

AUSTIN PEAY STATE UNIVERSITY
CLARKSVILLE, TENNESSEE 37044

JUNIOR HIGH/MIDDLE SCHOOL
MATHEMATICS COMPETITION

Prepared by:

SEVENTH GRADE TEST
1991
SCORING FORMULA: $4R - W + 40$

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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

	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

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 $a = 2$, $b = -1$, and $c = 4$, then $(a + b \div c)^{1/2} =$

a) $\frac{\sqrt{7}}{2}$

b) $\frac{\sqrt{3}}{2}$

c) $\frac{1}{4}$

d) $\frac{1}{2}$

e) $\frac{3}{4}$

2. If n is an integer and $100 < 3^n < 700$ then $n =$

a) 3

b) 4

c) 5

d) 9

e) 100

3. The product of two three digit numbers may have

~~a) 3 digits~~

b) 4 digits

~~c) 6 digits~~

~~d) 8 digits~~

~~e) 9 digits~~

4. Given that x is an even integer, which of the following must be an even integer?

~~a) $\frac{1}{2}x$~~

~~b) $\frac{1}{2}(x+1)$~~

c) $3x + 1$

~~d) $5x + 1$~~

e) $5x$

5. A car dealership received half of a shipment of cars on Monday, one-third of the shipment on Tuesday, and the remainder on Wednesday. The cars which arrived on Wednesday included a red sedan and a blue two-door. Which of the following could be the size of the entire shipment?

a) 6 cars

b) 10 cars

c) 12 cars

d) 13 cars

e) 15 cars

6. Last month a clothing store manager decreased prices on all stock by 10%. This month she increased all prices by 10%. What would you pay this month for a coat that had cost \$100 before prices decreased last month?

- a) \$89
- b) \$95
- c) \$98
- d) \$99
- e) \$100

7. Arrange in order from smallest to largest: π , $\frac{22}{7}$, $3.1\bar{4}$, 3.14

- a) ~~π , 3.14, $\frac{22}{7}$, $3.1\bar{4}$~~
- b) $\frac{22}{7}$, π , 3.14, $3.1\bar{4}$
- c) $\frac{22}{7}$, 3.14, $3.1\bar{4}$, π
- d) 3.14, π , $\frac{22}{7}$, $3.1\bar{4}$
- e) 3.14, $\frac{22}{7}$, π , $3.1\bar{4}$

8. Four balls numbered 1, 2, 3, and 4 are placed in a bag and two are drawn at random without replacement. What is the probability that their sum is an odd number?

- a) $\frac{1}{3}$
- b) $\frac{1}{2}$
- c) $\frac{2}{3}$
- d) $\frac{7}{10}$
- e) $\frac{4}{5}$

9. If $\frac{582}{77.962} = \frac{x}{77962}$ then $x =$

- a) .582
- b) 5820
- c) 58200
- d) 582,000
- e) 5,820,000

10. Test 1 counts 30% of the six-weeks grade. Test 2 counts 50%. Test 3 counts the remainder. Matthew makes 90 on test 1, 80 on test 2, and 55 on test 3. What is his six-weeks grade?

- a) 75
- b) 76.75
- c) 78
- d) 82
- e) 83.25

Handwritten calculation:
 $30 \cdot 90 = 270$
 $50 \cdot 80 = 400$
 $20 \cdot 55 = 110$
 $\hline 825$

11. Which of the following numbers is not divisible by 3?

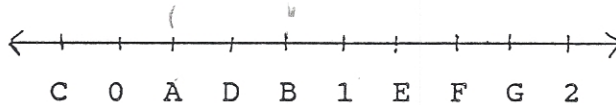
- a) 111,111,111
- b) 111,111,111,111
- c) 123,456,789,111
- d) 1,111,111,111,111
- e) 111,111,111,111,111

12. David is thinking of a number. If he multiplies that number by 4 and then adds 12, he has 6 times his original number. What is David's original number?

- ~~a) 2~~
- ~~b) 3~~
- ~~c) 4~~
- d) 6
- ~~e) 8~~

13. If the number represented by A is subtracted from the number represented by B, which letter best represents the difference?

- a) C
- b) D
- c) E
- d) F
- e) G



14. If $210 = x$ then $280 =$

- a) $\frac{3}{4}x$
- ~~b) $x + 50$~~
- c) $\frac{7}{5}x$
- d) $\frac{5}{4}x$
- e) $\frac{4}{3}x$

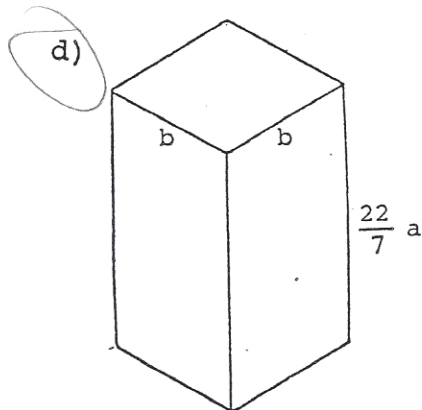
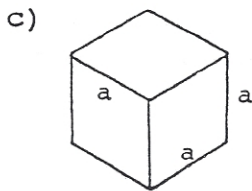
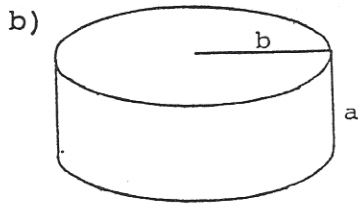
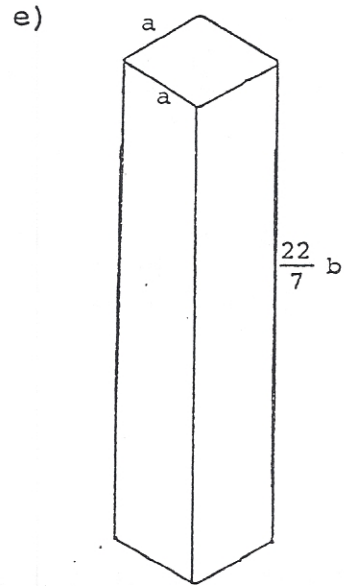
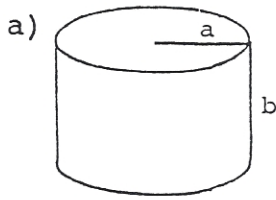
15. $273 \cdot 146 \cdot 919 =$

- a) 26,612,483
- b) 36,519,516
- c) 36,526,491
- d) 36,629,502
- e) 36,715,408

16. ~~$785,785,000,785,785 \div 785 =$~~

- a) 1,001,000,001,001
- b) 1,001,010,000,001
- c) 1,010,000,100,001
- d) 1,110,111,111,111
- e) 1,111,111,111,111

17. Given that $b > a > 0$, which container holds more water?



18. The lengths of two sides of a triangle are 5 and 7. Which of the following could not be the length of the third side?

- a) ~~3~~
- b) ~~4~~
- c) ~~7~~
- d) ~~11~~
- e) ~~13~~

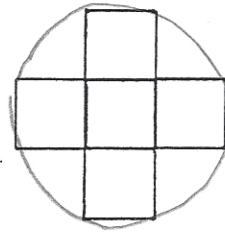
$$\frac{1}{2} \times \frac{35}{1}$$

$$\frac{35}{2}$$



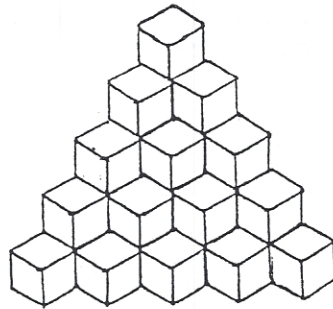
19. The figure pictured, made up of five squares, has area 20 square units. What is the perimeter?

- a) 18 units
- b) 20 units
- c) 22 units
- d) 24 units
- e) 30 units



20. This stack is made from 1 cm cubes. Find the volume.

- a) 20cm^3
- b) 25cm^3
- c) 35cm^3
- d) 45cm^3
- e) 50cm^3



21. $3^{101} + (-3)^{101} =$

- a) 0
- b) 6^{101}
- c) 9^{101}
- d) 3^{202}
- e) 9^{202}

22. The measure of one angle of an isosceles triangle is 30. Which of the following could be the measure of another angle of that triangle?

- a) 60
- b) 75
- c) 80
- d) 85
- e) 90



23. If $x - y = 15$ and $x^2 + y^2 = 273$, then $xy =$

- a) -48
- b) -24
- c) 0
- d) 24
- e) 48

24. How many three-digit numbers are there in which the sum of the digits is 25?

- a) 5
- b) 6
- c) 7
- d) 8
- e) 10

25. John has 2 quarters, 1 nickel and 2 dimes in his pocket. He makes a purchase requiring exactly 35¢. If he reaches into his pocket and pulls out two coins at random, what is the probability that his hand contains at least enough money to make the purchase?

- a) $\frac{3}{10}$
- b) $\frac{1}{3}$
- c) $\frac{1}{2}$
- d) $\frac{2}{3}$
- e) $\frac{7}{10}$

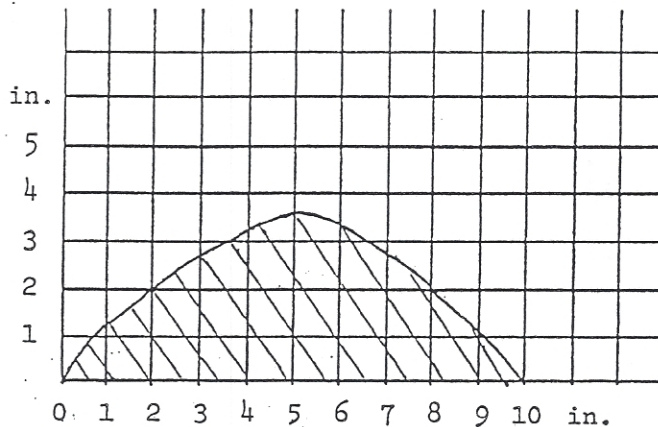
Handwritten notes:
 $1q + 1d = 35$
 ~~$2q + 0 = 35$~~
 $1q + 1d =$

26. If $a > 0$, $b < 0$ and $c < 0$ then which of the following must be true?

- a) $a + b + c > 0$
- b) $a + b + c < 0$
- c) $a + b - c > 0$
- d) $abc > 0$
- e) $abc < 0$

27. Let A be the area of the shaded region. Which of the following is true?

- a) $17 \text{ sq. in.} < A < 24 \text{ sq. in.}$
- b) $A = 20.5 \text{ sq. in.}$
- c) $A < 17 \text{ sq. in.}$
- d) $A > 24 \text{ sq. in.}$
- e) $A = 30 \text{ sq. in.}$

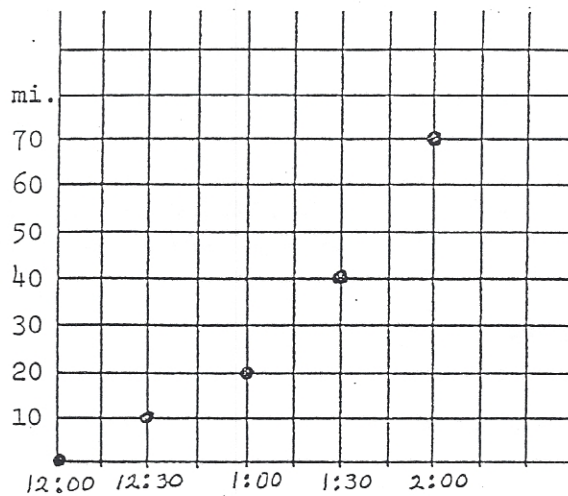


28. The largest number in the set $\{8^{1/3}, 8^{-3}, 8^{-1/3}, (1/8)^{-2/3}, (1/4)^{-1/3}\}$ is

- a) $3^{1/3}$
- b) 8^{-3}
- c) $8^{-1/3}$
- d) $(1/8)^{-2/3}$
- e) $(1/4)^{-1/3}$

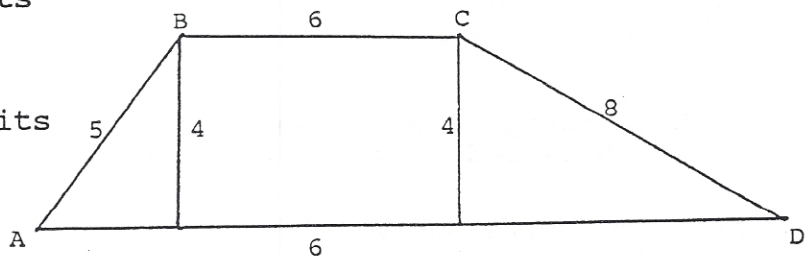
29. Ellen begins an automobile trip in Topeka at 12:00. She traveled a straight highway across flat terrain for two hours. The chart below shows the distance of her car from Topeka at 30 minute intervals. For example, at 1:30, Ellen was 40 miles from Topeka. What was Ellen's average speed during the time interval from 12:30 to 2:00?

- a) 20 mph
- b) 23.3 mph
- c) 35 mph
- d) 40 mph
- e) 45 mph



30. In the given figure \overline{BC} is parallel to \overline{AD} . The area of quadrilateral ABCD is

- a) $30 + 8\sqrt{3}$ sq. units
- b) 23 sq. units
- c) 40 sq. units
- d) $8\sqrt{3}$ sq. units
- e) $36 + 16\sqrt{3}$ sq. units



31. $4^4 + 4^4 + 4^4 + 4^4 =$

- a) 4^4
- b) 4^5
- c) 4^6
- d) 4^{12}
- e) 4^{16}

32. If $4x + 4y = 14$ then $2x + 2y + 5 =$

- a) 7
- b) 8
- c) 10
- d) 11
- e) 12

33. In a survey of 64 hamburger lovers, ~~32~~¹² liked tomato, ~~24~~¹⁸ liked lettuce, ~~16~~ liked mustard, 6 liked lettuce and mustard, 10 liked lettuce and tomato, 7 liked tomato and mustard, and 3 liked all three. How many people preferred hamburgers without any of the three condiments?

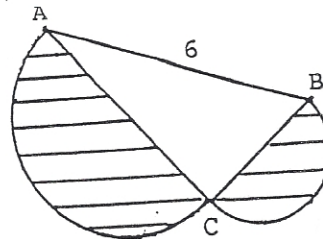
- a) 0
- b) 8
- c) 10
- d) 12
- e) 14

34. If Ross Poirot offers you 1¢ today, 2¢ tomorrow, 4¢ the next day, 8¢ the fourth day, etc., how much money are you offered on the 30th day?

- a) $\frac{2^{26}}{25}$ dollars
- b) $\frac{2^{27}}{25}$ dollars
- c) $\frac{2^{28}}{25}$ dollars
- d) $\frac{2^{29}}{25}$ dollars
- e) $\frac{2^{30}}{25}$ dollars

35. In the triangle below, angle C is a right angle, the two arcs are semicircles and $AB = 6$. What is the area of the shaded region?

- a) $\frac{9\pi}{2}$ square units
- b) 9π square units
- c) $\frac{25\pi}{2}$ square units
- d) 18 square units
- e) 18π square units



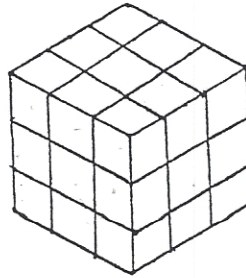
36. Which of the following is largest?

- a) 1^{1000}
- b) 2^{70}
- c) 3^{40}
- d) 4^{30}
- e) 10^{20}

a. 1,001
b. 10,000,000,000,000,000,000

37. Twenty-seven one-inch cubes are assembled into a single large cube. This large cube is spray painted on all surfaces with red paint. If the large cube is then disassembled into the 27 smaller cubes, and one of these cubes is selected at random, what is the probability that the cube has exactly two red faces?

- a) $\frac{2}{9}$
 b) $\frac{8}{27}$
 c) $\frac{4}{9}$
 d) $\frac{3}{27}$
 e) $\frac{1}{3}$



Handwritten calculations for problem 37:
 $\frac{9}{27} = \frac{3 \times 3}{9 \times 42}$
 $\frac{27}{42} = \frac{3}{6} = \frac{1}{2}$
 $\frac{3}{9} = \frac{1}{3}$

38. A cannonball is dropped from a tower. The distance d of the ball from the ground after t seconds is given by the formula $d = -16t^2 + 64$. After how many seconds will the ball hit the ground?

- a) 2 sec
 b) 4 sec
 c) 8 sec
 d) 16 sec
 e) 64 sec

Handwritten calculations for problem 38:
 $n = \sqrt{2}$ $10n = 2\sqrt{2}$
 $-n = \sqrt{2}$

39. $\frac{\sqrt{.2}}{\sqrt{.36}} =$

- a) $\frac{1}{18}$
 b) $\frac{11}{18}$
 c) $\frac{5}{9}$
 d) $\frac{1}{6}$
 e) $\frac{1}{12}$

Handwritten calculations for problem 39:
 $n = \sqrt{.36}$ $100n = 36.36$ $9n = 2.0$
 $-n = \sqrt{.36}$ $n = \frac{2}{9} =$
 $\frac{4}{11} = \frac{36}{99}$
 $\frac{22}{99} \times \frac{99}{36 \cdot 18} = \frac{11}{18}$

40. If $(A \cup B) \cap C = A \cap B$, which of the following must be true?

- a) $A = C$
 b) $A \subseteq B$
 c) $A \cap B = \emptyset$
 d) $A \cap B \subseteq C$
 e) $A \cap C = A$

