Seventh Grade Mathematics Competition
1995

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DIRECTIONS:

This is a test of your competence in middle school mathematics. For each problem there are five 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
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The correct answer is 1 which is **d**; so you should answer this problem by darkening the space on the answer sheet corresponding with this choice.

If you change your mind about your 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 60 minutes.

JUNIOR HIGH SCHOOL MATHEMATICS COMPETITION
SEVENTH GRADE TEST
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1. 95 is 125% of what number?

   a. 20   b. 84   c. 76   d. 70   e. 30

2. The cost of an ice cream cup includes the cost of the cup and the cost per dip of ice cream. If a single scoop cup costs 50¢ and a double scoop cup costs 90¢, how much should a 4 scoop cup cost?

   a. $1.60   b. $1.70   c. $1.80   d. $2.00   e. $2.15

3. What is the surface area of a cube with one edge that is 4 inches long?

   a. 16 in²   b. 24 in²   c. 64 in²   d. 96 in²   e. not given

4. Identical cubes are stacked in the corner of a room as shown. How many of the cubes are not visible?

   a. 15
   b. 18
   c. 24
   d. 12
   e. 20
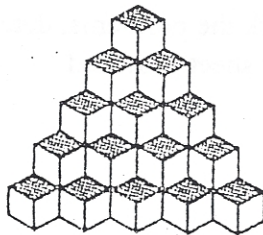
5. A school has 1200 students. Each student takes 5 classes a day. Each teacher teaches 4 classes. Each class has 30 students and 1 teacher. How many teachers does the school have?

   a. 50   b. 60   c. 40   d. 45   e. 65

6. Which of the following can be lengths of the sides of a right triangle?

   1)   10, 24, 26   2)   8, 15, 17   3)   5, 13, $\sqrt{195}$

   a. all of the above   b. 1 and 2   c. 1 and 3   d. 2 and 3   e. none of these

7. A merchant advertises that every item in his store is sold at 30% off the regular price. If he wishes to sell a coat for $129.95, what should he mark as the regular price?

    a. $172.34   b. $159.95   c. $185.64   d. $168.94   e. $190.97

8. Which number is greater, 2^{100}, 3^{75}, 4^{50}, 5^{75}, or 3^{100} ?

    a. 3^{100} b. 5^{75} c. 4^{50} d. 3^{75} e. 2^{100}

9. If there are 9 boys and 6 girls at a party and each is to be given exactly the same number of candies that can be bought in packages containing 12 candies, what is the fewest number of packages bought?

    a. 5   b. 9   c. 10   d. 8   e. 4

10. Which of the following is false?

    a. The diagonals of a rectangle always bisect each other.
    b. The diagonals of a rectangle are always perpendicular.
    c. The diagonals of a rectangle, together with the sides, always form two pairs of congruent triangles.
    d. The diagonals of a rectangle always form pairs of vertical angles.
    e. The diagonals of rectangle always connect nonconsecutive vertices.

11. One button is drawn from a box containing 3 black buttons, 7 red buttons, and 5 yellow buttons. What is the probability that the button drawn is not black?

    a. 1/5   b. 7/15   c. 1/3   d. 4/5   e. 1/7

12. Given $AB = 3$, $\angle CBA \cong \angle BCA$, $m\angle D = 60°$ and $\angle A$ and $\angle BCD$ are right angles, find BD.
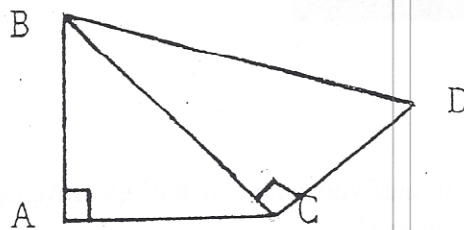
    a. $2\sqrt{6}$

    b. $2\sqrt{3}$

    c. 6

   d. $\dfrac{3\sqrt{6}}{2}$

    e. none of these

13. The mean of three test grades is 74. What must a fourth grade be to increase the mean to 78?

    a. 95   b. 90   c. 85   d. 84   e. 88

14. Which of the following is the smallest?

    a. $\dfrac{331}{452}$ b. $\dfrac{330}{451}$ c. $\dfrac{332}{453}$ d. $\dfrac{329}{450}$ e. $\dfrac{328}{454}$

15. A grain bin in the shape of a cylinder has a radius of 7 feet and a height of 18 feet. If there are about 1.25 ft.^{3} per bushel, approximately how many bushels of grain will the bin hold?

    a. 2200 bushels   b. 3450 bushels   c. 640 bushels   d. 1000 bushels   e. 1550 bushels

16. Of two cubical dice, one has a blank face instead of a 1, and the other has a blank face instead of a 4. What is the probability of rolling a sum of 7 with these dice?

    a. 0   b. 1/4   c. 1   d. 1/7   e. 1/9

17. Suppose that you owe your brother $38.05 for half the cost of a new video game. If sales tax is 8.25%, what was the price of the game before tax was added?

    a. $70.30   b. $76.05   c. $67.85   d. $82.40   e. $73.09

18. What percent of the total area of rectangle ABDC is shaded?

    a. 66.$\overline{6}$%

    b. 75%

    c. 62.5%

    d. 80%

    e. 45%
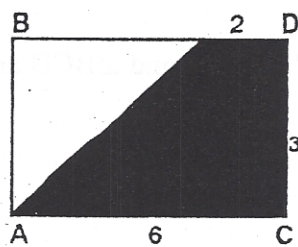
19. A square piece of paper is folded in half vertically. If the resulting figure has a perimeter of 12 cm, what was the area of the original square?

    a. 9   b. 25   c. 18   d. 16   e. 36

7.3

20. If there are exactly four Sundays in August, then August 31 could **not** fall on a

   a. Tuesday   b. Wednesday   c. Thursday   d. Friday   e. Saturday

21. A rectangle is formed from eight rows of six small squares each. How many of the squares do not have an edge on the outside border of the rectangle?

   a. 48   b. 28   c. 24   d. 20   e. 42

22. Find the difference: (5x-7) - (-2x+7)

   a. 3x - 14   b. 7x - 14   c. 7x   d. 3x   e. none of these

23. Compute

$$\frac{-\left(\frac{2}{3}\right)^2 - \frac{1}{3}}{3\left(\frac{2}{3} + \frac{1}{2}\right)^2}$$

   a. 3/49   b. -3/49   c. 3   d. -4/21   e. -49/3

24. On what date would the last Friday of the month fall if the second Thursday of the month was the smallest two digit prime number?

   a. 30th   b. 26th   c. 28th   d. 31st   e. 25th

25. A drawer contains 12 identical white socks and 12 identical black socks. What is the fewest number of socks that must be drawn to <u>guarantee</u> two matching pairs?

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

26. Write using inequality symbols.

   r is less than or equal to 7 and greater than 3.

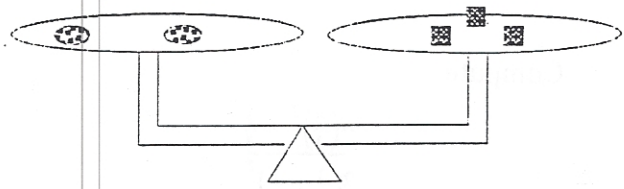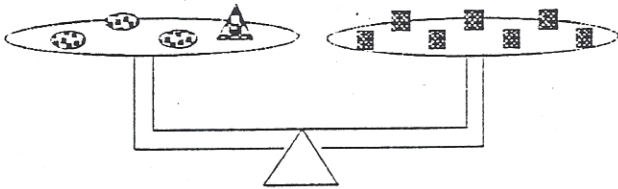   a. $3 \geq r > 7$ b. $3 > r > 7$ c. $3 < r \leq 7$ d. $3 < r < 7$ e. $3 \leq r < 7$

27. If 2.54 cm are in 1 inch, how many inches are in 1 cm?

    a. $(2.54)^2$ b. $1 - 2.54$ c. $\dfrac{1}{2.54}$ d. 2.54 e. $2.54 - 1$

28. Evaluate: $2/3 + 3/4 \div 5/2$

    a. 12/35   b. 14/35   c. 17/30   d. 29/30   e. 2/7

29. On the balance scales there are three types of weights. If the scales in the pictures balance, what weighs the same as 🔺?

    a.   b.   c.

    d.   e.

30. Perform the following operations and simplify:

$(-4) [6 - (5 \cdot 2^2) + 2^2] \div 8(2)^2$

    a. 20   b. -1   c. 0   d. -16   e. 5/4

31. Which one of the following is not possible?

    a. A right triangle that is also isosceles.
    b. A right triangle that is also equilateral.
    c. A right triangle that is also scalene.
    d. A right triangle that has 2 acute angles.
    e. All of the above are possible.

32. The area A and circumference C of a circle are related by which of the following?

    a. $C = 2A$ b. $C^2 = 2\pi A$ c. $A^2 = 2\pi C$ d. $A^2 = 4\pi C$ e. $C^2 = 4\pi A$

33. Find the next element in the following sequence: 1, 8, 27, 64, 125, ...

    a. 343   b. 236   c. 216   d. 150   e. 250

34. Find the product of:

    1/2 · 2/3 · 3/4 · 4/5 · 5/6 · 6/7

    a. 1/7   b. 1   c. 13/30   d. 21/27   e. 10

35. A mouse is at the bottom of an 18 foot well. Each day it climbs up 3 feet, and each night it slides back 2 feet. How long will it take the mouse to get out of the well?

    a. 20 days   b. 18 days   c. 14 days d. 16 days e. 24 days

36. How long is a sixty-pound roll of wire which weighs .3 pounds per foot?

    a. 200 ft.   b. 18 ft.   c. 60 ft.   d. 20 ft.   e. 180 ft.

37. A rectangular box measures 3 feet by 4 feet and is 2 feet deep. What is the length of the longest stick (rounded to the nearest hundreth) that will fit into the box?

    a. 6.24 feet   b. 7.86 feet   c. 4.95 feet d. 5.39 feet e. 4.50 feet

38. A box holds 2 blue, 2 red and 4 yellow marbles. Two marbles are drawn at random. What is the probability of drawing a yellow or blue marble on the first draw?

    a. .75   b. .6   c. .125   d. .5   e. not given

39. Michael sets out on a hike from his house. After walking for a while at 5 miles/hour, he discovers that he has forgotten his lunch. A passing truck takes him home at 20 miles/hour. When he gets home, he finds that exactly one hour has passed since he started on his hike. How far had he walked?

    a. 1 mile   b. 2 miles   c. 3 miles d. 4 miles e. 5 miles

40. A square is circumscribed about a circle of radius r. What is the area of the square?

    a. $2r^2$ b. r^2 c. $4r^2$ d. $2r$ e. $4r$

7.6