

# Junior High School Mathematics Competition

EIGHTH GRADE TEST

1986

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 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:	<input checked="" type="checkbox"/>	: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.

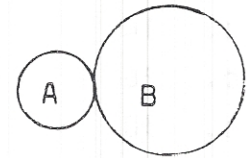
If you should change your mind about an answer, be sure to erase completely. Avoid wild guessing as wrong answers count against you. Do not mark more than one answer for any problem. Make no stray marks of any kind on your answer sheet.

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.



8. The radius of circle A is half that of circle B (see figure). If A rolls once around B without slipping, how many rotations will A make?

a. 1  
b. 2  
c. 3  
d. 4  
e. none of the above



9. In the morning Ingrid sells hats for \$3 each, grossing \$18. In the afternoon she reduces her price to \$2 each and sells twice as many hats as she did in the morning. What was Ingrid's gross income?

a. \$36  
b. \$54  
c. \$162  
d. \$27  
e. \$42

10.  $\sqrt{12 + \sqrt{12 + \sqrt{12 + \sqrt{12 + \dots}}}}$  is equal to:

a. 3  
b. 4  
c. 2  
d. 6  
e. 12

11. Tim said to Tom, "Give me 5 marbles and I'll have as many as you." Tom replied, "Yes, but if you give me 5 marbles, I'll have twice as many marbles as you." How many does each have?

a. Tim 15; Tom 20  
b. Tim 15; Tom 25  
c. Tim 25; Tom 30  
d. Tim 25; Tom 35  
e. Tim 30; Tom 40

12. A square is inscribed in a circle. If the area of the square is 25 sq. cm what is the area of the circle?

a.  $10\pi$  sq. cm  
b.  $12.5\pi$  sq. cm  
c.  $15\pi$  sq. cm  
d.  $25\pi$  sq. cm  
e.  $50\pi$  sq. cm

13. A jar contains 3 white, 5 blue, and 7 red balls. A ball is drawn out and then another ball is drawn out without replacement. What is the probability that both balls drawn out are red?

a.  $14/75$   
b.  $7/3$   
c.  $1/5$   
d.  $7/15$   
e.  $13/29$



21. A square and a regular pentagon have equal perimeters. If a side of the square is 3 inches longer than a side of the pentagon, what is the area of the square?
- a. 144 sq. in.                      b. 169 sq. in.  
 c. 196 sq. in.                      d. 225 sq. in.  
 e. 256 sq. in.
22. For what values of  $t$  will the equation,  $tx - 2 = 2 + t$  have only positive solutions for  $x$ ?
- a. for  $t > 0$                       b. for  $t < -4$   
 c. for  $t > 0$  or  $t < -4$         d. for  $-4 < t < 0$   
 e. for any value of  $t$
23. Choose the false statement.
- a. The sum of two even integers is always even.  
 b. The product of two odd integers is always odd.  
 c. For all integers  $x$  and  $y$ ,  $x$  and  $y$  are reciprocals if and only if  $(x)(y) = (y)(x) = 1$   
 d. For any integer  $x$ ,  $(x)(0) = (0)(x) = 0$   
 e. For any integer  $x$ ,  $x/x = 1$
24. A photograph measures  $1\frac{3}{4}$  by  $2\frac{5}{8}$  inches. It is enlarged so that the longer side will be 14 inches. How long is the other side?
- a.  $3\frac{1}{21}$  inches                      b.  $9\frac{1}{3}$  inches  
 c.  $9\frac{4}{5}$  inches                      d. 21 inches  
 e. none of these
25. Cleo, Dara, and Ella are different heights. Who is tallest and who is shortest if exactly one of the following is true?
- 1) Cleo is tallest    2) Dara is not tallest    3) Ella is not shortest
- a. Cleo tallest, Dara shortest        b. Dara tallest, Ella shortest  
 c. Ella tallest, Cleo shortest        d. Dara tallest, Cleo shortest  
 e. Ella tallest, Dara shortest
26. If four honest coins are tossed, what is the probability that three will land one way and the fourth one opposite?
- a.  $1/2$                                   b.  $1/3$   
 c.  $1/4$                                   d.  $1/8$   
 e.  $3/8$



34. Define the binary operation # by the equation:  $a\#b = a(a+b)$
- $2\#3 = 6$
  - # is commutative
  - $x\#1 = x+1$
  - $2\#(3\#5) = 52$
  - # is associative
35. If  $\frac{1}{2} + n = \frac{2}{3} + \frac{3}{4}$ , then n must be:
- 4/5
  - 11/12
  - 7/8
  - 5/6
  - none of these
36.  $36\frac{1}{4}$  is  $\frac{5}{8}$  of :
- $22\frac{21}{32}$
  - 29
  - $14\frac{1}{2}$
  - 56
  - none of these
37. If  $n = .\overline{19}$ , then the common fractional numeral for n is:
- 1/5
  - 19/99
  - 1/9
  - 19/100
  - none of these
38. Given that the area of an isosceles right triangle is 32 sq. in., the longest side measures approximately:
- 8 in.
  - 12.6 in.
  - 11.3 sq. in.
  - 16 in.
  - 9.8 in.
39. If the radius of a sphere is tripled, its surface area will be multiplied by:
- 3
  - 6
  - 8
  - 9
  - 27
40. How long would it take a train 1400 yards long to pass through a tunnel 360 yards long if the train goes 40 miles per hour?
- 40 seconds
  - 45 seconds
  - 1 minute, 15 seconds
  - 1 minute, 20 seconds
  - 1 minute, 30 seconds

