



Pre-Algebra

2017

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

ICTM Website

www.indianamath.org

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

Indiana Council of Teachers of Mathematics
State Mathematics Competition
Pre-Algebra 2017

Indiana State University, Department of Mathematics and Computer Sciences

1. One and thirty-two hundredths is:
a. 0.132 b. 1.032 c. 1.32 d. 132.00 e. None of these
2. The second largest number in the set $\{0.02, 0.09, 0.018, 0.017, 0.0081\}$ is:
a. 0.02 b. 0.09 c. 0.018 d. 0.027 e. 0.0081
3. The average of a set of integers is 60. The sum of the integers is 360. The number of integers in the set is:
a. 3 b. 108 c. 12 d. 6 e. None of these
4. A class of 20 students averaged 66% on an examination; another class of 30 students averaged 56%. The average percentage for all students was:
a. 63 b. 62 c. 61 d. 60 e. 50
5. If the diameter of the circle is increased by 100%, the area is increased by:
a. 100% b. 200% c. 300% d. 400% e. None of these
6. You receive 40% of the \$280 that was owed to you. How much money is still owed to you?
a. \$112 b. \$168 c. \$178 d. \$188 e. None of these
7. What number does $(6 \times 1000) + (0 \times 100) + (5 \times 10) + (2 \times 1)$ equal:
a. 652 b. 6052 c. 6152 d. 8502 e. None of these
8. If $a = \frac{0.01}{0.05}$, $b = \frac{0.05}{0.1}$, and $c = \frac{0.1}{0.05}$, then:
a. $a > b > c$ b. $b > a > c$ c. $c > a > b$ d. $a > c > b$ e. $c > b > a$
9. The average of $\frac{100}{200}$, $\frac{120}{180}$, and $\frac{90}{120}$ is:
a. $\frac{2}{3}$ b. $\frac{23}{36}$ c. $\frac{23}{12}$ d. $\frac{23}{24}$ e. None of these
10. How many positive factors of 36 are also multiples of 6?
a. 2 b. 3 c. 4 d. 5 e. 6

11. $892017 + 902017 + 912017 + 922017 + 932017 + 942017 + 952017 + 962017 + 972017 + 982017 + 992017 = ?$
- 9362187
 - 10362187
 - 10962187
 - 11162187
 - 11362187
12. A ream of paper containing 5000 sheets is 50 cm thick. Approximately how many sheets of this type of paper would there be in a stack 75 cm high?
- 2560
 - 5500
 - 6670
 - 7500
 - None of these
13. A square and a triangle have equal perimeters. The lengths of the three sides of the triangle are 62 cm, 83 cm, and 95 cm. The area of the square is, in cm^2 :
- 2400
 - 3600
 - 6800
 - 6400
 - 14400
14. If you walk for 30 minutes at a rate of 4 mph and then run for 30 minutes at a rate of 10 mph, how many miles have you gone at the end of one hour?
- 7 miles
 - 8 miles
 - 9 miles
 - 480 miles
 - None of these
15. The ratio of boys to girls in a school is 2:3. If there are 500 students in the school, how many more girls than boys are in the school?
- 100
 - 200
 - 300
 - 400
 - None of these

16. If the length and width of a rectangle are each increased by 10%, then the area of the rectangle is increased by:
- 1%
 - 10%
 - 20%
 - 21%
 - 40%
17. Mr. Green receives a 10% raise every year. His salary after five such raises has gone up by what percent?
- 40%
 - 50%
 - 60%
 - More than 60%
 - None of these
18. The sum of the least common multiple and greatest common factor of the numbers 5, 10, and 35 is:
- 1745
 - 75
 - 65
 - 5
 - None of these
19. The number of positive integer divisors of 120 is:
- 10
 - 12
 - 14
 - 16
 - None of these
20. A bag contains 40 jellybeans, 10 of which are red, 10 are black, 10 are green, and 10 are yellow. The least number that a blindfolded person must eat to be certain of having eaten at least one of each color is:
- 11
 - 5
 - 31
 - 10
 - None of these
21. Rearranging the digits of the number 579 produces different numbers. The sum of all such numbers, including 579, is:
- 4662
 - 4065
 - 3705
 - 3687
 - None of these

22. If $A * B = \frac{A+B}{2}$, then $(115 * 145) * 110$ is:
- 60
 - 80
 - 120
 - 160
 - None of these
23. If a , a , and $a + 5d$, (where $d > 0$) are the angles of a right-angled triangle, then the ratio $a:d$ is:
- 4:1
 - 8:1
 - 5:1
 - 9:1
 - None of these
24. The side, front, and bottom face of a rectangular cube have areas of $9x$, $4y$, and $xy \text{ cm}^2$, respectively. The volume of the cube, in cm^3 , is:
- xy
 - $6xy$
 - x^2y^2
 - $12xy$
 - None of these
25. If $a \times a \times a = -27$, then $a \times a \times a \times a \times a$ could equal:
- 81
 - 81
 - 243
 - 243
 - None of these
26. If $\frac{x}{4} + \frac{y}{5} = \frac{19}{20}$, where x and y are positive integers, then $5x+6y$ is
- 9
 - 19
 - 20
 - 21
 - None of these
27. Each side of a rhombus has a length of 10. The sum of the squares of the diagonals equals:
- 100
 - 200
 - 400
 - 300
 - None of these
28. If $\frac{1}{2x+2} = \frac{3}{5}$, then $\frac{1}{3x+2} =$
- 2
 - $3/2$
 - $2/3$
 - $1/2$
 - None of these
29. In 4 hours, through how many degrees does the hour hand of a circular clock move?
- 150°
 - 120°
 - 60°
 - 90°
 - None of these
30. In a group of men and women, the average age is 31. If the men's ages average 35 years, and the women's ages average 25, the ratio of the number of men to the number of women is:
- 5:7
 - 7:5
 - 3:2
 - 2:3
 - None of these

31. If I add 5 of the first 6 natural integers, the sum cannot be:
a. 18 b. 19 c. 20 d. 21 e. None of these
32. The sum of five distinct whole numbers is 50. The second largest of these five number can be at most:
a. 24 b. 23 c. 22 d. 21 e. None of these
33. If $\frac{4}{6} : \frac{10}{8} = \frac{1}{5} : x$, then x equals:
a. $\frac{3}{8}$ b. $\frac{1}{2}$ c. $\frac{8}{9}$ d. $\frac{3}{2}$ e. None of these
34. The volume of a sphere is equal to $\frac{4}{3}\pi r^3$ where r is the radius. How many times greater is the volume of the new sphere if the radius is doubled?
a. 8 b. 27 c. 24 d. 3 e. None of these
35. There are twenty four 4-digit numbers that can be formed, each using all the digits 1, 2, 3, 4. The 5th largest such number is:
a. 4321 b. 3412 c. 4123 d. 4132 e. None of these
36. What value of x will produce the next number in the following geometric sequence?
200, 100, 50, x-25
a. 100 b. 50 c. 25 d. 0 e. None of these
37. What is the reciprocal of the reciprocal of $(\frac{1}{3} - \frac{1}{4})$?
a. $\frac{1}{12}$ b. 12 c. 3 d. 4 e. None of these
38. The product of all prime numbers between 1 and 2017 is divided by 91, 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 different primes?
a. 210 b. 36 c. 96 d. 125 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