Directions
• You will have 4 minutes to answer each question.
• The scoring will be 16 points for a correct response in the 1st minute, 12 points for a correct response in the 2nd minute, 8 points for a correct response in the 3rd minute, 4 points for a correct response in the 4th minute. A sliding scale will be used.
• Once your hand has been raised with the answer sheet, it must stay up. If you put your hand down, your answer will be disqualified for that question.
• Your answer must be submitted on the official answer sheet that has been correctly filled out. Otherwise your answer will be disqualified.
• Your answer must be in the specific form that the question asks for.
Directions……

• If not otherwise noted, the answers should be in one of the following generally accepted forms:
  – Denominators rationalized
  – Simplest radical form
  – Fractions, improper fractions, or mixed numbers in simplest form
  – Equations should have integral coefficients in standard form

• No units are necessary
• Calculators are not allowed in any division except Statistics.
• Headphones, beepers, cell phones, or electronic devices are not permitted.
• Sunglasses and hats are not to be worn during the competition.

Are you ready?
1. How many seconds are there in ten thousand days? Write your answer in scientific notation.

2. When six times Sam’s score is decreased by 2, it has the same value as five times his score increased by 15. If Jim’s score is 8 less than Sam’s, what is the average of Jim’s score and the number 15?
3. Find the value of

\[ M + A + T + H \]

given:

- \( M \) = the number of zeros in the number one trillion
- \( A \) = the number of zeros after the decimal in one hundred thousandth
- \( T \) = the difference between the largest and smallest prime factors of 330
- \( H \) = the units digit of \( 7^{11} \)

4. Use properties of exponents to simplify

\[ \frac{(2w^2z)^2(2wz^3)^{-4}}{6w^0(w^{-1}z)^{-2}}. \]
5. Find the area of the triangle bounded by the lines

\[ y = 2, \]
\[ 3x - y = 7, \]
and
\[ 4x + y = 0. \]

6. Find the exact value of

\[
\frac{1}{2010 \times 8 + 36} \left[ (2015 + 2016 + 2017 + 2018)^2 - (2011 + 2012 + 2013 + 2014)^2 \right].
\]
7. Find \( \frac{AB}{CD} \)

given:

\[
\begin{align*}
A &= 2(32 + 1)^0 \\
B &= \sqrt{10^2 - 6^2} \\
C &= (5 + 3)^{1/2}(5 - 3)^{1/2} \\
D &= \frac{\sqrt{5+3}}{\sqrt{5-3}}
\end{align*}
\]

8. An item is marked 20% off. The customer pays $17.12 which includes 7% sales tax. What was the original price of the item?
9. Find all real numbers $a$ and $b$ that satisfy the equation

$$2a^2 + 9b^2 + 1 = 6ab + 2a.$$ 

10. The price of a movie ticket for a child age 6 and under is $1.50$ times the child’s age. The price of a ticket for anyone over the age of six is $12.50$. A mom takes her two children who are three years apart but under the age of six to the movie and spends $23$. What is the age of the younger child?
11. A linear function $f$ has the properties that $f(-2) = 3$ and $f(5) = -4$. Find $f(0)$.

12. Two police cars depart from the same point traveling in opposite directions. One car averages 6 miles per hour faster than the other car. Find the speed of the faster car in miles per hour if they are 176 miles apart at the end of 55 minutes.