**LIONS HIGH SCHOOL MATHEMATICS CONTEST**

**NAME**: **SET NO**.:

**SCHOOL**: **Candidate’s Signature**:

 **Date**:

**GRAND TOTAL**

**JUNIOR CATEGORY**

**May 2019**

**TIME: 2 Hrs**

**INSTRUCTIONS TO THE CANDIDATES**

* Write your name, set number and school in the spaces provided below.
* Answer ALL the questions in the spaces provided.
* ALL workings and answers must be clearly shown.
* A mark may be given for correct working even if the answer is wrong.
* Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

**FOR EXAMINER’S USE ONLY**

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|  |  |  |  |  |  |  |  |  |  |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 11 | 12 | 13 | 14 | 15 | 16 |
|  |  |  |  |  |  |

1. Find $k$ if $8x^{2}+4x+k+2$ is perfect. (2 mks)

2. Simplify $\frac{x^{2}-4}{x^{2}+4x+4}$. (2 mks)

3. Calculate the percentage error in the area of a rectangle of length $8.3 cm$ and width $5.45 cm$.

(2 mks)

4. If $a=3i-j$, $b=4i+2j$ and $p=2a-b$, find the magnitude of $p$ to 2 decimal places.

(3 mks)

5. Simplify $\frac{4+3\sqrt{2}}{3-2\sqrt{2}}$ leaving the answer in the form $a+b\sqrt{c}$ where $a, b$ and $c$ are rational numbers. (3 mks)

6. Find the integral values of $x$ which satisfy the inequalities $3+2x<3x-1\leq 2x+7$.

(3 mks)

7. The interior angle of a regular polygon is $9 times$ the exterior angle. How many sides does the polygon have? (3 mks)

8. Mr. Otieno works for a company earning a basic salary of $Ksh. 20,000$ and house allowance of $Ksh. 6,000$. In a certain year, the geothermal charged tax on PAYEE basis using the table below.

|  |  |
| --- | --- |
| **Income per month in Ksh.** | **Rate (% per Ksh.)** |
| 1 - 10000 | 5 |
| 10001 - 20000 | 10 |
| 20001 - 30000 | 20 |
| 30001 and over | 30 |

Mr. Otieno is given a personal relief of $Ksh. 700$ per month, find the tax he pays in that month. (4 mks)

9. The sum of four consecutive odd numbers is 152. Find the numbers.

10. James is now three times as old as his daughter. In 10 years’ time, he will be twice as old as his daughter. Find their present ages.

11. Shopping center $X, Y$ and $Z $are such that $Y$ is $12 km$ south of $X $and $Z$ is $15 km$ from $X$. $Z $is on a bearing of 3300 from $Y$. Calculate the bearing of $Z$ from $X$.

12. A straight line passes through points $A(-3, 8)$ and $B(3, -4)$. Find the equations of a perpendicular bisector to line $AB$.

13. Solve for$ x$: $log\_{2}\left(4x-8\right)-1=log\_{2}x+1$.

14. In the diagram below, $AB$ is the diameter, $∠CAD=48^{0}$ and $∠ABC=71^{0}$. Find $∠ACD$.



15. Oliver and Michael live $40 km$ apart. Oliver starts from his home at $7.30 am$ and cycles towards Michael’s home at $16 km/hr$. Michael starts from his home at $8.00 am$ and cycles at$ 8 km/hr$ towards Oliver’s. At what time do they meet?

16. Solve for $x$: $32^{\left(x-3\right)}×8^{(x+4)}=64÷2^{x}$.