## ASA

## ALABAMA SCHOOL OF FINE ARTS

Mathematics Tournament
January 18, 2013-- 2014 ©

## $6^{\text {th }}$ Grade Written Test

## Directions:

1. Make sure your name and student number are bubbled correctly on the pink scantron sheet.
2. No books, notes, calculators, or other aids may be used. Scratch paper will be provided by the exam proctor.
3. You may write on this exam booklet; however, all answers must be recorded in the proper places on the pink scantron sheet. The pink scantron sheet must be given to the exam proctor when time is called.
4. All answers must be simplified. Do not round unless stated in the question. Units are not required in an answer. If a certain form for the answer is requested, be sure to use that form.
5. This exam consists of 25 multiple choice questions with $A, B, C, D$, and $E$ as answer choices. There are three tie-breaker questions: TB1, TB2, and TB3. Write all tie-breaker answers on the back of the pink answer sheet, labelled with the respective number.
6. "NOTA" denotes "None of the above."
7. Each correct answer earns 4 points. For each incorrect answer, 1 point is subtracted. There is no penalty for unanswered questions.
8. Figures are not drawn to scale.
9. Find the sum of all of the divisors of 256 .
A) 154
B) 255
C) 511
D) 551
E) NOTA
10. We have boxes with dimensions of 6 in. $x 2$ in. $x 5$ in. What is the largest possible number of these boxes that will fit into a moving van, if the van has 5 ft . $\times 4 \mathrm{ft} . \times 10 \mathrm{ft}$. of storage space?
A) 5
B) 2400
C) 3
D) 5760
E) NOTA
11. Solve for the height of the plant at the end of 10 days. Assume that the plant grows at a constantly steady rate.

| End of Day | 1 | 3 | 5 |
| :---: | :---: | :---: | :---: |
| Height (mm) | 10 | 22 | 34 |

A) 64
B) 70
C) 76
D) 82
E) NOTA
4. $5+(9 \div 3)^{2}-2 \times 4 \div(6-2)$
A) 12
B) 6
C) 8
D) 16
E) NOTA
5. A barn has forty-eight sheep. Twenty-two sheep like to eat clover, twenty-two like to eat forbs, and seventeen like to eat grass. Eleven like to eat clover and grass, thirteen like to eat clover and forbs, and eleven like to eat forbs and grass. Nine like eating all three types of food. How many sheep do not eat any of the listed items?
A) 6
B) 10
C) 13
D) 14
E) NOTA
6. If the sum of three consecutive integers is 1203 , then what is the middle number?
A) 401
B) 499
C) 501
D) 599
E) NOTA
7. The Hallman family has a rectangular pool 30 feet long and 25 feet wide. There is a walkway 4.5 feet around the entire perimeter of the pool. Find the outer perimeter of the walkway.
A) 110
B) 1326
C) 128
D) 146
E) NOTA
8. Place the following fractions in order from least to greatest:

$$
\frac{1}{2}, \frac{3}{7}, \frac{-7}{15}, \frac{-1}{2}, \frac{5}{11}
$$

A) $\frac{-1}{2}, \frac{-7}{15}, \frac{1}{2}, \frac{5}{11}, \frac{3}{7}$
B) $\frac{-7}{15}, \frac{-1}{2}, \frac{5}{11}, \frac{1}{2}, \frac{3}{7}$
C) $\frac{-1}{2}, \frac{-7}{15}, \frac{3}{7}, \frac{5}{11}, \frac{1}{2}$
D) $\frac{-7}{15}, \frac{-1}{2}, \frac{1}{2}, \frac{3}{7}, \frac{5}{11}$
E) NOTA
9. If a standard 52-card deck is shuffled, and two cards are pulled out at random with no replacements, what is the probability that both cards will be hearts?
A) $\frac{1}{4}$
B) $\frac{1}{17}$
C) $\frac{1}{16}$
D) $\frac{1}{3}$
E) NOTA
10. Express $0 . \overline{948}$ as a fraction.
A) $\frac{473}{500}$
B) $\frac{948}{999}$
C) $\frac{949}{999}$
D) $\frac{316}{333}$
E) NOTA
11. Zhichun needs a $67 \%$ to get a 5 on her AP exam. If there are 135 possible points, how many points must she get to earn a 5 ? Assume that percentages are not rounded up.
A) 87
B) 89
C) 90
D) 91
E) NOTA
12. What is the value of:

$$
\frac{15}{16}+\frac{17}{18}+\frac{19}{20}
$$

A) $\frac{17}{6}$
B) $\frac{17}{18}$
C) $\frac{203}{73}$
D) $\frac{2039}{720}$
E) NOTA
13. What is the sum of the $10^{\text {th }}$ row of Pascal's Triangle, where the first row only has one " 1 ", the second row has two " 1 "'s, and so on as indicated in the diagram below?

A) 256
B) 512
C) 1024
D) 2048
E) NOTA
14. How many distinct ways can you rearrange the letters of ASFAMATHTOURNAMENT?
A) 18 !
B) 17 !
C) $\frac{18!}{2!2!3!4!}$
D) $\frac{17!}{2!2!3!4!}$
E) NOTA
15. Simplify: $\left[2014 \times \frac{-2014}{2014^{2}} \div\left(\frac{1}{2}\right)\right]^{3}+2 \times 3-(-2)$
A) -1
B) 0
C) 1
D) 2014
E) NOTA
16. One Master Ball is worth 30 Ultra Balls. One Ultra Ball is worth 35 Poke Balls. One Great Ball is worth 7 Poke Balls. How many Great Balls is an Ultra Ball worth?
A) 4
B) 5
C) 6
D) 7
E) NOTA
17. Evaluate: $2014(2000 \times 1999 \times 1998 \ldots \times 2 \times 1)^{0}$
A) 0
B) 1
C) undefined
D) 2014
E) NOTA
18. Write 1,200 in scientific notation.
A) $1.2 \times 10^{3}$
B) $0.12 \times 10^{4}$
C) $12 \times 10^{2}$
D) $1.2 \times 10$
E) NOTA
19. Find the area of a circle if the center of the circle bisects the hypotenuse of an inscribed right triangle with legs of 5 and 12.

A) $169 \pi$
B) $144 \pi$
C) $\frac{169}{4} \pi$
D) $36 \pi$
E) NOTA
20. If $a \Psi b=\frac{a-b}{a+b}$, then find the value of $\frac{6}{7} \Psi(8 \Psi 6)$.
A) $\frac{5}{7}$
B) 1
C) $\frac{15}{7}$
D) 2
E) NOTA
21. Find the sum of the prime numbers from 40 to 60 .
A) 247
B) 304
C) 253
D) 196
E) NOTA
22. When a brand new clock is purchased, the hands of the clock are set to $10: 10$. Assuming that the hour hand is exactly on the 10 and the minute hand is exactly on the 2 , what is the measure of the small angle formed by the hands of the clock?
A) $60^{\circ}$
B) $90^{\circ}$
C) $120^{\circ}$
D) $124^{\circ}$
E) NOTA
23. What base 10 value is written in base 2 as $10110_{2}$ ?
A) 18
B) 20
C) 22
D) 44
E) NOTA
24. The distance between my house and Nath's house is 15 miles. If my car travels at an average speed of 30 mph , then what time will I get to Nath's house if I leave my house at $12: 45$ pm?
A) $1: 15 \mathrm{am}$
B) $1: 00 \mathrm{pm}$
C) $1: 10 \mathrm{pm}$
D) $1: 15 \mathrm{pm}$
E) NOTA
25. What is the value of $\frac{50^{2}-49^{2}}{7^{2}-4^{2}}$ ?
A) $\frac{1}{3}$
B) 3
C) $\frac{25}{3}$
D) 5
E) NOTA

## TIEBREAKERS

TB1: A circle with a radius of 2 has its diameter tripled, cut in half, and then tripled again. What is the area of the final circle?

TB2: Find the value of $\frac{6 a}{b}$ rounded to the nearest whole number given that $\mathrm{a}=3.14159 \ldots$ and $\mathrm{b}=2.71828 \ldots$
TB3: Find $A-B+C$ if each letter represents a distinct digit from 0 to 9 and the following is true:


