

Junior High School Mathematics Competition

Prepared by:

SEVENTH GRADE TEST
1982

SCORING FORMULA: $4R - W + 40$

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

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)

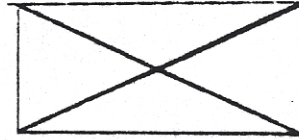
The correct answer is 1, which is answer (d), so you would answer this problem by darkening the space on the answer sheet corresponding with this choice.

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. How many triangles are there in the figure?

- a) 4
- b) 2
- c) 8
- d) 10
- e) 6



2. Joe had an allowance of \$1.50 per week. He spent \$.45 for a magazine. What percent of his allowance did he spend?

- a) 30%
- b) 300%
- c) 3.0%
- d) 70%
- e) 7.0%

3. B is a set with the property that $B \subset \{a, b, c, d, e\}$, $B \subset \{b, c, d, e, f\}$, B has 3 elements and $c \notin B$. Then B =

- a) $\{a, b, d\}$
- b) $\{a, d, e\}$
- c) $\{a, d, f\}$
- d) $\{b, d, e\}$
- e) $\{b, d, f\}$

4. Which of the following is not a prime number?

- a) 83
- b) 2
- c) 143
- d) 97
- e) They are all prime.

5. The length of a new piece of chalk is about

- a) 1 mm
- b) 1 dm
- c) 1 cm
- d) 1 m
- e) 1 dam

6. Write a mathematical expression for twelve less than a number n.

- a) $12 < n$
- b) $n > 12$
- c) $12 \div n$
- d) $n - 12$
- e) $12 - n$

7. Evaluate:

$$2 + 8 \div 2 - 2 \times 6 + 4 \div 2$$

- a) -7
- b) -4
- c) 8
- d) -8
- e) None of the above.

8. $\frac{1}{\frac{1}{4} + \frac{1}{3}} =$
- a) $\frac{7}{12}$ b) 7
c) $\frac{12}{7}$ d) $\frac{7}{2}$
e) $\frac{2}{7}$
9. $9.6 \div 0.03 =$
- a) 3.20 b) 32
c) 320 d) 0.32
e) 3200
10. How many twelfths are equivalent to $\frac{1}{2} + \frac{3}{4}$?
- a) 15 b) 10
c) 11 d) 12
e) 8
11. If 5 pounds of hamburger costs \$6.05, how much will 3 pounds cost?
- a) \$1.21 b) \$2.42
c) \$3.63 d) \$4.82
e) \$3.98
12. Find the simple interest on \$500 at $5\frac{1}{2}\%$ for 5 years.
- a) \$125 b) \$625
c) \$27.50 d) \$25
e) \$137.50
13. The sum of an odd number of odd numbers
- a) is always odd. b) is always even.
c) can be either odd or even. d) is always a composite number.
e) is always a prime number.
14. $14.52 \text{ hm} = \underline{\hspace{2cm}} \text{ dm}$
- a) .01452 dm b) 1.452 dm
c) 145.2 dm d) 14 520 dm
e) 145 200 dm

15. At the beginning of a trip the odometer on the car showed 27,000 miles. At the end of the trip, it read 28,200 miles. If the car used 50 gallons of gas during the trip, then what was the mileage (miles per gallon)?
- a) 20 m.p.g. b) 24 m.p.g.
c) 25 m.p.g. d) 18 m.p.g.
e) 21 m.p.g.
16. If the price of an item originally costing \$6.00 is reduced by 20% and later by an additional 10%, what is its final cost?
- a) \$4.20 b) \$1.80
c) \$4.12 d) \$3.62
e) \$4.32
17. If $\frac{1}{8}$ of a pie has already been eaten, and the rest is divided equally among 4 people, then each person will receive
- a) $\frac{28}{8}$ of the pie b) 20% of the pie
c) $\frac{1}{2}$ of the pie d) $\frac{7}{32}$ of the pie
e) $\frac{1}{32}$ of the pie
18. One car leaves a point heading north at 40 m.p.h. and a second car leaves the same point at the same time heading east at 30 m.p.h. After how many hours will they be 100 miles apart?
- a) $\frac{7}{10}$ b) $\frac{10}{7}$
c) 10 d) 4
e) 2
19. If the numerical value of the volume of a cube is 64, what is the numerical value of the area of one of its faces?
- a) 8 b) 4
c) 16 d) 32
e) $21\frac{1}{3}$
20. If one rolls two dice, what is the probability that the sum will be five?
- a) $\frac{1}{18}$ b) $\frac{1}{9}$
c) $\frac{1}{12}$ d) $\frac{1}{6}$
e) $\frac{1}{3}$

21. In base 5, $22_{\text{five}} \div 4_{\text{five}} = ?$

- a) 5.5_{five} b) 3.25_{five}
c) 10.2_{five} d) $.33_{\text{five}}$
e) 3_{five}

22. If $f(a) = \frac{6a + 4 - a^2}{a + 2}$ then $f(2) =$

- a) 3 b) 8
c) 16 d) 4
e) None of these.

23. Jack had scores of 70 and 65 on two tests. What score on the third test will give him an average of exactly 75?

- a) 75 b) 80
c) 90 d) 100
e) None of the above.

24. $\frac{2.7 \times 10^8}{1.8 \times 10^2} =$ _____

- a) $3/2$ b) 1.5×10^4
c) 9×10^5 d) $.9 \times 10^6$
e) 1.5×10^6

25. $3 \frac{3}{4} \div 2 \frac{1}{2} =$

- a) $5/4$ b) $3/2$
c) $25/4$ d) $5/2$
e) $75/8$

26. Fill in the blank.

$$\frac{53}{60} \quad \text{_____} \quad \frac{7}{8}$$

- a) $>$ b) $<$
c) $=$ d) \leq
e) None of the above.

27. Find the radius of a circle whose circumference is $9 \frac{3}{7}$ ft. Use $\pi = \frac{22}{7}$

- a) $3/2$ b) 3
c) $27/44$ d) $\sqrt{3}/2$
e) $\sqrt{3}$

28. Express $\overline{.45}$ as the quotient of two integers.
- a) $45/100$ b) $9/20$
c) $5/11$ d) $9/11$
e) $5/9$
29. The prime factors of 84 are
- a) $\{1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84\}$ b) $\{2, 3, 7, 21\}$
c) $\{1, 2, 3, 7\}$ d) $\{2, 3, 7\}$
e) $\{1, 2, 3, 4, 6, 7\}$
30. An urn contains 3 red, 4 blue, and 6 green marbles. If one marble is drawn at random, what is the probability it is not red?
- a) $3/13$ b) $4/13$
c) $6/13$ d) $10/13$
e) None of the above.
31. Three times a certain number plus 3 is 15. The number is
- a) 1 b) 4
c) 2 d) 7
e) 6
32. How many different ways can 5 students line up at a ticket window?
- a) 15 b) 5
c) 3125 d) 25
e) 120
33. A suit is on sale at \$104.40, which is 13% off the original price. What was the original price?
- a) \$117.97 b) \$135.72
c) \$120.00 d) \$125.00
e) None of the above.
34. Solve $6x + 3 = 18 + 3x$
- a) 5 b) -5
c) 3 d) -3
e) None of these.

35. John, in driving to visit his uncle in another city, averaged 60 m.p.h. going and 40 m.p.h. returning. What was his average rate for the round trip?
- a) 50 m.p.h. b) 48 m.p.h.
 c) 55 m.p.h. d) 45 m.p.h.
 e) 52 m.p.h.
36. A solid block that is 3 in. by 4 in. by 5 in. has a 1 in. cube removed from each corner. What is the ratio of the surface area of the "new block" to the original block?
- a) 1/1 b) 52/60
 c) 47/60 d) 26/47
 e) 70/94
37. A woman bought 15 yards of cotton material at \$.90 per yard, two spools of thread at \$.20 each, and 3 packs of tape at \$.25 each. How much change did she receive from a \$20.00 bill?
- a) \$12.00 b) \$6.65
 c) \$4.00 d) \$5.35
 e) None of the above.
38. A trucking firm charges \$.10 per pound for the first 10,000 lbs. and \$.08 per pound for all over 10,000 lbs. to haul cargo between two cities. How much would it cost to ship 13,000 lbs. of cargo?
- a) \$1,040.00 b) \$1,300.00
 c) \$1,100.00 d) \$1,260.00
 e) \$1,240.00
39. Let $U = \{m, a, t, h, i, s, f, u, n\}$, $X = \{t, h, i, s\}$, $Y = \{i, s\}$, and $Z = \{n, u, t, s\}$. Find $(X \cup Z) \cap \bar{Y}$
- a) $\{t, h, u, n\}$ b) $\{s, h, u, n\}$
 c) $\{s, n, u, r, f\}$ d) $\{f, i, s, t\}$
 e) $\{h, i, t\}$
40. A basement 15' by 20' was flooded with water 6" deep. How many gallons of water was this? (Use $7\frac{1}{2}$ gallons per 1 cu. ft.)
- a) 13,500 gal. b) 1,125 gal.
 c) 2,250 gal. d) 1,350 gal.
 e. 307.5 gal.

