10. 53, 41, 29. To form a conjecture about the next three numbers, look for a pattern in the sequence. From looking at the sequence, we can hypothesize that the terms are each twelve less than the value of the previous term. When testing it out, we see that the pattern is subtracting 12.

11. $\frac{16}{9}, \frac{32}{27}, \frac{64}{81}$ To form a conjecture about the next three numbers, look for a pattern in the sequence. From looking at the sequence, we can hypothesize that the terms are found by multiplying the previous term by $\frac{2}{3}$. When testing it out, we see that the pattern is multiplying by $\frac{2}{3}$.

12. To form a conjecture about the number of triangles formed, look for a pattern in the sequence. From looking at the sequence, we can make the conjecture that for every n sides there 2 less triangles in the polygon. When testing it out, we see that the pattern holds true. The number of triangles is $n - 2$.

13. Comparing the ratios $\frac{\text{Seniors with a License}}{\text{Number of Seniors}}$ for each year, use the pattern to make a conjecture about the number of seniors each year that have a driver's license. Each year, about 65% of the senior class have a driver's license.

14. Using the ratio found in the previous problem, we can conclude that out of 413 seniors about 264 to 270 should have a driver's license. (Answers should vary within that range.)

15. Answers may vary. Sample:

16. Answers may vary. Sample: Both 8 and 0 are rational numbers, but

$8 \div 0$ is not a rational number. This is a counterexample, so the statement is false.

17. **a.** Answers may vary. Sample: The data for the four groups is very close. In all four trials, between 20% and 23% of subjects reported better sleep. Therefore, a reasonable conjecture is that the herb is between 20% and 23% effective in improving sleep.

b. Answers may vary. Sample: Between 200 and 230 subjects will report better sleep.

18. Deshawn could start by finding all three digit numbers where the first and third digits are equal to each and the sum of the first and third digits is equal to the second digit. Then he could determine if each is divisible by 11.

$121\,(1+1=2):121\div 11=11$
$242\,(2+2=4):242\div 11=22$
$363\,(3+3=6):363\div 11=33$
$484\,(4+4=8):484\div 11=44$

Since $5+5=10$, there are no more three-digit numbers that fit this description. Since the statement has been shown to be true for all possible cases, the statement is true.

19. Yes; observing the circles, she can see from $1+1=2$; $3+4=7$; $7+6=13$; and $13+8=21$ that the pattern is to add successive multiples of 2. A design with 6 circles has $21+10=31$ separate regions.

20. 12: no

19: no

22: yes

28: no

30: yes

21. (D) 256

From observing the sequence, we can see that the pattern multiplies the previous two numbers to find the next number. The next number in the sequence is $8\times 32=256$.

22. (B) $2n + 1$

The numbers of dots take the 1 dot and increases by 2 each iteration, therefore $2n + 1$.

23. **Part A** Answers may vary. Sample conjectures: If there is a vote on Proposition 3, then it is likely to pass. If the survey is representative of the population, then Proposition 3 is likely to pass. Sample explanation: In a survey of 300 people, half would be 150. Since more than 150 people are for Proposition 3, it is likely to pass.

Part B Answers may vary. Sample: Using the voting ratios displayed in the graph, about $4,000$ out of $7,500$ people would vote for Proposition 3.