

# Junior High School Mathematics Competition

Prepared by:

SEVENTH GRADE TEST  
1981

SCORING FORMULA:  $4R - W + 40$

The Mathematics Departments of  
Austin Peay State University  
and  
Middle Tennessee State University

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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 you.

## SAMPLE:

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

(a) 0

(b) 2

(c) -1

(d) 1

(e) none of the above

1 a b c  d e  
2 a b c d e  
3 a b c d e  
4 a b c d e  
5 a b c d e

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 to page 2 and begin. When you have finished one page, go on to the next. The working time for the entire test is 80 minutes.

1.  $6 + 15 \div 3 - 2 =$

- a) 21
- b) 5
- c) 8
- d) 0
- e) 9

2.  $4.75 \times 8.31 =$

- a) 394725
- b) 39472.5
- c) 3947.25
- d) 394.725
- e) 39.4725

3.  $5 \frac{5}{12} =$

- a) 5.12
- b)  $5.4\overline{16}$
- c)  $5.\overline{416}$
- d) 5.42
- e) 5.512

4.  $\frac{31}{89} \cdot \frac{41}{100} + \frac{31}{89} \cdot \frac{59}{100} =$

- a)  $\frac{1271}{8900}$
- b)  $\frac{31}{100}$
- c)  $\frac{131}{8900}$
- d)  $\frac{31}{89}$
- e)  $\frac{30}{89}$

5.  $6\frac{1}{4} \div 8\frac{3}{4} =$

a)  $\frac{13}{4}$

b)  $\frac{13}{12}$

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

d)  $\frac{5}{7}$

e)  $1\frac{2}{5}$

6. A man's car used 3 gallons of gasoline to go 50 miles. How many gallons would be required for a comparable trip of 350 miles?

a) 21

b) 19

c) 22

d) 20

e) 23

7. In the division of a whole number by 7, which of the following could not be a remainder?

a) 1

b) 2

c) 3

d) 9

e) 6

8.  $\frac{3}{5} + \frac{1}{4} =$

a)  $\frac{4}{9}$

b)  $\frac{3}{20}$

c)  $\frac{17}{20}$

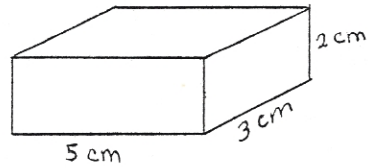
d)  $\frac{3}{4}$

e)  $\frac{4}{5}$

9. Boats are needed to transport 225 people across the bay. Each boat can carry only 8 people. How many boats are needed?
- a) 25
  - b) 28
  - c)  $28\frac{1}{8}$
  - d) 29
  - e) 1800
10. Which one of the following is the most economical purchase?
- a) An 8 oz. can of tuna for 50¢
  - b) A 5 oz. can of tuna for 30¢
  - c) A 1 lb. can of tuna for \$1.04
  - d) A 10 oz. can of tuna for 57¢
  - e) A 2 lb. can of tuna for \$1.92
11. What percent of 360 is 54?
- a) .15%
  - b)  $6\frac{2}{3}\%$
  - c)  $66\frac{2}{3}\%$
  - d) 15%
  - e) 194.4%
12. The statement  $(9 \times 12) \times 10 = 9 \times (12 \times 10)$  is an example of the
- a) commutative property for multiplication.
  - b) associative property for multiplication.
  - c) distributive property.
  - d) commutative property for addition.
  - e) associative property for addition.

13. What is the capacity of the box pictured below?

- a) 300 ml
- b) 3000 ml
- c) 15 ml
- d) 3 ml
- e) 30 ml



14. The surface area of the box in problem 13 is

- a) 31 square cm
- b) 50 square cm
- c) 62 square cm
- d) 42 square cm
- e) 30 square cm

15. The least common multiple of 30 and 56 is

- a) 1680
- b) 280
- c) 120
- d) 420
- e) 840

16. How many prime numbers are there between 90 and 100?

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

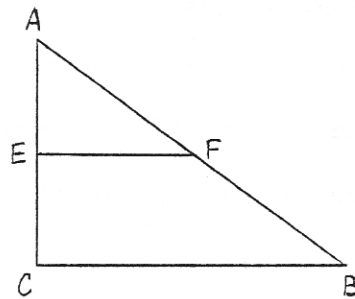
17. An item, after a discount of 30%, now sells for \$3.15. What was the original price?
- a) \$4.50
  - b) \$10.50
  - c) \$9.45
  - d) \$4.10
  - e) \$5.36
18. At standard temperature and pressure the mass of 1 ml of water is 1 g. What is the mass of 1 liter of water under the same conditions?
- a) .001 kg
  - b) .01 kg
  - c) .1 kg
  - d) 1 kg
  - e) 10 kg
19. A woman has stitched the hem of two sides and half the third side of a square tablecloth. What fractional part of the entire hem has she completed?
- a)  $\frac{3}{5}$
  - b)  $\frac{5}{9}$
  - c)  $\frac{3}{4}$
  - d)  $\frac{2}{3}$
  - e)  $\frac{5}{8}$
20. Which of the following is a true statement?
- a)  $0 \div 4$  is undefined.
  - b)  $4 \div 0 = 0$
  - c)  $0 \div 0 = 0$
  - d)  $0 \div 0 = 1$
  - e) All of the above are false.

21. A bank pays  $8\frac{3}{4}\%$  simple interest on money deposited in an account for one year. If you deposited \$1000.00, what total amount would you have at the end of one year?

- a) \$1008.75
- b) \$1087.50
- c) \$1875.00
- d) \$87.50
- e) \$8.75

22. In the figure below  $\triangle ABC$  is a right triangle with right angle at C,  $AE = EC$ ,  $AF = FB$ ,  $AB = 10$ , and  $CB = 8$ . Then  $AE =$

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

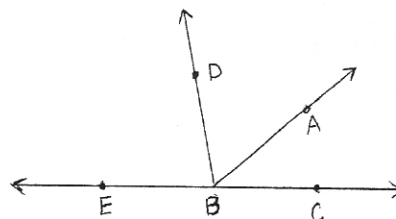


23.  $(\frac{5}{3} - 1)^2 =$

- a)  $\frac{16}{9}$
- b)  $\frac{4}{9}$
- c)  $\frac{4}{3}$
- d)  $\frac{2}{3}$
- e)  $\frac{24}{9}$

24. In the figure below E, B, and C lie on a line,  $m(\angle ABC) = 41^\circ$ , and  $m(\angle DBE) = 83^\circ$ . Then  $m(\angle DBA) =$

- a)  $52^\circ$
- b)  $62^\circ$
- c)  $58^\circ$
- d)  $54^\circ$
- e)  $56^\circ$



25. A tank is originally  $\frac{3}{4}$  full of fuel oil. After 250 liters are used, the tank is  $\frac{1}{2}$  full. How many liters does the tank hold?

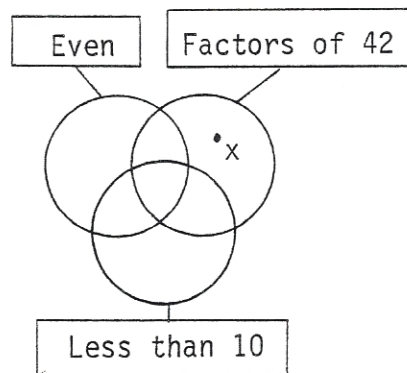
- a) 1000 liters
- b) 5000 liters
- c) 750 liters
- d) 1250 liters
- e) 500 liters

26. The product of two negative integers is

- a) sometimes a negative integer.
- b) always a negative integer.
- c) never a negative integer.
- d) usually a negative integer.
- e) never a positive integer.

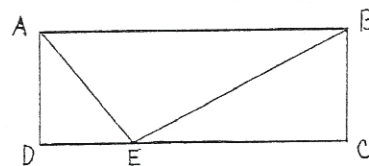
27.  $x =$

- a) 21
- b) 7
- c) 42
- d) 3
- e) 14



28. Quadrilateral ABCD pictured below is a rectangle with  $AB = 8$  and  $BC = 3$ . Also E is a point on  $\overline{CD}$ . Then the area of  $\triangle AEB$  is

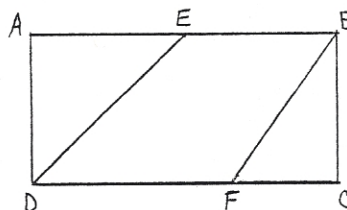
- a) 24 square units.
- b) 16 square units.
- c) 12 square units.
- d) 10 square units.
- e) 8 square units.





29. Quadrilateral ABCD is a rectangle with  $AB = 12$ ,  $BC = 6$ ,  $AE = EB$  and  $DC = 3 FC$ . Then the area of quadrilateral DEBF is

- a) 42 square units.
- b) 45 square units.
- c) 72 square units.
- d) 36 square units.
- e) 50 square units.



30. Which of the following is true?

- a) Two distinct lines may intersect in more than one point.
- b) The intersection of two triangles may be a point.
- c) A triangle may have two right angles.
- d) Adjacent sides in a rectangle must be congruent.
- e) Opposite angles in a rectangle are not congruent.

31. A student has an average of 87% on his first 5 tests. What should his average on the next 3 tests be to have an accumulative average of exactly 90%?

- a) 95%
- b) 90%
- c) 93%
- d) 100%
- e) 98%

32. Using only the digits 4, 8, 3, 5, and 2, how many two-digit numbers can you make if you are not allowed to use a digit more than once in the same number?

- a) 20
- b) 25
- c) 16
- d) 8
- e) 10

33. If  $2x + 9 = 15$  then
- a)  $x = 15 - 9$
  - b)  $x = 15 + 9$
  - c)  $x = 2(15 - 9)$
  - d)  $x = 2(15 + 9)$
  - e)  $x = (15 - 9) \div 2$
34. A box contains 5 red balls, 6 green balls, and 3 blue balls. What is the probability of selecting a ball from the box that is not green in one random draw?
- a)  $\frac{2}{3}$
  - b)  $\frac{3}{7}$
  - c)  $\frac{4}{7}$
  - d)  $\frac{1}{3}$
  - e)  $\frac{4}{3}$
35. The area of a circle with circumference  $12\pi$  is
- a)  $72\pi$
  - b)  $144\pi$
  - c) 36
  - d)  $36\pi$
  - e)  $6\pi$
36. Articles purchased for \$40 each were marked up 10% to obtain their retail price. During a sale they were marked down 10% of their retail price. What was the sale price of this item?
- a) \$40.00
  - b) \$44.00
  - c) \$36.00
  - d) \$35.60
  - e) \$39.60

37. Let  $a$  be an integer such that  $a > 0$  and let  $b$  be an integer such that  $b = a$ . Which of the following is a true statement?

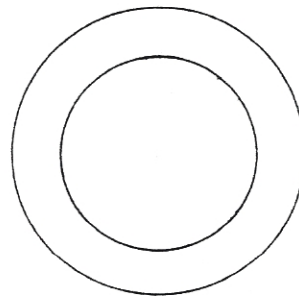
- a)  $(a + b)(a - b) > 0$
- b)  $\frac{a - b}{a + b} > 0$
- c)  $(a - b) + (a + b) > 0$
- d)  $(a - b) - (a + b) > 0$
- e)  $(b - a)(b + a) > 0$

38. What is the ratio of the number of subsets of  $\{a, b, c\}$  to the number of subsets of  $\{a, b, c, d\}$ ?

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

39. Of the two circles pictured below, the inner circle has a radius of 2 units and the outer circle has a radius of 3 units. If a point is chosen at random within the outer circle, what is the probability that it also lies within the inner circle?

- a) 0
- b)  $\frac{2}{3}$
- c)  $\frac{4}{9}$
- d)  $\frac{1}{2}$
- e) 1



40. Consider the following array containing consecutive odd whole numbers. If the array were expanded to 23 rows, what would be the entry in the middle of the twenty-third row?

				1
			3	5
		7	9	11
	13	15	17	19

- a) 517
- b) 509
- c) 441
- d) 529
- e) 625

