## Team Ciphering

$6^{\text {th }}$ Grade

## Round 1

1. Consider the number 24 .

- Let $A$ be the sum of all the positive factors.
- Let $B$ be the sum of the proper factors, including 1 .
- Let $C$ be the number of integer factors.

Find $C\left({ }^{B} / A\right)$.
2. Let $\mathrm{B}=$ the number of distinct ways you can misspell BERRY.

Let $S=$ the number of distinct ways you can spell SIMMONS.
Let $\mathrm{T}=$ the number of distinct ways you can spell TOURNAMENT, if the "words" must begin and end with T.

Find $\mathrm{B}-\mathrm{S}+\mathrm{T}$.
3. For the set of numbers: $\{28,108,92,56$, and 81$\}$

- Find the mean
- Find the median
- Find the range

Your answer is the median of those three numbers.
4. Let $\mathrm{A}=$ the probability of getting heads when you flip one coin.

Let $\mathrm{B}=$ the probability of drawing a spade from a standard deck of cards.
Let $\mathrm{C}=$ the probability of randomly drawing an A or B if the letters of
BLACKBEARS are placed individually in a hat.
Find $A B C$.
5. What is the sum of all integers 1 through 5000 ?

1.

- If you roll three dice, what is the probability that the product of the numbers shown is odd?
- Multiply that number by the smallest natural number with exactly 5 factors.
- Add to that the quotient of $\frac{666666}{333}$.

Write your answer in the box.
2. Let $\mathrm{S}=$ the $50^{\text {th }}$ term in the sequence: $1,2,2,3,3,3,4, \ldots$. Let $\mathrm{I}=$ the $20^{\text {th }}$ digit in the decimal representation of $1 / 7$. Let $X=$ the number of zeros at the end of 20 !

Find SIX.
3. Let $\mathrm{A}=$ the number of socks that must be drawn from a drawer full of blue and black socks to guarantee having 2 of the same color.

Let $\mathrm{B}=$ the probability of rolling a sum of 7 using two fair dice.
Let $\mathrm{C}=$ the number of squares with integral side lengths that can be found on a $4 \times 4$ grid.

Let $\mathrm{D}=$ base 10 value of $11_{2}+11_{3}+11_{4}+11_{5}$.
Find $A C+B D$.
4. Let $\mathrm{A}=1$ more than the $4^{\text {th }}$ perfect square

Let $B=1$ less than the $5^{\text {th }}$ prime number
Let $\mathrm{C}=1$ times the sum of the numbers of Row 5 of Pascal's Triangle.
Find $A+B+C$.
5. What is the value of $(J+A+G+S)-(B+U+C+S)$ if:
$A=2^{2}+9$
$B=13+\sqrt{4}$
$C=63-8^{2}$
$U=17-42+30$
$\mathrm{G}=30-4^{2}$
$J=\sqrt{100}+7 \quad \mathrm{~S}=17-\sqrt{16}+6^{2}$

| 1. $\begin{aligned} & \text { Let } S=1 / 4+2 / 3 \\ & \text { Let } D=3 / 5-1 / 6 \\ & \text { Let } P=1^{2} / 5 \times 3 \\ & \text { Let } Q=2 / 3 \div 1 / 2 \end{aligned}$ <br> Find $S+D-P \times Q$ | ANSWERS |
| :---: | :---: |
| 2. Find the difference of -4 and 6 . Call this $B$. Find the product of $-2(-1)(-3)$. Call this E . Find the sum of $52+-54$. Call this R. Find the quotient of $-51 / 17$. Call this Y . <br> Find the value of $B E R^{2} Y$. |  |
| 3. For the set of numbers $\{1,2,2,4,5,5,5,6,8,8,9,9\}$ <br> Let $M=$ the mean <br> Let $\mathrm{A}=$ the mode <br> Let $\mathrm{T}=$ median <br> Let $\mathrm{H}=$ the range <br> Find the range of $\mathrm{M}, \mathrm{A}, \mathrm{T}$ and H . |  |
| 4. Let $\mathrm{A}=$ the number of digits in the product $234 \times 345$ <br> Let $B=$ the number of digits in $2.5 \times 10^{8}$ <br> Let $\mathrm{C}=\mathrm{A}+\mathrm{B}$ <br> Let $D=A-B$ <br> Find C/D. |  |
| 5. Find the area of a rectangle whose length is twice the diameter of a circle with area $16 \pi$, and whose diagonal is $5!/ 3!$. |  |

