

Science Olympiad – SSSS 2020 - will0416 - Regional Level

Names of participants: (Please print neatly)

School Name: _____

Check your team: Varsity JV1 JV2 JV3

Warning: Do not open this packet until given permission to do so.

Note: There are useful notes after this page.

Scoring:

Time to solve first problem: _____ (use to calculate Bonus below)

| Question | Value | Incorrect letters | Deduction | Score |
|--------------------|-------|-------------------|-----------|-------|
| Timed | 200 | | | |
| 1 | 250 | | | |
| 2 | 300 | | | |
| 3 | 600 | | | |
| 4 | 350 | | | |
| 5 | 350 | | | |
| 6 | 300 | | | |
| 7 | 250 | | | |
| 8 | 400 | | | |
| 9 | 150 | | | |
| 10 | 100 | | | |
| 11 | 100 | | | |
| 12 | 300 | | | |
| 13 | 600 | | | |
| 14 | 300 | | | |
| 15 | 650 | | | |
| 16 | 550 | | | |
| 17 | 250 | | | |
| 18 | 200 | | | |
| 19 | 450 | | | |
| Bonus | | | | |
| Final Score | | | | |

The following tables might be useful during the event.

| | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| A | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| B | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A |
| C | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B |
| D | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C |
| E | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D |
| F | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E |
| G | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F |
| H | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G |
| I | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H |
| J | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I |
| K | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J |
| L | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K |
| M | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L |
| N | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M |
| O | O | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N |
| P | P | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
| Q | Q | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P |
| R | R | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
| S | S | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R |
| T | T | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S |
| U | U | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T |
| V | V | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U |
| W | W | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V |
| X | X | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W |
| Y | Y | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X |
| Z | Z | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 |

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
| Z | Y | X | W | V | U | T | S | R | Q | P | O | N | M | L | K | J | I | H | G | F | E | D | C | B | A |

| | | | | | | | | | | | |
|---|---|----|----|---|----|----|----|----|----|----|----|
| 1 | 3 | 5 | 7 | 9 | 11 | 15 | 17 | 19 | 21 | 23 | 25 |
| 1 | 9 | 21 | 15 | 3 | 19 | 7 | 23 | 11 | 5 | 17 | 25 |

| | | | | | | | |
|--------------|---|--------------|-----|--------------|---|--------------|-----|
| AAAA | A | AABBA | G | ABBAA | N | BAABA | T |
| AAAAB | B | AABBE | H | ABBAB | O | BAABB | U/V |
| AAABA | C | ABAAA | I/J | ABBBA | P | BABAA | W |
| AAABB | D | ABAAB | K | ABBBB | Q | BABAB | X |
| AABAA | E | ABABA | L | BAAAA | R | BABBA | Y |
| AABAB | F | ABABB | M | BAAAB | S | BABBB | Z |

Frequency Table of English letters:

| | | | | |
|------------|-----------|-----------|-----------|-----------|
| E - 12.51% | S - 6.54% | C - 3.06% | G - 1.96% | K - 0.67% |
| T - 9.25% | R - 6.12% | U - 2.71% | W - 1.92% | X - 0.19% |
| A - 8.04% | H - 5.49% | M - 2.53% | Y - 1.73% | J - 0.16% |
| O - 7.60% | L - 4.14% | F - 2.30% | B - 1.54% | Q - 0.11% |
| I - 7.26% | D - 3.99% | P - 2.00% | V - 0.99% | Z - 0.09% |
| N - 7.09% | | | | |

Frequency Table of Spanish letters:

| | | | | |
|------------|-----------|-----------|-----------|-----------|
| E - 14.08% | I - 5.98% | M - 3.08% | Y - 1.09% | Z - 0.47% |
| A - 12.16% | L - 5.24% | P - 2.89% | V - 1.05% | Ñ - 0.17% |
| O - 9.20% | D - 4.67% | B - 1.49% | G - 1.00% | X - 0.14% |
| S - 7.20% | T - 4.60% | H - 1.18% | F - 0.69% | K - 0.11% |
| N - 6.83% | U - 4.69% | Q - 1.11% | J - 0.52% | W - 0.04% |
| R - 6.41% | C - 3.87% | | | |

For the purposes of cryptograms it is customary to treat n and ñ as distinct letters, but a and á are the same letter. Likewise for e and é, and i and í. In other words, all the accent marks get amputated when working with cryptograms. Also, while some older Spanish dictionaries consider ch, ll, and rr, to be their own letters—this has fallen out of modern usage. Accordingly, “burro” is considered as five letters: “b-u-r-r-o” and not as four letters “b-u-rr-o.”

Morse Code:

| | | | | | | | | | |
|---|------|---|------|---|------|---|------|---|------|
| A | •- | F | ••-• | K | -•- | P | •--• | U | ••- |
| B | -••• | G | --• | L | •-•• | Q | --•- | V | •••- |
| C | -•-• | H | •••• | M | -- | R | •-• | W | •-- |
| D | -•• | I | •• | N | -• | S | ••• | X | -••- |
| E | • | J | •--- | O | --- | T | - | Y | -•-- |
| | | | | | | | | Z | --•• |

| | | | | | | | | | |
|---|--------|---|-------|---|-------|---|-------|---|--------|
| 0 | ----- | 2 | ••--- | 4 | ••••- | 6 | -•••• | 8 | ----•• |
| 1 | •----- | 3 | •••-- | 5 | ••••• | 7 | --••• | 9 | -----• |

| | | | | | | | | | | | | | | | |
|-------|---|--------|---|-------|---|-------|---|--------|---|------|---|-------|---|-----|---|
| • | E | - | T | -• | N | -- | M | -•• | D | -•- | K | -•• | G | --- | O |
| •• | I | •- | A | •-• | R | •-- | W | •--• | P | •--- | J | ••••- | | | |
| ••• | S | ••- | U | ••-• | F | •-•• | L | --•• | Z | --•- | Q | | | | |
| •••• | H | •••- | V | -•-• | C | -•-• | Y | ••••- | 4 | | | | | | |
| -••• | B | -••- | X | ••--- | 2 | ••••- | 3 | -----• | 9 | | | | | | |
| ----- | 0 | •----- | 1 | --••• | 7 | ---•• | 8 | | | | | | | | |
| ••••• | 5 | -•••• | 6 | | | | | | | | | | | | |

Timed Question **[200 points]** Solve this timed aristocrat. When you have solved it, raise your hand so that the time can be recorded and the solution checked.

P GDIM PDGRJG RJ QHDZ URGK P IZRBIM AHRSM PZL SPZZHG

SHCV, JH KM KPJ HZXV GH SHCV GH CDHAM KRJ

HDRWRZPXRGV

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|-------------|---|---|---|---|---|---|---|----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | 2 | 1 | 3 | 5 | | | 8 | 11 | 3 | 5 | 4 | 1 | 5 | | | 7 | 1 | 9 | 4 | | 1 | 4 | 1 | 2 | | 7 |
| Replacement | | | | | | | | | | | | | | | | | | | | | | | | | | |

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1) [250 points] Solve this affine cipher given that $a = 5$ & $b = 11$.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Z | X | C | U | F | S | F | L | Y | B | C | U | Z | Y | P | T | D | S | F | A | L | Y | P | F | S | D | H | X | C | U | L | Y |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X | B | T | I | L | C | U | F | C | Z | V | H | Y | A | F | S | X | C | L | Y | A | Z | Y | P | ? | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | ? | | | | | | | |

2) [300 points] Encode this text using the Vigenere cipher and the keyword SCHOOL.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| E | D | U | C | A | T | I | O | N | H | A | S | P | R | O | D | U | C | E | D | A | V | A | S | T | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | O | P | U | L | A | T | I | O | N | A | B | L | E | T | O | R | E | A | D | B | U | T | U | N | A | B | L | E | T | O | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | I | S | T | I | N | G | U | I | S | H | W | H | A | T | I | S | W | O | R | T | H | R | E | A | D | I | N | G | . | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | . | | | |

3) [600 points] Solve this K1 patristocrat said by Ralph Nader given that the word "OIL" appears once in the plaintext.

FVLAF KIDOJ ZTRQI MTUJF FADIG ADDIA IJFGR GTUJU

RAQJZ TJRQC TUI

| K1 | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | 5 | | 1 | 4 | | 5 | 3 | | 6 | 6 | 1 | 1 | 1 | | 1 | | 3 | 4 | | 5 | 4 | 1 | | | | 2 |
| Replacement | | | | | | | | | | | | | | | | | | | | | | | | | | |

4) [350 points] Solve this aristocrat said by Bob Ross (hint: a word in the plaintext correlates with his occupation).

KHLS WOPYSVEL MOYS EVJHQYSPHY, VLWVJPOXXN AN SZVPE

WVVEL

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | 1 | | | | 4 | | | 3 | | 2 | 1 | 4 | 1 | 2 | 3 | 5 | 1 | | 5 | | | 7 | 3 | 2 | 4 | 1 |
| Replacement | | | | | | | | | | | | | | | | | | | | | | | | | | |

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5) [350 points] Encode this text using the Hill Cipher and a keyword of PEWD.

$$\begin{pmatrix} P & E \\ W & D \end{pmatrix} \equiv \begin{pmatrix} 15 & 4 \\ 22 & 3 \end{pmatrix}$$

| | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| N | E | I | T | H | E | R | T | H | E | S | U | N | N | O | R | D | E | A | T | H | C | A | N | B | E |
| | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|--|--|
| L | O | O | K | E | D | A | T | W | I | T | H | A | S | T | E | A | D | Y | E | Y | E | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | |

6) [300 points] Solve this quote from the song "Already Gone" by Eagles.

LI IVJTX JGQT GJ KOEETXL, RT OUU UGCT IMW UGVT GX

HKOGXL, OXY RT XTCTW TCTX NXIR RT KOCT JKT NTS.

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|---|---|
| Frequency | | | 4 | | 2 | | 6 | 1 | 4 | 4 | 4 | 3 | 1 | 2 | 5 | | 1 | 4 | 1 | 15 | 4 | 2 | 2 | 8 | 1 | |
| Replacement | | | | | | | | | | | | | | | | | | | | | | | | | | |

7) [250 points] Decode this given an a value of 21 and a b value of 24.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| L | G | Y | U | E | M | E | E | Q | E | J | H | P | E | Y | U | E | G | Z | R | G | Q | Y | L | O | E | H | G |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K | H | M | E | V | Z | | | | | | | | | | | | | | | | | | | | | | |

8) [400 points] Solve this baconian said by Steven Wright on the topic of a certain scientist associated with finches.

BDCARWEINFDGHAJKLRWIMONPQRDASRWTUVXIYNDZBARCWEFIGNHJD

KLAMORWPINQDRASRTWUVINDXYAZBRCEFGWIHNJDAKLMROPQWRSTIN

UVDXYZARWBCEFGIHNKLMODAPQRSTRUVXYWZIBCENFGHJDAKLRMWO

PQRSTUIVXYNZBCEFGHJDAKRWLI MNDAORPQWRSTIUVXYZND

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9) [150 points] A quote has been encoded using the Morbit Cipher for you to decode. You are told that 9=●x, 2=x-, 7=●-, 5=--, 6=●●, 8=x●.

2 6 3 3 4 9 2 7 4 5 1 7 5 6 7 7 4 3 1 3 4 7 1 7 1

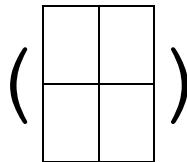
3 3 8 5 8 5 8 3 6 3 3 4 9 3 1 4 3 4 5 1 5 9 3 4 7 1

1 7 1 8 9 2 8 1 7 5 6 2 6 2 7 4 7 8 5 8 9 3 4 3 4 1

7 8 7 6 2 3 4 1 3 7 4

10) [100 points] Find the decryption matrix of encryption matrix BISL

$$\begin{pmatrix} B & I \\ S & L \end{pmatrix} \equiv \begin{pmatrix} 1 & 8 \\ 18 & 11 \end{pmatrix}$$



11) [100 points] Solve this Caesar Cipher.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|--|
| B | K | N | P | D | A | I | K | O | P | L | W | N | P | L | A | K | L | H | A | W | N | A | L | N | K | Q | Z | K | B | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | D | A | L | H | W | Y | A | B | N | K | I | S | D | E | Y | D | P | D | A | U | Y | K | I | A | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

12) [300 points] Solve this aristocrat said by Charles Platt (hint: if you're having trouble, the first word is the title of a famous Maroon 5 song).

WYLCGH YL IXC LITSS DS ADWCBH, YS DZC AJZ VTLI UYPC

UDZE CZDTEX ID ECI DPCG YI.

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Frequency | 2 | 1 | 8 | 7 | 3 | | 2 | 2 | 6 | 1 | | 4 | | | | 2 | | | 4 | 3 | 2 | 1 | 2 | 2 | 5 | 4 |
| Replacement | | | | | | | | | | | | | | | | | | | | | | | | | | |

13) [600 points] It's in Spanish. You know what to do.

CPVS ESWWSDP SA SW PWVP BAJSQBLQ; NZS SW GLVEQS

SRJSQAL X SW BAJSQAL TSPA ZAL.

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | Ñ | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|-------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---|---|---|---|---|---|---|
| Frequency | 7 | 3 | 1 | 1 | 2 | | 1 | | | 3 | | 5 | | 1 | | | 5 | 5 | 1 | 14 | 1 | | 3 | 6 | 1 | | 2 |
| Replacement | | | | | | | | | | | | | | | | | | | | | | | | | | | |

14) [300 points] The following quote needs to be decoded with the Vigenère Cipher with a keyword of **BOOKWORM**.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| U | V | S | B | A | O | C | X | Z | U | F | O | W | H | E | A | W | S | Z | D | A | B | U | E | U | C | P | O | P | V | V |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Q | Y | O | Q | D | J | S | X | M | U | W | J | O | K | T | Z | F | T | O | I | D | D | C | I | , | E | M | W | T | O | . |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

17) [250 points] A quote has been encoded using the Pollux Cipher for you to decode. You are told that 0=●, 1=-, 5=●, 8=-, 6=x, 2=●.

375020607680357931782942154498806203685429527100788438

733267388268180793141515495362807691972235473622007566281

71268875203607238458540475945987846209045062324276891

4037165753876930403540370881487895847236987328645801480

7924159378122

18) [200 points] Solve this Caesar cipher said by Lewis Thomas.

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| K | G | U | A | W | L | Q | W | N | G | D | N | W | K | F | G | L | T | Q | K | Z | G | M | L | A | F | Y | W | S | U | Z |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G | L | Z | W | J | V | G | O | F | T | M | L | T | Q | L | Z | W | M | F | A | I | M | W | U | S | H | S | U | A | L | Q |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| G | X | M | F | A | I | M | W | A | F | V | A | N | A | V | M | S | D | Z | M | E | S | F | T | W | A | F | Y | K | L | G |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U | G | E | H | J | W | Z | W | F | V | W | S | U | Z | G | L | Z | W | J | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

19) [450 points] Solve this baconian cipher given that the last 3 letters are PED.

ADEFBCGJHIMKLNPOQRVSTWUXYZADBECEGFHIMNJKLOPQRSRTVUWYZXD

AEBFJCKGLHIPQMNROSTVWXDUYZABEFCJKGHLPIMQRNOSVWXTDUYEZ

AFBCJGKGLHIMPQRNVWOXSDTEUYZFABJCGHKIMNOSLTUYZABPCGHIMN

OSQRTVWUYXZDABECGFJHKIMLPNOSQTURYZVAWBCXGHIDEFMNJOSTK

UYZABCLPGHQIMNOSTURYZVABCWXDGHIMNEOSFTUJYK LZPQARVBCGW

XHIDMENOFSTUJKLYPZABCQRGHIMVWNXOSTDUYZABECGHIMNFOSTJU

YKZALBCPGQRHIMVWXNDEOFSJTKUYZLABPCGHQIMRVWNOSTUYXDEZA

BFCGHIMJK