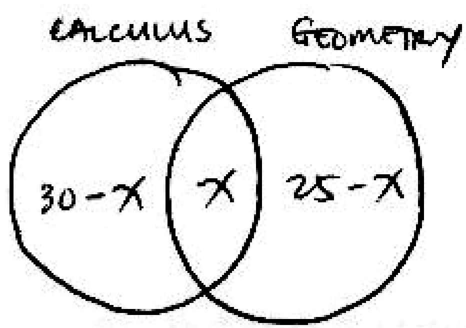
Answer Key

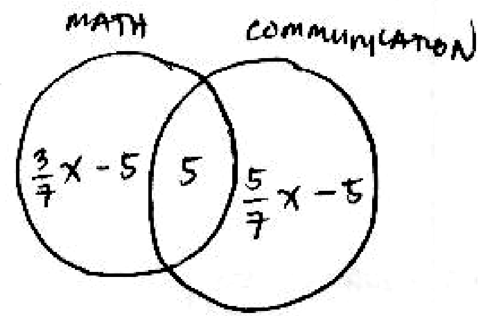
Probability and Statistics

1



$$50 = 30 - x + x + 25 - x$$

$$\boxed{x = 5}$$



let x = # of examinees

$$\left(\frac{3}{7}x - 5\right) + 5 + \left(\frac{5}{7}x - 5\right) = x$$

$$\boxed{x = 35}$$

3

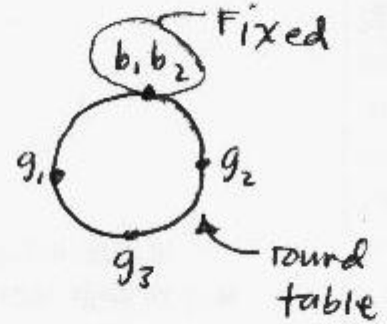
$$N = (n-1)!$$
$$= (8-1)!$$
$$\boxed{N = 5040 \text{ ways}}$$

4

$$N = (n-1)!$$

$$= 2(4-1)!$$

$$\boxed{N = 12}$$



5

No order is required to invite one or more of your seven friends

$$N = {}_6C_1 + {}_6C_2 + {}_6C_3 + {}_6C_4 + {}_6C_5 + {}_6C_6$$

$$\boxed{N = 63}$$

6 to 10

Exponential LEAP ONLINE REVIEW

2 kings and ace

Ordinary Deck: 52 cards

No order needed

$$P = \frac{\#\text{ of favorable ways}}{\#\text{ of possible ways}} = \frac{(\overbrace{4C_2}^{\text{KING}})(\overbrace{4C_1}^{\text{ACE}})}{52C_3}$$

$$\boxed{P = \frac{24}{22100}}$$

Jack, Queen, King

No order required

$$P = \frac{(4C_1)(4C_1)(4C_1)}{52C_3}$$

$$\boxed{P = \frac{64}{22100}}$$

Cards of order: Jack, Queen, King

$$P = \frac{(4P_1)(4P_1)(4P_1)}{52P_3}$$

$$\boxed{P = \frac{8}{16575}}$$

Cards of the same color

$$P = P_{RED} + P_{BLACK}$$

$$= \frac{26C_3}{52C_3} + \frac{26C_3}{52C_3}$$

$$\boxed{P = \frac{4}{17}}$$

Cards of the same suit

$$P = P_F + P_H + P_D + P_S$$

$$= \frac{13C_3}{52C_3} + \frac{13C_3}{52C_3} + \frac{13C_3}{52C_3} + \frac{13C_3}{52C_3}$$

$$\boxed{P = \frac{22}{425}}$$

11 to 12

Exactly 3 heads

$n = 5$

$r = 3$

$n - r = 2$

$p = \frac{1}{2}$

$q = 1 - \frac{1}{2} = \frac{1}{2}$

$$P = nC_r p^r q^{n-r}$$

$$= 5C_3 \left(\frac{1}{2}\right)^3 \left(\frac{1}{2}\right)^2$$

$$\boxed{P = \frac{5}{16}}$$

At least 3 heads

$$P_{3H} = P_{3H} + P_{4H} + P_{5H}$$

$$= 5C_3 \left(\frac{1}{2}\right)^3 \left(\frac{1}{2}\right)^2 + 5C_4 \left(\frac{1}{2}\right)^4 \left(\frac{1}{2}\right)^1 + 5C_5 \left(\frac{1}{2}\right)^5 \left(\frac{1}{2}\right)^0$$

$$\boxed{P_{3H} = \frac{1}{2}}$$

$n = 5$

$r = 3$

$n - 3 = 2$

$p = \frac{1}{4}$

$q = 1 - \frac{1}{4} = \frac{3}{4}$

$P = {}_nC_r\, p^r q^{n-r}$

$= {}_5C_3 \left(\frac{1}{4}\right)^3 \left(\frac{3}{4}\right)^2$

$\boxed{P = \frac{45}{512}}$

14 to 15

by any door

there are 9 entrance doors and 9 exit doors, therefore

# of ways = (9)(9)

$\boxed{\text{\# of ways = 81 ways}}$

by different door

there are 9 entrance doors and 8 exit doors, therefore

# of ways = (9)(8)

$\boxed{\text{\# of ways = 72 ways}}$

16 to 19

red ball

$$P = \frac{7}{7+9+11} = \boxed{0.2593}$$

not red

$$P = \frac{9+11}{27} = \boxed{0.7407}$$

white

$$P = \frac{9}{27} = \boxed{0.3333}$$

red or white

$$P = \frac{7+9}{27} = \boxed{0.5926}$$

Number of committees that can be formed

$$N = (11)(9)(7)$$

$$\boxed{N = 693}$$

21

5 black balls

7 white balls

Probality 1: 1 black then 1 white

Probality 2: 1 white then 1 black

$$P = \left(\frac{5}{12} * \frac{7}{11}\right) + \left(\frac{7}{12} * \frac{5}{11}\right)$$

$$\boxed{P = 0.53}$$