Part D

1. Using choose: There are $\binom{6}{2} = \frac{6 \cdot 5}{1 \cdot 2} = 15$ equally likely ways for the archers to hit the targets, and one can count that 4 of these involve them hitting two targets exactly 10 m from each other. So the probability is $\boxed{\frac{4}{15}}$.

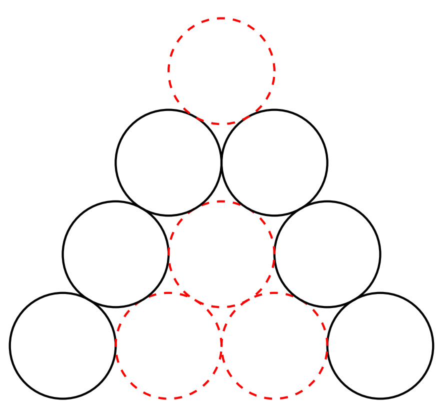
   Alternatively: if one archer hits one of the two leftmost or two rightmost targets, then the other archer has a $\frac{1}{5}$ chance to hit a target exactly 10 m away, since there is only one such target. Otherwise, there are two ways. So the probability that the two archers hit two targets exactly a distance of 10m from each other is $\frac{4}{6} \times \frac{1}{5} + \frac{2}{6} \times \frac{2}{5} = \boxed{\frac{4}{15}}$.

2. Between 1 and 99, there are $\frac{99}{3} = 33$ multiples of 3 and $\frac{95}{5} = 19$ multiples of 5. There are also $\frac{90}{15} = 6$ multiples of both. If we add the number of multiples of 3 and 5, we will count the multiples of both twice. But we want to count them zero times. So we subtract them twice, and the answer is $33 + 19 - 6 - 6 = \boxed{40}$.

3. Notice that the prices of medium and large pizzas are divisible by 3. Since the price of a topping is \$3, a medium or large pizza with any number of toppings will always have a price divisible by 3, and the final cost cannot be prime! So the pizza has to be small, with as many toppings as possible so that the price is prime. If we add 3 additional toppings to our small pizza, then the total cost will be \$16, which is not prime. With one less topping, the total cost is \$13, which is prime. So the most expensive pizza possible is a small pizza with 2 toppings, which costs $\boxed{\$13}$.

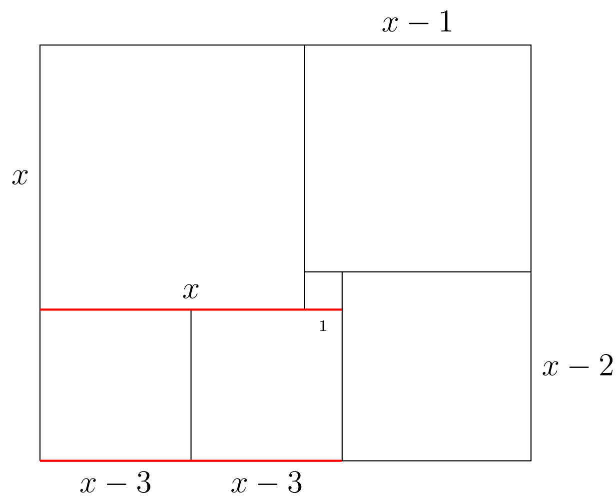
4. If more than 93% of the people in the math club are girls, then less than 7% of the people in the math club are boys. Since we want to find the minimum possible number of people, let's assume that Robert is the only boy. Then, we want to find an integer x such that $\frac{1}{x} \leq 0.07$. Solving, we get $x \geq \frac{1}{0.07}$, or $x \geq 15$. So there are at least $\boxed{15}$ people in the club.

5. The answer is $\boxed{4}$. Here is one possible way to do it (the red dashed circles are the ones removed):

   Convince yourself that the task is impossible if you are only allowed to remove 3 circles.

6. One good way to do this question is to use variables. Let x be the side length of the largest square. Then, using the fact that the smallest square has side length 1, we can find the side length of every other square in terms of x:



Equating the lengths of the two red segments in the picture above, we get

$$x + 1 = 2(x - 3),$$

which solves to give $x = \boxed{7}$.

7. Apart from 1, there are 9 possible digits (0, 2, ..., 9).

   We can write any number between 1 and 999 as a three-digit number (with possible leading zeroes). For example, we can write 2 as 002, 45 as 045, and 233 as 233.

   For each of the hundreds, tens, and units digits, we can choose to assign it one of the 9 possible digits, and the result will be a number that does not contain the digit 1. This gives $9 \times 9 \times 9 = 729$ numbers.

   However, this includes the number 0 (which was counted as 000), which needs be excluded.

   Thus the answer is $729 - 1 = \boxed{728}$.

8. Since Ernie's speed is 60km/h, one hour after Ernie leaves, Ernie has driven 60km.

   When Ernie runs out of fuel, he will have driven a total of 60km + 40km = 100km.

   The time he takes to drive this additional 40km is $40/60 = \frac{2}{3}$h.

   Thus, for Bert to catch up with Ernie at the exact instant Ernie runs out of fuel, Bert must drive 100km in $\frac{2}{3}$h.

   This means Bert must drive at a speed of $\dfrac{100\text{km}}{2/3\text{h}} = \boxed{150 \text{ km/h}}$.