

Pre-Algebra

2018

Sponsored by the Indiana Council of Teachers of Mathematics Indiana State Mathematics Contest

This test was prepared by Indiana State University, Department of Mathematics and Computer Sciences

Indiana State Mathematics Contest

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Do not open this test booklet until you have been advised by the test proctor.

Next year's math contest date:

(B) b>a>c

(A) a>b>c

(A)0.1189

is

Indiana Council of Teachers of Mathematics State Mathematics Competition Pre-Algebra 2018

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2. Of the numbers 0.05129, 0.09,0.089, and 0.02889, the sum of the smallest and the largest

(D) a>c>b

(D) 0.1179

(E) c>b>a

(E) 0.1429

1. If a=0.1/0.5, b=0.05/0.11, and c=1/0.5, then in order of magnitude,

(B) 0.08019 (C) 0.1428

601 395 .

(C) c>a>b

3.	The intege	The integer closest to $\sqrt{\frac{9.9}{9.9} + \frac{100}{100}}$ is						
	(A)3	(B) 8	(C)		D) 25	(E) 64	ļ	
4.	instead of (A) add 3	35.95. In 6 35.95	of additions of order to correct (B) subtract (E) subtract	et this error 85059.05	with a singl	e entry h		095
5.	The numb	er halfway	between 0.12	25 and $\frac{7}{12}$ is	s			
			(C)			(E) $\frac{1}{4}$	7 8	
6.	Five students took a test. The average score was 68. If the scores of four students were 75, 53, 62, 84, the score of the fifth student was							
	(A)	66	(B) 68	(C) 76	(D)	$68\frac{1}{2}$	(E) 56	
7.	The averag	ge of $\frac{1}{20}$,	$\frac{2}{30}$, and $\frac{3}{40}$	is:				
	(A) $\frac{1}{15}$	(B) $\frac{1}{3}$	23 600	$(C)\frac{23}{120}$	(D)	23 240	(E) None of th	iese
8.	The average	ge of a set	of integers is	60. The sur	m of the inte	egers is 1	80. The number	er of
	integers in							
	(\mathbf{A})	3	(B) 108	(C) 12	$(D) \epsilon$	5	(E) None of th	iese

9. A class of 200 students averaged 66% on an examination; another class of 300 students

(D) 60

(E) 50

(C) 61

averaged 56%. The average percentage for all students was:

(B) 62

(A) 63

(A) 4:1

(B) 8:1

(C) 20: 21

(D) 20:1

(E) None of these

10. Of the following sets of angles, the one which could be the angles of an isosceles triangle is							
(A) 40^{0} , 60^{0} , 80^{0} (B) 82^{0} , 8^{0} , 91^{0} (C) 70^{0} , 70^{0} , 70^{0} (D) 50^{0} , 50^{0} , 70^{0} (E) 54^{0} , 72^{0} , 54^{0}							
11. The number of degrees in one interior angle of a regular polygon is x. In term of x, the							
number of sides of the polygon is							
(A) $\frac{2x+360}{90}$ (B) $\frac{180}{2x}$ (C) $\frac{360}{180+x}$ (D) $\frac{360}{x}$ (E) $\frac{360}{180-x}$							
12. The smallest number in the set $\{(-2.3)^2, 1.03, \sqrt{4}, (1.02)^2, (1.25)^2\}$							
(A) $(-2.3)^2$ (B) 1.03 (C) $\sqrt{4}$ (D) $(1.02)^2$ (E) $(1.25)^2$							
13. The lengths of the sides of a triangle are 7-b, b+1, and 4b-2. The number of values							
of b for which the triangle is isosceles is							
(A) 0 (B) 1 (C) 2 (D) 3 (E) None of these							
14. The regular price of a pencil is 10 cents and a special sale price for Mondays is 5 cents. If							
Karen bought 15 pencils on Saturday and 10 on Monday, then how much did she pay for pencils							
in the week?							
(A) \$50 (B) \$1.5 (C) \$2 (D) \$3 (E) None of these							
15. The integer 119 is exactly divisible by							
(A) 2 (B) 3 (C) 5 (D) 11 (E) None of these							
16. The number of integer divisors of 60, excluding 1 and 60, is							
(A) 4 (B) 10 (C) 11 (D) 12 (E) 3							
17. If $xy = 6$, $z^3 + 1 = 217$, then the value of xyz is							
(A) 648 (B) 1296 (C) 48 (D) 36 (E) None of these							
18. If a, b and c are real numbers such that $a^2 + b^2 + c^2 = 1$, then the minimum value of $ab + bc + ca$ is							
(A) -1 (B) $-\frac{1}{3}$ (C) 0 (D) $\frac{1}{2}$ (E) $-\frac{1}{2}$							
19. If a, a+d, and 9d+a, (a>0, d>0), are the sides of a right-angled triangle, then the ratio a:d is							

20.	The side, front, and bottom faces of a rectangular solid have areas of $2x, \frac{y}{2}$, and xy cm	ı ²
	respectively. The volume of the solid, in cubic centimeters, is	

(A) xy (B) 2xy (C) x^2y^2 (D) 4xy (E) Cannot be determined from the information

21. If a and b are two integers with b>a, then the number of integers between a and b is

(A) b-a-1 (B) b-a+1 (C) b-a (D) b-a-2 (E) None of these

22. 90 + 91 + 92 + 93 + 94 + 95 + 96 + 97 + 98 + 99 = ?

(A) 845 (B) 945 (C) 1005 (D) 1025 (E) 1045

23. If ax + 3y = 5 and 2x + cy = 3 represent the same straight line, then a + c equals

(A) 5 (B) $\frac{77}{15}$ (C) $\frac{19}{15}$ (D) $\frac{31}{5}$ (E) $\frac{77}{10}$

24. If the area of the square is 144, then the area of the inscribed circle is

(A) 36π (B) 6π (C) 9π (D) 12π (E) 81π

25. The area of a given circle is 9π cm². The diameter of this circle, in cm, is

(A) 9 (B) 3 (C) $\frac{3}{2}$ (D) $\frac{9}{2}$ (E) 6

26. A number which is a multiple of 15, but not a multiple of 18 is:

(A) 180 (B) 360 (C) 450 (D) 420 (E) 540

27. The difference between an 8.5% sales tax and an 8% sales tax on an item priced at \$200 is:

(A) \$0.10 (B) \$1.00 (C) \$5.00 (D) \$10.00 (E) None of these

28. If (2, 5) is the midpoint of the line segment joining (5, y) and (x, 7), then x+y is equal to

(A) 6 (B) 5 (C) 7 (D) 12 (E) None of these

29. If a and b are the x- and y- intercepts of a line respectively which passes through the point (2, 1), then

(A) a(b-1)=2b (B) a=2b (C) b=2a (D) b(a-1)=2a (E) None of these 30. The lines x=0, y=0, and 2x+y=4 form a triangle, the number of points with integer coordinates which are inside this triangle is

(A) 0 (B) 1 (C) 2 (D) 3 (E) more than 3

e					Č	
		g on the uppe		ded, then the nur	uch dice are rolled, and mber of possible different	
32. The number of 32 or 3 is	ber of possi	ble positive i	ntegers that a	re less than 500	and that are not divisible	
-	(B) 10	67 (C)	166 (I	D) 165 (E)	83	
34. The surf	face area of	a sphere is e	qual to $4\pi r^2$		(E)None of these dius. How many times	
		3) 4			(E) None of these	
the large	ee digit numest value of (B) 4	A is		nd gives 5B3. If D) 8 (E)	5B3 is divisible by 3, then	n
10, 5, x	-2.5	_	e next numbe (C) 2.5		g geometric sequence? 20 (E) None of these	,
37. What is	the reciproo	cal of the rec	iprocal of $(\frac{1}{2})$	$-\frac{1}{3}$) ?		
	4		(C) 3	3	(E) None of these	

38. The product of all prime numbers between 1 and 2018 is divided by 143, what is the remainder?

(A) 0

(B) 1

(C) 2

(D) 3

(E) None of these

39. Of the following numbers, which one is divisible by the greatest number of multiple of different primes?

(A) 2310

(B) 396

(C) 1056

(D) 1375

(E) None of these

- 40. Two circles have diameters PS and QR. If PS=2QR, then the ratio of their areas is:
 - a. 9:1 b. 4:1 c. 3:1 d. 2:1 e. None of these