## 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

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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. a. x 16 С. 2x8 e. 2. 0.00730 written correctly in scientific notation is:  $7.3 \times 10^{-3}$  $7.3 \times 10^{-4}$  $7.30 \times 10^{-3}$  $7.30 \times 10^3$ C. d.  $7.3 \times 10^4$ e. 3.  $8 + 3 \times 2 + 40 \div 2 \times 5 =$ 114 a. b. 122 С. 26 d. 18 е. 81 In this subtraction example, in what base are the numerals written? 4. a. base seven b. base eight 615 -364 С. base nine d. base ten 241 you can't tell e. A box contains 4 blue balls, 6 green balls, and 5 red balls. 5. What is the probability that if one ball is drawn it will be either red or blue? 4/15 a. b. 1/3 C. 2/5 d. 3/5 e. none of the above If p, q, r are consecutive whole numbers, which of the following 6. must be true? a. (p)(q)(r) is even (p)(q)(r) is odd b. p + q + r is even d. p + q + r is odd If p + q + r is odd, then (p)(q)(r) is odd

e. none of the above

a.

48

Given that a and b are real numbers,  $b \neq 0$ , let D(a,b) = a/b

b.

d. 12

3

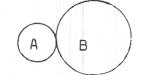
and  $M(a,b) = a \cdot b$  Then M(D(3,12), M(6,2)) =

- 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 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.  $\sqrt{12 + \sqrt{12 + \sqrt{12 + \sqrt{12 + \cdots}}}}$  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
- €. 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. 12.5π 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

14.	A polyhedron has 12 faces a does it have?	nd 1	6 vertices. How	many edges
	a. 14	b.	18	
	c. 26	d.	28	
	e. 30	0.		
15.	Which of the following is t	rue	for all values of	m and n?
	a.  m+n  > m + n	h	m-n  <u>&lt;</u>  m  -  n	
7,	c. $ m+n  >  m  +  n $			1명 - '스러워' 사고로 [18대학 : - 12대학 : 12대학
	e. none of the above	u.	1(11)(11)1 - (111)(11	
			d ·	
16.	How many diagonals does a decagon have?			
	a. 20	b.	25	
	c. 30	d.	35	
	e. 40			
17.	When the repeating decimal	frac	tion. 918918	is written
1 / 6	as a common fraction in low			
	a. 999	b.	37	
	c. 1000	d.	100	
	e. 500			
18.	If $x + 1 > 0$ , then which of	the	following is not	nossible?
	a. $x - 1 = 0$		x - 1 > 0	possible.
	c. $1/x = -1$		$x^2 < 1$	
	e. 1/x is undefined	u.		
10				
19.	What is the measure of the angle between the small hand and the large hand of a clock when it is 2:40?			
	a. 100 degrees	b.	105 degrees	iral http://
	c. 130 degrees	d.	140 degrees	
	e. 160 degrees			
20.	What is the probability of g 5 when a pair of honest dice	getti e are	ing a combination e rolled?	that totals
	a. 1/9	b.	1/12	
	c. 1/6	d.	5/36	
	e. 1/13			

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.				
0.0					
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				
0.7					
23.	Choose the false statement.				
	<ul><li>a. The sum of two even integers is always even.</li><li>b. The product of two odd integers is always odd.</li><li>c. For all integers x and y, x and y are reciprocals</li></ul>				
	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				
0.6					
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				

27.	The solution set for $ 3x  =$	x	- 4  for real values of x is:		
	a. Ø	b.	(1) is to feder at high productions		
	c. {0, 4}	d.	{1, 7}		
	e. {-2, 1}				
28.	Each team in a nine team lea	aque	plays every other team twice		
	through the regular season.	Wha	at is the total number of games		
	played between league teams				
	a. 36	b.	72		
	c. 81	d.	144		
	e. 162				
29.	In the figure given at the phow many rectangles contain				
	a. 16	b.	*		
	c. 24	d.			
	e. not given				
30.		0 4 0 4	atly five divisors these		
JU.	If a natural number, n, has a. n is greater than 20		n is odd		
	c. n is a multiple of 5				
	e. n is a perfect square				
31.	In Clock Arithmetic (modulo	12)	the reciprocal of 9 is:		
<i>)</i> ( •					
	a. 3	b.	8		
	c. 4	d.			
	e. 9 does not have a reciprocal				
32.		es,	each edge is painted blue then how many of the one-inch cubes two faces?		
	a. 12	b.	18		
	c. 24	d.	36		
	e. 45				
33.	The sum of the first five pr	ime	natural numbers is:		
	a. 28	b.	18		
	c. 26	d.	39		
	e. none of these		. I was a second of the second		
	8-	.5			
		-			

34.	. Define the binary operation #	by the equation: a#b = a(a+b)			
-	a. $2#3 = 6$ b.	# is commutative 2#(3#5) = 52			
	e. # is associative	$2\pi(3\pi3) = 32$			
35.	. If $\frac{1}{2} + n = \frac{2}{3} + \frac{3}{4}$ , then n must	be:			
	a. 4/5 b.	11/12			
	c. 7/8	5/6			
	e. none of these				
36.	. $36\frac{1}{4}$ is $\frac{5}{8}$ of:				
	22	29			
	c. $14\frac{1}{2}$ d.	56			
	e. none of these				
37.	If $n = .1\overline{9}$ , then the common fr	actional numeral for n is:			
		19/99			
		19/100			
	e. none of these				
38.	Given that the area of an isosceles right triangle is 32 sq. in., the longest side measures approximately:				
	0 0 1 -	12.6 in.			
	0 11 7 1	16 in.			
	e. 9.8 in.				
39.	If the radius of a sphere is transfer will be multiplied by:	ipled, its surface area			
	a. 3 b.	6			
	c. 8 d.	9			
	e. 27				
40.	How long would it take a train 1 a tunnel 360 yards long if the t	400 yards long to pass through rain goes 40 miles per hour?			
	a. 40 seçonds b.	45 seconds			
	c. 1 minute, 15 seconds d.	l minute, 20 seconds			
	e. 1 minute, 30 seconds				

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