

AMERICAN MATHEMATICS COMPETITIONS

4th ANNUAL
AMERICAN JUNIOR HIGH SCHOOL
MATHEMATICS EXAMINATION
(AJHSME)

THURSDAY, DECEMBER 1, 1988

Sponsored by

Mathematical Association of America

Society of Actuaries Mu Alpha Theta

National Council of Teachers of Mathematics

Casualty Actuarial Society American Statistical Association

American Mathematical Association of Two-Year Colleges

American Mathematical Society

INSTRUCTIONS

1. DO NOT OPEN THIS BOOKLET UNTIL TOLD TO DO SO BY YOUR PROCTOR.
2. This is a twenty-five question multiple choice test. Each question is followed by answers marked A, B, C, D and E. Only one of these is correct.
3. For each question, indicate your answer by marking the appropriate space on the answer card provided by your proctor.
4. There is no penalty for guessing. Your score on this test is the number of correct answers.
5. Use a #2 pencil since your answer card will be read by a marked-sense machine. Scratch paper, graph paper, rulers and erasers are permitted. *Calculators are not permitted.*
6. Unless specified otherwise, figures are not necessarily drawn to scale.
7. Before beginning the test, your proctor will ask you to record certain information on the answer card.
8. When your proctor gives the signal, begin working the problems. You will have **40 MINUTES** working time for the test.

The Committee on the American Mathematics Competitions reserves the right to re-examine students before deciding whether to grant official status to their scores. The Committee also reserves the right to disqualify all scores from a school if it is determined that the required security procedures were not followed.

1. The diagram shows part of a scale of a measuring device. The arrow indicates an approximate reading of



- A) 10.05 B) 10.15 C) 10.25
D) 10.3 E) 10.6

2. The product $8 \times .25 \times 2 \times .125 =$

- A) $\frac{1}{8}$ B) $\frac{1}{4}$ C) $\frac{1}{2}$ D) 1 E) 2

3. $\frac{1}{10} + \frac{2}{20} + \frac{3}{30} =$

- A) .1 B) .123 C) .2 D) .3 E) .6

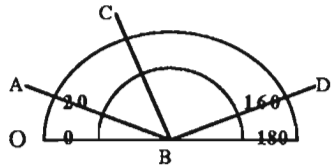
4. The figure consists of alternating light and dark squares. The number of dark squares exceeds the number of light squares by

- A) 7 B) 8 C) 9
D) 10 E) 11



5. If $\angle CBD$ is a right angle, then this protractor indicates that the measure of $\angle ABC$ is approximately

- A) 20° B) 40° C) 50°
D) 70° E) 120°



6. $\frac{(.2)^3}{(.02)^2} =$

- A) .2 B) 2 C) 10 D) 15 E) 20

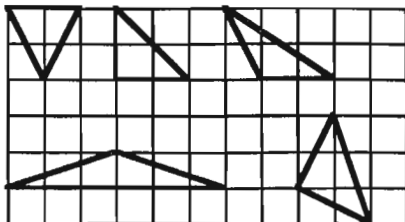
7. $2.46 \times 8.163 \times (5.17 + 4.829)$ is closest to

- A) 100 B) 200 C) 300 D) 400 E) 500

8. Betty used a calculator to find the product 0.075×2.56 . She forgot to enter the decimal points. The calculator showed 19200. If Betty had entered the decimal points correctly, the answer would have been

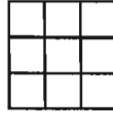
- A) .0192 B) .192 C) 1.92 D) 19.2 E) 192

9. An isosceles triangle is a triangle with two sides of equal length. How many of the five triangles on the square grid below are isosceles?



- A) 1 B) 2 C) 3 D) 4 E) 5
10. Chris' birthday is on a Thursday this year. What day of the week will it be 60 days after her birthday?
- A) Monday B) Wednesday C) Thursday D) Friday E) Saturday
11. $\sqrt{164}$ is
- A) 42 B) less than 10 C) between 10 and 11
D) between 11 and 12 E) between 12 and 13
12. Suppose the estimated 20 billion dollar cost to send a person to the planet Mars is shared equally by the 250 million people in the U.S. Then each person's share is
- A) \$40 B) \$50 C) \$80 D) \$100 E) \$125
13. If rose bushes are spaced about 1 foot apart, approximately how many bushes are needed to surround a circular patio whose radius is 12 feet?
- A) 12 B) 38 C) 48 D) 75 E) 450
14. \diamond and Δ are whole numbers and $\diamond \times \Delta = 36$. The largest possible value of $\diamond + \Delta$ is
- A) 12 B) 13 C) 15 D) 20 E) 37
15. The reciprocal of $(\frac{1}{2} + \frac{1}{3})$ is
- A) $\frac{1}{6}$ B) $\frac{2}{5}$ C) $\frac{6}{5}$ D) $\frac{5}{2}$ E) 5

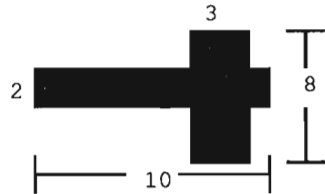
16. Placing no more than one X in each small square, what is the greatest number of X's that can be put on the grid shown without getting three X's in a row vertically, horizontally, or diagonally?



- A) 2 B) 3 C) 4
D) 5 E) 6

17. The shaded area formed by the two intersecting perpendicular rectangles, in square units, is

- A) 23 B) 38 C) 44 D) 46
E) unable to be determined from the information given



18. The average weight of 6 boys is 150 pounds and the average weight of 4 girls is 120 pounds. The average weight of the 10 children is

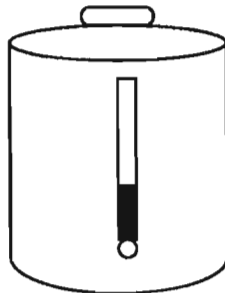
- A) 135 pounds B) 137 pounds C) 138 pounds
D) 140 pounds E) 141 pounds

19. What is the 100th number in the arithmetic sequence: 1, 5, 9, 13, 17, 21, 25, ... ?

- A) 397 B) 399 C) 401 D) 403 E) 405

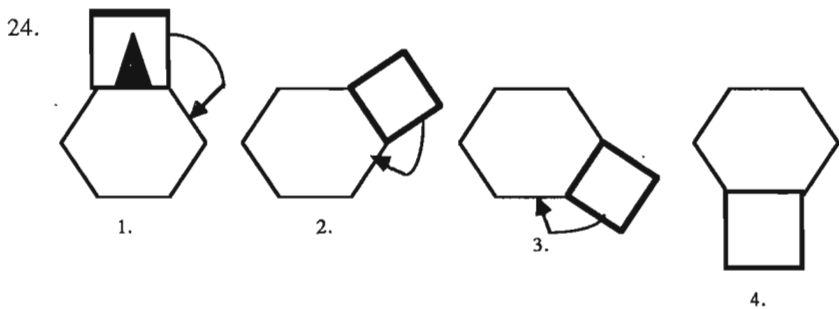
20. The glass gauge on a cylindrical coffee maker shows there are 45 cups left when the coffee maker is 36% full. How many cups of coffee does it hold when it is full?

- A) 80 B) 100 C) 125
D) 130 E) 262



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21. A fifth number, n , is added to the set of numbers $\{3,6,9,10\}$ to make the mean of the set of five numbers equal to its median. The number of possible values for n is
- A) 1 B) 2 C) 3 D) 4 E) more than 4
22. Tom's Hat Shoppe increased all original prices by 25%. Now the shoppe is having a sale where all prices are 20% off these increased prices. Which statement best describes the sale price of an item?
- A) The sale price is 5% higher than the original price.
 B) The sale price is higher than the original price, but by less than 5%.
 C) The sale price is higher than the original price, but by more than 5%.
 D) The sale price is lower than the original price.
 E) The sale price is the same as the original price.
23. Maria buys computer disks at a price of 4 for \$5 and sells them at a price of 3 for \$5. How many computer disks must she sell in order to make a profit of \$100?
- A) 100 B) 120 C) 200 D) 240 E) 1200



The square in the first diagram "rolls" clockwise around the fixed regular hexagon until it reaches the bottom. In which position will the solid triangle be in diagram 4?

- A) B) C) D) E)

25. A **palindrome** is a whole number that reads the same forwards as backwards. If one neglects the colon, certain times displayed on a digital watch are palindromes. Three examples are: $\boxed{1:01}$, $\boxed{4:44}$ and $\boxed{12:21}$. How many times during a 12-hour period will be palindromes?
- A) 57 B) 60 C) 63 D) 90 E) 93

SOLUTIONS

Your School Examination Manager has at least one copy of the 1988 AJHSME Solutions Pamphlet. It is meant to be lent or given to students (but not duplicated).

WRITE TO US!

Questions and comments about the problems and solutions for this AJHSME (but not requests for the Solutions Pamphlet) should be addressed to:

Prof Thomas Butts, AJHSME Chairman
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P O Box 830688 FN32, Richardson, TX 75083-0688

Comments about administrative arrangements and orders for any publications listed below should be addressed to:

Prof Walter E Mientka, CAMC Executive Director
Department of Mathematics and Statistics
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1989 AHSME

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- AJHSME (Junior High Exam), 1985-1988, 50 cents per copy per year.
- AJHSME Combination Set containing 10 copies each of 1985, 1986, and 1987 AJHSME at \$12 per set.
- AHSME 1972-88, 50 cents per copy per year.
- AIME 1983-88, \$1 per copy per year.
- AJHSME Summary of Results and Awards, 1985-87, \$3 per copy per year.
- AHSME Summary of Results and Awards, 1976-88, \$4 per copy per year.

Books (Exams and solutions):

- Contest Problem Book I, AHSMEs 1950-60, \$8.50.
- Contest Problem Book II, AHSMEs 1961-65, \$8.50.
- Contest Problem Book III, AHSMEs 1966-72, \$9.50.
- Contest Problem Book IV, AHSMEs 1973-82, \$10.50.