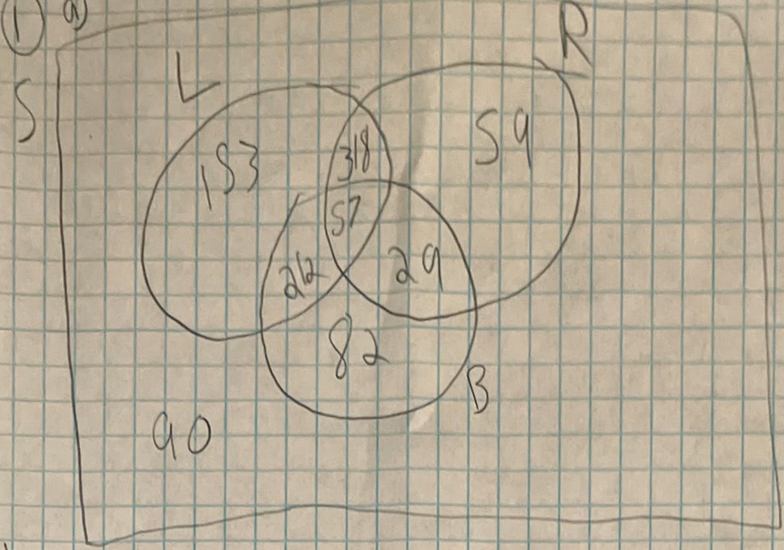
1 a)



b) $n(L \cup R \cup B) = n(L) + n(R) + n(B) - n(L \cap R) - n(L \cap B) - n(R \cap B) + n(\text{all } 3)$

$= 740 + 463 + 380 - 375 - 269 - 86 + 57$

$= 910$

∴ 910 watch at least one of the teams

c) watched none of the teams?

$1000 - 910 = 90$

Total survice — those who picked one of the three teams

∴ 90 students did not watch any of the teams

d) watch only one of the teams?

$L = 153 \quad R = 59 \quad B = 82$

$153 + 59 + 82 = 294$

2

Choose 6 from 1-49

$_{49}C_6 = 13983816$

3

				1					row 0
			1		1				row 1
		1		2		1			row 2
	1		3		3		1		row 3
1		4		6		4		1	row 4

$(2x-3y)^4$

$= 1(2x)^4(-3y)^0 + 4(2x)^3(-3y)^1 + 6(2x)^2(-3y)^2 + 4(2x)^1(-3y)^3 +$

$1(2x)^0(-3y)^4$

$= 16x^4(1) + 32x^3(-3y) + 24x^2(9y^2) + 8x(-27y^3) +$

$(1)(81y^4)$

$= 16x^4 - 96x^3y + 216x^2y^2 - 216xy^3 + 81y^4$

4

a jury of 12 people chosen from 12 men, 10 women

a) no restrictions?

$12+10=22$

$_{22}C_{10} = 646646$

b) equall amount of men/women?

$_{12}C_6 \times {}_{10}C_6 = 194040$

c) 75% of the jury to be women?

$12 \times \frac{3}{4} = 9$

$_{10}C_9 \times {}_{12}C_3 + {}_{10}C_{10} \times {}_{12}C_2 = 2266$

(5) 14 rugby players, 19 football players. form a group of 4.

a) has to be one rugby player?

$${}_{14}C_1 \times {}_{19}C_3 = 13566$$

b) all rugby or all football players

$${}_{14}C_4 + {}_{19}C_4 = 4877$$

c) at least 1 football player

$${}_{19}C_1 \times {}_{14}C_3 + {}_{19}C_2 \times {}_{14}C_2 + {}_{19}C_3 \times {}_{14}C_1 + {}_{19}C_4 \times {}_{14}C_0$$

$$= 39919$$

(6) 16 people grouped into 3 groups and each group needs at least 5 people

$${}_{16}C_6 \times {}_{10}C_5 \times {}_5C_5 \times 3$$

$$= 6054048$$

number of ways the last person can be in

(7) 3 orange marbles, 4 green, two yellow, need 1

$$\underline{4} \times \underline{5} \times \underline{3} - 1$$

$$= 59$$

8) a) $n(T \cup W \cup Q) = n(T) + n(W) + n(Q) - n(T \cap W) - n(T \cap Q) - n(W \cap Q) + n(\text{all } 3)$

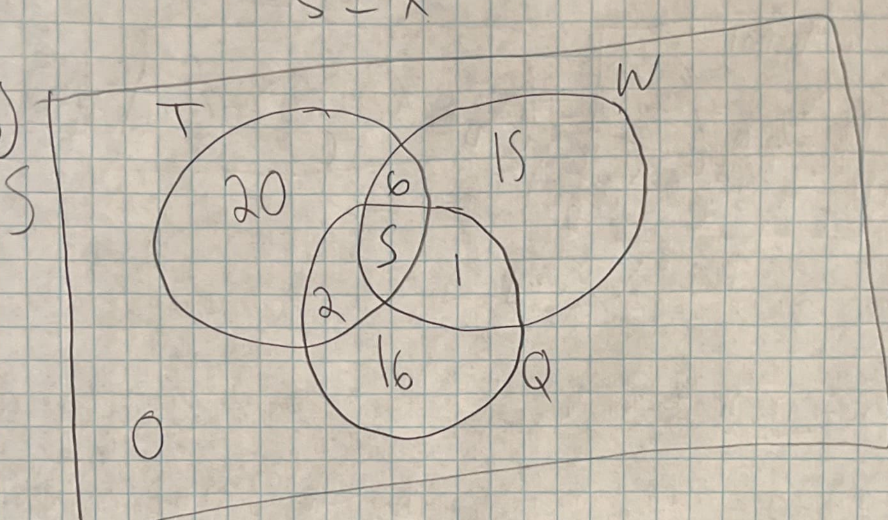
$65 = 33 + 27 + 24 - 11 - 7 - 6 + x$

$65 = 60 + x$

$65 - 60 = x$

$5 = x$

b)



c) 20 intend to apply only to UPT.

d) 6 applied to T and W but not Q

(9)

14 volunteers, 3 working the entrance, 4 with children, and 7 at tables

a) how many ways can they be assigned?

$$ {}_{14}C_3 \times {}_{11}C_4 \times {}_7C_7 = 120120 $$

b) total − dont want $\boxed{MM}$

Door $\boxed{MM}$ $\boxed{MM}$ children

Total

$$ \boxed{\left({}_{14}C_3 \times {}_{11}C_4 \times {}_7C_7\right)} - \boxed{\left({}_{12}C_1 \times {}_{11}C_4 \times {}_7C_7\right)} - \boxed{{}_{12}C_2 \times {}_{10}C_3 \times {}_7C_7} - \boxed{{}_{12}C_5 \times {}_7C_4 \times {}_3C_3} $$

Tables $\boxed{MM}$

$$ 120120 - \boxed{MM} = 80520 $$

∴ 80520 ways for both mary and martha not to be in the same station.