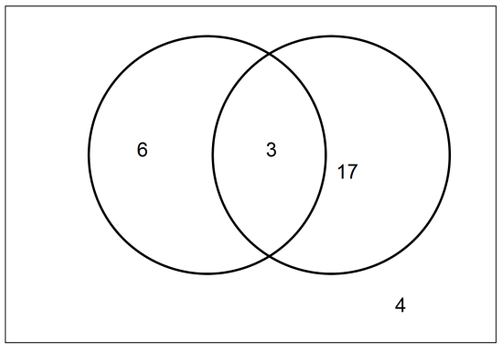
PART II - Answer Key

36(a). Brandon surveyed his classmates to see if they liked Action movies or Horror movies.

- 9 people like Horror movies
- 3 people like both Action movies and Horror movies
- 4 people like neither type of movie
- 20 people like Action movies

Draw a Venn diagram to determine how many people were surveyed in total.

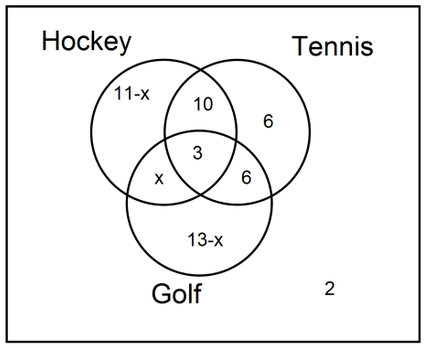


9-3 = 6 (Horror only)
20-3 = 17 (Action only)

30 people in total

3 36(b). 50 members of a sports club were surveyed:

Determine the number of people who play hockey **AND** golf but **NOT** tennis.



11-x+10+3+6+6+x+13-x+2=50
-x +51 = 50
-x = -1
x = 1

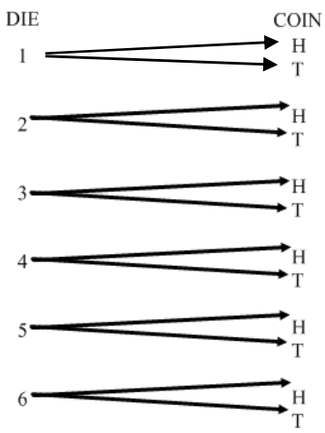
1 person

2 37(a). How many different arrangements of the letters MATHEMATICS are there?

$$\frac{11!}{2!2!2!} = \frac{39916800}{2\ x\ 2\ x\ 2} = \frac{39916800}{8} = 4\ 989\ 600$$

2 37(b). David rolls a fair die and flips a fair coin. Use a graphic organizer such as a tree diagram or table to illustrate all possible outcomes.

Students may set up something like the following or have another suitable graphic.



3 37(c). How many 6 person committees can be formed from a group of 4 teachers and 30 students if there must be at least 3 teachers?

$({}_4C_3 \times {}_{30}C_3) + ({}_4C_4 + {}_{30}C_2)$

16240 + 435

16675

3 37(d). Algebraically solve for *n*: ${}_nP_2 = 72$

${}_nP_2 = 72$

$\frac{n!}{(n-2)!} = 72$

$\frac{n(n-1)(n-2)!}{(n-2)!} = 72$

$n(n-1) = 72$

$n^2 - n - 72 = 0$

$(n-9)(n+8) = 0$

n= 9, n = -8 (reject)

3 38(a). When considering the total arrangements of the letters of the word FLOAT, what is the probability of the vowels (O, A) being together?

# of Possible Arrangements with conditions = $4!\,2! = 48$

Total Possibilities without conditions = $5!=120$

Probability = $\frac{48}{120} = \frac{2}{5}$

3 38(b). John likes to jog. If the weather is nice he is 80% likely to jog. If it is raining he is only 40% likely to jog. The forecast for tomorrow indicates a 30% chance of rain. What is the probability that he will jog tomorrow?

P (rain) = 30% = 0.30 P (not rain) = 70% = 0.70

P(jog) = 0.40 P(not jog) = 0.60 P(jog) = 0.80 P(not jog) = 0.20

P (jog) = (Probability of Raining **AND** Probability of Jogging) **OR** (Probability of Not Raining **AND** Jogging)

P (jog) = $(0.30 \times 0.40) + (0.70 \times 0.80) = 0.12 + 0.56 = 0.68$

3 38(c). A recent survey indicated that 98% of all high school students in Newfoundland have a cell phone and of these students, 40% have an I-Phone. What is the probability of a student owning a cell phone that is not an I-Phone?

$\mathrm{I} = \text{owns an I-Phone}$
$\mathrm{C} = \text{owns a cell phone}$

$\mathrm{P(I|C)} = 0.4$
$\mathrm{P(I'|C)} = 0.6$

$\mathrm{P(C \cap I')} = \mathrm{P(C)} \times \mathrm{P(I'|C)} = 0.98 \times 0.6 = 0.588$

3 39(a). Solve: $\frac{2}{3x} + \frac{5}{6} = 2$

$\frac{4}{6x} + \frac{5x}{6x} = \frac{12x}{6x}$

4 + 5x = 12x
4 = 7x
x = $\frac{4}{7}$

4 39(b). Simplify and state the restrictions: $\frac{6x+30}{6+3x} \div \frac{3(x+5)}{x^2-4}$

$\frac{6x+30}{6+3x} \bullet \frac{x^2-4}{3(x+5)}$

$\frac{6(x+5)}{3(2+x)} \bullet \frac{(x+2)(x-2)}{3(x+5)}$

$\frac{2(x-2)}{3}$

$x \neq -5, -2, 2$

39(c). It takes Jason and Sean 6 minutes to shovel their driveway when they work together. When Jason works alone, he takes 5 minutes more to shovel the driveway than when he works alone.

1 (i) Set up a rational equation to model the situation.

$\frac{1}{t} + \frac{1}{t+5} = \frac{1}{6}$

2 (ii) Use your equation from (i) to determine how long it would take Sean to shovel the driveway when he works alone.

$\frac{6}{t}+\frac{6}{t+5}=1$

$\frac{6}{t}\cdot\left(\frac{t+5}{t+5}\right)+\frac{6}{t+5}\cdot\left(\frac{t}{t}\right)=1$

$\frac{6t+30}{t^2+5t}+\frac{6t}{t^2+5t}=1$

$\frac{6\,t+30+6t}{t^2+5t}=1$

$12t+30=t^2+5t$

$t^2-7t-30=0$

$(t-10)(t+3)=0$

t= 10 or t = -3

t must be positive so Sean takes 10 minutes.