

1. A	7. D	13. B	19. A	25. A
2. B	8. D	14. A	20. E	26. E
3. C	9. A	15. C	21. E	27. B
4. D	10. B	16. C	22. E	28. C
5. E	11. C	17. B	23. D	29. A
6. D	12. C	18. B	24. C	30. D

For this test, we will make a pass through the test and eliminate as many answers as possible. It would be extremely wise to keep track of what you have answered on a separate sheet of paper AS WELL AS the number of times you've selected each answer choice.

We can't immediately eliminate any answers from question 1, but question 2 we can eliminate answer C, as a straight has length 5 and $27+5$ is outside the range of this test. Questions 3 and 4 don't have any eliminations in them but you can be reasonably certain that there are not only 2 answer choices A on this whole test; it is unlikely the answer to 4 is A. Questions 5 and 6 have no eliminations right now. Question 7, we can eliminate answer choice E because the first instance of E cannot follow an E. For question 8, we can eliminate answer choices A, B, and E because they have the same answer as answer choice. Question 9 is the first one we can actually bubble in an answer! Selecting ANSWER D is answer choice A.

Questions 10 and 11 have no eliminations yet. Questions 12 and 13 are easily solved, just look at each answer choice and look for one that sends you back to itself in 12. C sends to B sends to C so we choose C for 12 and B for 13. We can go ahead and eliminate answer A from question 2 as well because the straight can't start on a B. For number 14, the number of answer choices that are consonants is $30 - A - E$; note that down and move on. Question 15 gives us some valuable information: $A = B = D$. We don't know what C and E are, so we must go on from this question for now.

For questions 16, we must first compute $16^{13} \equiv 2^{4 \cdot 13} \pmod{13}$. Because 2 and 13 are relatively prime, we can apply Euler's Theorem $[a^{\phi(n)} \equiv 1 \pmod{n}]$ noting that $2^{12} \equiv 1 \pmod{13}$, then noting that $52 \equiv 4 \pmod{12}$ we have $2^{52} \equiv 2^{12 \cdot 4} \cdot 2^4 \equiv 2^4 \equiv 16 \pmod{13} = 3$. Thus the answer to this question is the same as the answer to question 3. Since we don't know what 3 is, we will come back to it.

For Question 17, for now we should just list out the pairs: 8 and 34 (can't be this one!), 7 and 23, 6 and 14, 5 and 7, and 4 and 2. We can't do anything on Question 18 or 19 at first pass. Question 20 has answer $30 - A$. Question 21 implies that we have questions 20, 21 and 22 all the same answer choice. Nothing much on question 22. Number 23 provides one of the last clue to crack this test wide open. We now know that $E=A-1$. The wording of the question implies that C must be 2 more than another answer choice, but C can't be 2 more than A because then we have the equation $A + A + A + 2 + A + A - 1 = 30 \rightarrow 5A + 1 = 30$ which doesn't have any integer solutions. By the same logic, C can't be 2 more than B or D, and it clearly can't be more than itself. Therefore we know that C is 2 more than E. Thus

we can deduce that $A = B = D = 6, C = 7, E = 5$. Go ahead and mark Question 15 as C because $C=7$ and $E=5$ so $7 - 5 = 2$.

Question 24 is easy now that we know that $A=6$, we choose answer choice C. We'll come back to 25 and 26 later. For 27, we will just fill in whatever we get for 30. For 28, we know that A, B, and D are 6, so they are not divisors of 28, but $C=7$ is, so choose C. On 29, we know that there are only 5 E's so the only choice here is A.

Finally, we examine question 30. This recurrence relation works for all x , so we can go ahead and plug in $x=1$ to eliminate having to juggle many different powers of x in the final polynomial. We see that $f_0(1) = 2$, then $f_1(1) = 1f_0(1) + 1 = 3$, $f_2(1) = 2f_1(1) + 1 = 7$, then we have $3 \cdot 7 + 1 = 22$, $4 \cdot 22 + 1 = 89$, then $5 \cdot 89 + 1 = 446$, then $6 \cdot 446 + 1 = 1677$, then finally we get $f_7(1) = 7f_6(1) + 1 = 7 \cdot 2677 + 1 = 18740$ which is answer D (go ahead and fill this in for Question 27 as well).

Now let's make a second pass. Still haven't eliminated anything from 1, but we can now eliminate options from Question 2. A is impossible because the answer to Q13 is not A, D is impossible because then Question 24 would have to be E, and E is impossible because 15 is C, THUS the straight of answers must start at Question 1 so fill in A-E for Q1-5. Now that we have the answer to question 3, we know that answers 6 and 7 are the same answer, and we also know from Q5 that there are no E's between 5 and 20 (go ahead and cross these off, and mark E for Q20). We now know that Q6 must be answer choice D because A has 6 appearances, then 7 is also D because of questions 4 and 5.

Q8 will be the last question we answer. For Q10, 24 is not A, 29 is not C, 27 is not D, and between B and E, we have a true statement if the answer here is B so we can ignore answer E. Q11 is choice C because we now know the answer to 24. Q14 must be A because $30 - A - E = 19$ which is prime. Q16 is now C because Q3 is C. Q17 is B because Q7 and Q23 are both D. Let us examine Q18: Either answer choice B or D is correct because we know enough of the key to eliminate A C and E. The answer is B because the wording of the question implies that this question is the ONLY question with this property, and even though at this point we don't know if 25 is C or not, we see that 14 is A and 15 is C. Let's skip 19 for now at least until we have the rest of the key. Question 21 guarantees that because 20 is E, 21 and 22 are also E. 21 and 5 are the two odd questions that have answer E so $21-5=16$ gives us confidence that we are on the right track. Q25, we know now that 14 is A so the only choice here is A, and Q26 is E, as there is a correct answer of each of A, B, C, and D, after it.

Let's take a look back at Q19 now. We know now that there are 2 A's after 19, but not 3 B's, 4 C's, 5 D's and certainly not 6 E's. Now we finally look back at Q8, and we must count the number of answers C and D to find out how many we have left to answer. Remember, we know that there should be 7 C's and 6 D's and we see that there are already 7 answers C and only 5 D's so we must choose D for 8 and we are done!