{4}}$

i)

$$\text{Prob}(4) = \frac{1}{6}$$

$$\frac{1}{6} \times 60 = \boxed{10}$$

j)

- i)  $P(\text{Red}) = \frac{15}{50} = \boxed{\frac{3}{10}}$
- ii) Relative Frequency

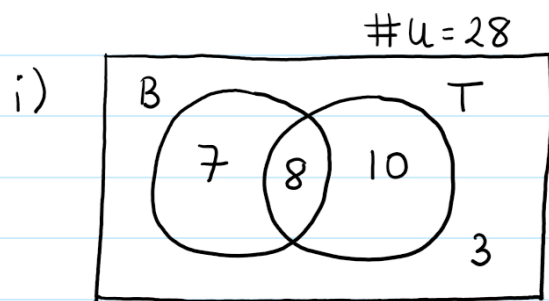
Q2

a)

i)  $50 - 25 - 5 - 8 = \boxed{12}$

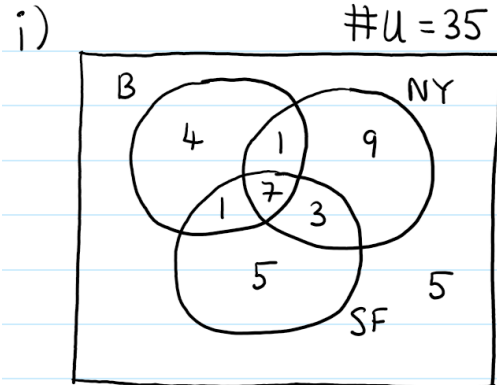
ii)  $\frac{25+5+12}{50} = \boxed{\frac{21}{25}}$

b)



ii)  $\text{Prob} = \frac{10}{28} = \boxed{\frac{5}{14}}$

d)



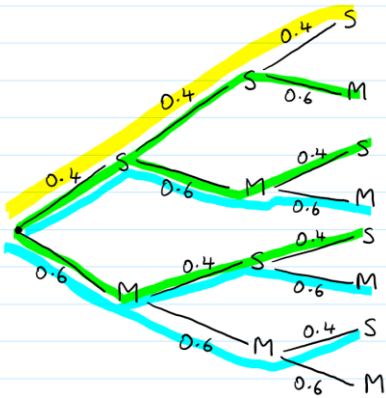
ii)  $\frac{5}{35} = \boxed{\frac{1}{7}}$

iii)  $\frac{8}{20} = \boxed{\frac{2}{5}}$

d)

i) S = Score M = Miss

$$\text{ii) } P(\text{SSS}) = 0.4 \times 0.4 \times 0.4 \\ = \frac{8}{125} \text{ or } 0.064$$



$$\text{iii) } P(\text{SSS}) \text{ or } P(\text{SSM}) \text{ or } P(\text{SMS}) \text{ or } P(\text{MSS}) \\ (0.4 \times 0.4 \times 0.4) + (0.4 \times 0.4 \times 0.6) + (0.4 \times 0.6 \times 0.4) + (0.6 \times 0.4 \times 0.4) \\ = 0.064 + 0.096 + 0.096 + 0.096 \\ = \frac{44}{125} \text{ or } 0.352$$

$$\text{iv) } P(\text{SMM}) \text{ or } P(\text{MSM}) \text{ or } P(\text{MMS}) \\ (0.4 \times 0.6 \times 0.6) + (0.6 \times 0.4 \times 0.6) + (0.6 \times 0.6 \times 0.4) \\ = 0.144 + 0.144 + 0.144 \\ = \frac{54}{125} \text{ or } 0.432$$

e)

$$\frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} = \frac{1}{216}$$

f)

$$P(\text{Gold}) = \frac{2}{3}$$

$$\Rightarrow \frac{x}{x+5} = \frac{2}{3}$$

$$3x = 2(x+5)$$

$$3x = 2x + 10$$

$$x = 10$$

g)

$$\text{i) } 1 - 0.1 - 0.1 - 0.2 - 0.3 - 0.1 \\ = \frac{1}{5} \text{ or } 0.2$$

$$\text{ii) } P(2 \text{ or } 4 \text{ or } 6) \\ = 0.1 + 0.2 + 0.1 \\ = \frac{2}{5} \text{ or } 0.4$$

Q3

a)

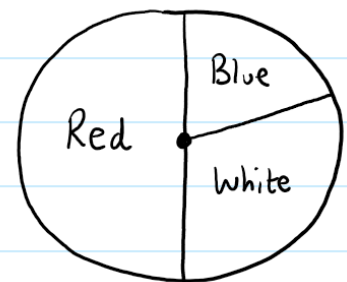
i) 50% would be red, 30% would be white and 20% would be blue.

$$\text{ii) } P(\text{Red}) = \frac{50}{100} = \frac{1}{2} \times 360 = 180^\circ$$

$$P(\text{White}) = \frac{30}{100} = \frac{3}{10} \times 360 = 108^\circ$$

$$P(\text{Blue}) = \frac{20}{100} = \frac{2}{10} \times 360 = 72^\circ$$

One possibility:



b)

i)		1	2	3	4	5	6
	1	2	3	4	5	6	7
	2	3	4	5	6	7	8
	3	4	5	6	7	8	9

v)		1	2	3	4	5	
	1	2	3	4	5	6	
	2	3	4	5	6	7	
	3	4	5	6	7	8	

ii)  $\frac{2}{18} = \boxed{\frac{1}{9}}$

iii)  $P(\text{Same no.}) = \frac{3}{18} = \frac{1}{6}$   
 $\Rightarrow \frac{1}{6} \times 420 = \boxed{70}$

iv) Money in = €420  
€1 Payouts = €80  
Profit = -€120  
€5 Payouts = €220

$\Rightarrow$  No. of people =  $\frac{220}{5} = \boxed{44}$

Probability of getting money back was  $\frac{3+2}{18} = \frac{5}{18}$   
but now it's  $\frac{3+1}{15} = \frac{4}{15}$ .  
As  $\frac{4}{15} < \frac{5}{18}$ , Paul is correct.