AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE 37044

JUNIOR HIGH/MIDDLE SCHOOL
MATHEMATICS COMPETITION

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SEVENTH GRADE TEST
1993
SCORING FORMULA: 4R - W + 40

DIRECTIONS:

This is a test of your competence in junior high school mathematics. For each problem there are 5 possible answers listed. You are to work the problems, determine the correct answer, and indicate your choice on the separate answer sheet provided.

SAMPLE:

1. If $x + 1 = 2$, then x equals

   (a) 0

   (b) 2

   (c) -1

   (d) 1

   (e) none of the above

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    A B C D E
1  ① ② ③ ● ⑤
    A B C D E
2  ① ② ③ ④ ⑤
    A B C D E
3  ① ② ③ ④ ⑤
    A B C D E
4  ① ② ③ ④ ⑤
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The correct answer is 1, which is answer (d), so you would answer this problem by darkening the space on the answer sheet corresponding with this choice.

If you should change your mind about an answer, be sure to erase completely. Avoid wild guessing, as wrong answers count against you. Do not mark more than one answer for any problem. Make no stray marks of any kind on your answer sheet.

When told to do so, open your test booklet and begin. When you have finished one page, go on to the next. The working time for the entire test is 80 minutes.

1. If $360 = a$ then $300 =$

    a) $\frac{2}{3}$ a
    b) $\frac{3}{4}$ a
    c) $\frac{5}{6}$ a
    d) $\frac{7}{8}$ a
    e) $\frac{9}{10}$ a

2. Which is the largest number?

    a) $2^3 \cdot 3^2$
    b) 5^6
    c) 6^5
    d) $3^2 + 2^3$
    e) $(3 \cdot 2^3)^2 3$

3. How many natural numbers less than 124 are divisible by 2, 3 and 5?

    a) 4
    b) 5
    c) 6
    d) 7
    e) 8

4. Which of the following could <u>not</u> be the measure of the largest angle of a triangle?

    a) $59°$
    b) $61°$
    c) $68°$
    d) $178°$
    e) $179°$

5. Evaluate $x^3 - 8$ if $x = -3$.

    a) -35
    b) 19
    c) -17
    d) -19
    e) 35

6. $\dfrac{\frac{3}{4} - \frac{1}{3}}{\frac{2}{3} + \frac{1}{4}} =$

    a) $\frac{14}{3}$
    b) $\frac{5}{11}$
    c) $\frac{3}{2}$
    d) $\frac{2}{3}$
    e) $\frac{5}{9}$

7. Ted has an average score of 90 on his first two math tests. What will his average be if he makes a 96 on the third test?

    a) $93 \frac{2}{3}$
    b) 93
    c) $92 \frac{1}{2}$
    d) 92
    e) $91 \frac{1}{4}$

8. Evaluate $\left| |3| - |-8| \right|$.

    a) 5
    b) 11
    c) -5
    d) $|11|$
    e) -11

9. Which of the following is between $\frac{2}{3}$ and $\frac{3}{4}$?

    a) $\frac{3}{5}$
    b) $\frac{5}{7}$
    c) $\frac{7}{9}$
    d) $\frac{9}{11}$
    e) $\frac{77}{100}$

10. Quadrilateral ABCD is a square and the area of △ABC is 18 square
   units. What is the perimeter of square ABCD?

    a) 24 units
    b) 28 units
    c) 32 units
    d) 36 units
    e) 40 units
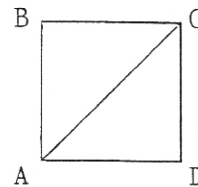
11. A number is selected at random from the set {1, 2, 3, 4, ···, 20}.
    What is the probability that this number is a perfect square or a
    perfect cube but not both?

    a) $\frac{1}{20}$ b) $\frac{1}{10}$ c) $\frac{3}{20}$ d) $\frac{1}{5}$ e) $\frac{1}{4}$

12. Possible scores on a tennis skill test are 0, 1, 2, 3, 4, and 5. This
    graph indicates the number of students making each score.
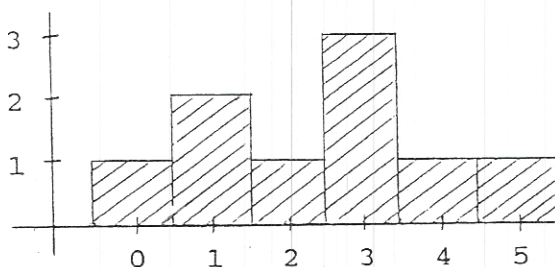
    What was the average score?

    a) $2\frac{4}{9}$ b) $1\frac{1}{3}$ c) $2\frac{1}{2}$ d) 3   e) 2

13. On a particular map $\frac{3}{4}$ of an inch represents 10 miles. On the map,
    Aberdeen and Frederick are 12 inches apart. What is the actual
    distance between these towns?

    a) 160 miles b) 150 miles c) 100 miles d) 90 miles   e) 80 miles

14. Let p be the perimeter of a square and let A be the area of that same
    square. Which of the following is a formula which indicates how to
    find the area given the perimeter?

    a) $A = \frac{p}{4}$ b) $A = p\sqrt{2}$ c) $A = p^2\sqrt{2}$ d) $A = \frac{p^2}{16}$ e) $A = 4p^2$
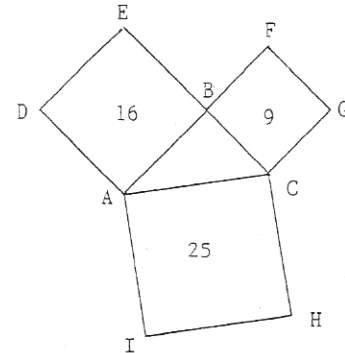
7-2

15.

	Black	Brown	Total
Boys	4	7	11
Girls	6	5	11
Total	10	12	22

In reference to the chart, a person is selected at random. What is the probability that the person is a boy who wears brown shoes?

a) $\dfrac{11}{22}$ b) $\dfrac{6}{22}$ c) $\dfrac{4}{22}$ d) $\dfrac{5}{22}$ e) $\dfrac{7}{22}$

16. The area of square ABED is 16, the area of square BCGF is 9 and the area of square ACHI is 25. What is the area of $\triangle ABC$?

a) 6
b) 7
c) 9
d) 10
e) 12

17. The price of an item is increased by 25% and when it doesn't sell, this price is decreased by 20%. The final price is what percent of the original price?

a) 105%   b) 100%   c) 80%   d) 75%   e) 110%

18. $\dfrac{1 + 2 + 3 + \cdots + 30}{2 + 4 + 6 + \cdots + 60} =$

a) $\dfrac{1}{4}$ b) $\dfrac{1}{3}$ c) $\dfrac{1}{2}$ d) $\dfrac{5}{8}$ e) $\dfrac{3}{4}$

19. If $\dfrac{821.6}{381.75} = \dfrac{x}{38,175}$ then x =

a) 821.6   b) 8216   c) 82160   d) 821,600   e) 8,216,000

20. A train 1 mile long travels through a tunnel 1 mile long at a rate of 1 mile per hour. From the time the front of the train enters the tunnel, how long does it take before the train has passed completely through the tunnel?

a) 1 hour   b) 1.5 hours   c) 2 hours   d) 2.5 hours   e) 3 hours

21. How many rectangles are pictured?

a) 7
b) 9
c) 16
d) 18
e) 19
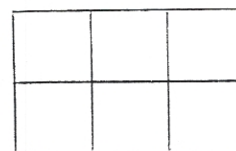
22. $641 \cdot 352 \cdot 279 =$
    a) 60,591,831
    b) 61,378,591
    c) 61,983,437
    d) 62,943,523
    e) 62,951,328

23. Cakes are baked in 1 inch deep rectangular pans measuring 6" x 8",
    7" x 9" and 10" x 12". The cakes are cut into uniform cubes 1 inch on
    a side and a piece is selected at random. What is the probability that
    it came from the 7" x 9" pan?

    a) $\dfrac{1}{3}$
    b) $\dfrac{1}{63}$
    c) $\dfrac{1}{231}$
    d) $\dfrac{3}{11}$
    e) $\dfrac{7}{16}$

24. If $\dfrac{20}{30} = \sqrt{\dfrac{20}{x}}$, then x =

    a) 9
    b) 30
    c) 40
    d) 45
    e) 900

25. In a certain group of 75 students, 16 are taking algebra, biology and
    English, 24 are taking algebra and biology, 30 are taking algebra and
    English, and 22 are taking biology and English. 7 students are taking
    only algebra, 10 students are taking only biology, and 5 are taking
    only English. How many students are not taking any of the three
    subjects?

    a) 45
    b) 14
    c) 9
    d) 0
    e) 5

26. A bag contains 4 red marbles, 8 blue marbles and 12 green marbles.
    What is the probability that a marble chosen at random from the bag
    will be either blue or green?

    a) $\dfrac{3}{4}$
    b) $\dfrac{1}{2}$
    c) $\dfrac{5}{12}$
    d) $\dfrac{2}{3}$
    e) $\dfrac{5}{6}$

27. A girl left school at 3:46 and walked $\dfrac{3}{4}$ of the way home in 18 minutes.
    If she continued to walk at that same rate, when would she get home?

    a) 4:08
    b) 4:10
    c) 4:12
    d) 4:26
    e) 4:46

28. How many four-digit numbers are there that have a thousands digit which
    is even, a hundreds digit which is divisible by 5, a tens digit which
    is prime and a units digit which is odd?

    a) 100
    b) 120
    c) 140
    d) 150
    e) 160

29. If the area of each small square
    is 1, find the area of the shaded
    triangle.
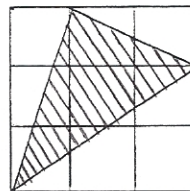
    a) 3
    b) $3\dfrac{1}{2}$
    c) 4
    d) $4\dfrac{1}{2}$
    e) 5
    f) $5\dfrac{1}{2}$

30. How many cards must be drawn from a standard deck of 52 playing cards to guarantee that at least two cards are from the same suit?

a) 4   b) 5   c) 6   d) 7   e) 14

31. Which digit(s) can be filled into 32095__24 so that the resulting number is divisible by 8.

a) any digit
b) no digits
c) only 0 and 8
d) any odd digit
e) any even digit

32. Consider the sequence

$$\frac{1}{2}, \quad \frac{1}{3}, \quad \frac{2}{3}, \quad \frac{1}{4}, \quad \frac{2}{4}, \quad \frac{3}{4}, \quad \frac{1}{5}, \quad \frac{2}{5}, \quad \frac{3}{5}, \quad \frac{4}{5} \cdots .$$

In this sequence $\frac{1}{2}$ is the first term, $\frac{1}{3}$ is the second term, $\frac{2}{3}$ is the third term, etc. Which term is $\frac{3}{8}$?

a) the 23th term
b) the 24th term
c) the 25th term
d) the 26th term
e) the 27th term

33. Which circular pizza(s) is the best buy for $10.00?

a) one 20-inch diameter pizza
b) three 10-inch diameter pizzas
c) one 40-inch circumference pizza
d) six 8-inch diameter pizzas
e) forty 2-inch diameter pizzas

34. In how many ways can 47 be expressed as the sum of two prime numbers?

a) 0   b) 1   c) 2   d) 3   e) 4

35. One-third of the marbles in a first bag are red while one-fourth of the marbles in a second bag are red. The two bags are mixed together in a jar and a marble is drawn. What is the probability that it is red, if the total number of marbles in the jar is 36 and the second bag had twice as many marbles as the first bag?

a) $\frac{7}{12}$ b) $\frac{2}{7}$ c) $\frac{13}{18}$ d) $\frac{5}{12}$ e) $\frac{5}{18}$

36. For the circle, O is at the center, OA = 6
and m ∠ BOA = 100°. What is the area of
the shaded region?
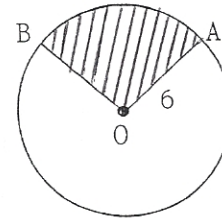
    a) 6π square units
    b) 7π square units
    c) 8π square units
    d) 10π square units
    e) 12π square units

37. How many divisors does $2^4 \cdot 3^5$ have?

    a) 20   b) 22   c) 24   d) 28   e) 30

38. A woman has two quarters, two dimes and two nickels in her pocket. She
wishes to purchase an item which costs 30¢. If she selects, at random,
two coins from her pocket, what is the probability that she will have
at least enough money to pay for the item?

    a) $\frac{1}{2}$ b) $\frac{5}{9}$ c) $\frac{8}{15}$ d) $\frac{17}{30}$ e) $\frac{3}{5}$

39. What is the area of the shaded triangle?

    a) 90 cm^2
    b) 96 cm^2
    c) 120 cm^2
    d) 180 cm^2
    e) 192 cm^2

30 cm

6 cm   12 cm
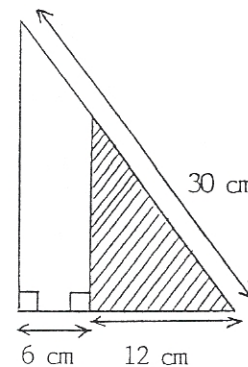
40. Which of the following is true?

    a) $2^{44} < 3^{33} < 5^{22}$
    b) $2^{44} < 5^{22} < 3^{33}$
    c) $3^{33} < 5^{22} < 2^{44}$
    d) $3^{33} < 2^{44} < 5^{22}$
    e) $5^{22} < 3^{33} < 2^{44}$