

1.

1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1

2. Use the 6th row of Pascal's Triangle: 1 6 15 20 15 6 1

0-tails – 1 way

1-tail – 6 ways

2-tails – 15 ways

3-tails – 20 ways

4-tails – 15 ways

5-tails – 6 ways

6-tails – 1 way

3. Use the 5th row of Pascal's Triangle 1 5 10 10 5 1

0-sales – 1 way

1-sale – 5 ways

2-sales – 10 ways

3-sales – 10 ways

4-sales – 5 ways

5-sales – 1 way

4. a. we need to take 5 cards from the 39 nonclubs $C(39, 5)$

We need zero cards from the 13 clubs: $C(13, 0)$

So the answer is: $C(39,5)C(13,0)$ or just $C(39,5)$

4.b. We need to take 5 cards from the 13 clubs: $C(13, 5)$

We need zero cards from the 39 nonclubs: $C(39, 0)$

So the answer is: $C(13,5)C(39,0)$ or just $C(13,5)$

5a. Each sales call results in either a sale or a no sale, so we have 2 possible outcomes 10 times or: 2^{10} possible outcomes

and $C(10,0)$ is the number of ways he makes zero sales, so we have:

$$2^{10} - C(10,0) = 1024 - 1 = 1023$$

5b. $C(10,0)$ is the number of ways he makes zero sales

and $C(10,1)$ is the number of ways he makes 1 sale, so we have:

$$C(10,0) + C(10,1) = 1 + 10 = 11$$

6a. Each calculator either breaks down or doesn't breakdown, so we have 2 possible outcomes 20 times or: 2^{20} possible outcomes.

$C(20,0)$ is the number of ways zero will break down

$C(20,1)$ is the number of ways exactly 1 will break down

so we have: $2^{20} - C(20,0) - C(20,1) = 1,048,576 - 1 - 20 = 1,048,555$

6b. $C(20,0) = 1$ is the number of ways none will breakdown

6c. $C(20,0) + C(20,1) + C(20,2) = 1 + 20 + 190 = 211$