

Mathematica Centrum

Together, let's shape the mathematicians of the future

PYTHAGORAS | 2016 contest

April 20, 2016

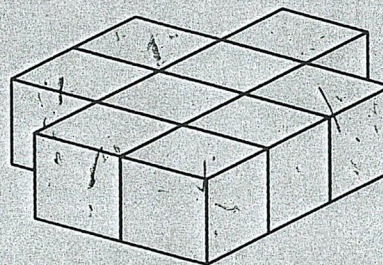
Time: 1h 15 min

Calculators are not permitted

Instructions

1. You must wait for the contest supervisor's signal before starting the contest.
2. You may use scrap paper, a ruler and a compass to do your work.
3. Be sure that you understand the coding system of the response form. If you have any questions, ask the contest supervisor. Verify that you have received the response form with the title **Pythagoras Contest**.
4. This contest is composed of 50 multiple choice questions. Each question is followed by 5 possible answers: A, B, C, D, and E. There is only one correct answer. When you make your choice, record your answer by filling in the appropriate circle.
5. If you change an answer, make sure to erase your first answer completely.
6. Each correct answer is worth one point. Incorrect answers will not be penalised.
7. After the supervisor's signal, you will have exactly 75 minutes to finish. Do not lose time on a specific problem, move on to the next one.
8. When you are finished, give the question booklet and the response form to the contest supervisor.

1. $20 + 16 = ?$
 A) 216 B) 26 C) 36 D) 46 E) 35
2. The base of a pyramid has 5 sides. How many vertices does the pyramid have?
 A) 5 B) 6 C) 7 D) 8 E) 9
3. $1 + 2 + 3 + 4 + 5 = ?$
 A) 18 B) 17 C) 14 D) 15 E) 16
4. Which of the following is false?
 A) $109 > 118$ B) $353 > 254$ C) $226 < 478$ D) $637 < 899$ E) $500 > 489$
5. What is the difference between 8×12 and $72 \div 9$?
 A) 90 B) 91 C) 92 D) 88 E) 89
6. 7 weeks and 8 days is more than
 A) 60 days B) 58 days C) 56 days D) 59 days E) 57 days
7. The ten's digit of the result of $548 - 458$ is
 A) 8 B) 9 C) 7 D) 5 E) 6
8. You go to the gym 5 times each week. Which of the following is closest to the number of times you will go to the gym over a period of 5 months?
 A) 200 times B) 80 times C) 130 times D) 150 times E) 110 times
9. What is the missing number in the equation: 10 dimes - ? nickels = 5 dimes?
 A) 10 B) 9 C) 8
 D) 14 E) 12
10. When half of 20 is multiplied by the number which is 5 less than half of 20, the result is
 A) 150 B) 0 C) 40
 D) 100 E) 50
11. Nine blocks have been glued together, as shown in the diagram. How many blocks have exactly 4 faces that have glue on them?
 A) 0 B) 1 C) 2
 D) 3 E) 4
12. Mathew is X years old and Mathilda is Y years old. What was the sum of their ages 2 years ago?
 A) $X + Y - 2$ B) $X + Y - 4$ C) $X + Y + 2$ D) $X + Y + 4$ E) $X + Y$

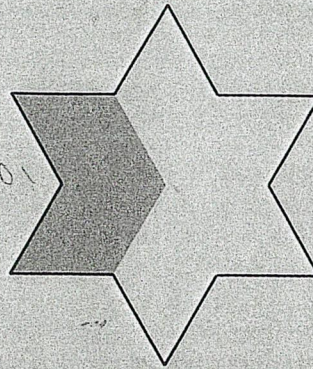


13. How many 3-digit natural numbers are there?

- A) 800 B) 1 000 C) 898
 D) 900 E) 901

14. Which expression does not yield a sum that is even?

- A) $31 + 18 + 19$ B) $22 + 24 + 36 + 19$ *$45 + 55 = 100$*
 C) $12 + 14 + 16$ D) $12 + 14 + 55 + 33$
 E) $10 + 20 + 56$



15. What fraction of the figure is shaded?

- A) $\frac{1}{2}$ B) $\frac{1}{4}$ C) $\frac{1}{3}$
 D) $\frac{2}{3}$ E) $\frac{1}{5}$

16. Mathilda rolls a dice 60 times. About how many times should she expect to get a 6?

- A) 25 times B) 30 times C) 10 times
 D) 20 times E) 15 times

17. Which number, represented by a ?, has a value closest to 41?

- A) 36 B) 52 C) 28
 D) 27 E) 39

X	9	13	7
3	<i>27</i>	39	21
<i>41</i>	36	<i>52</i>	<i>28</i>
10	90	130	70

18. 2 hundreds + 50 ones + 15 tens is equal to

- A) 300 B) 350 C) 450 D) 400 E) 500

19. Mathew met the son of his father's sister. He met his ...

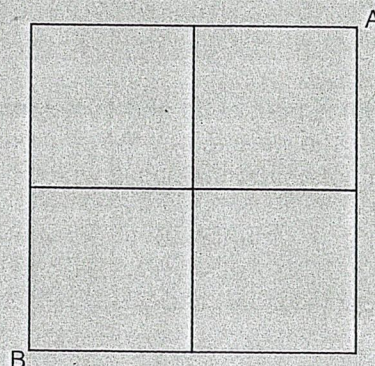
- A) brother B) cousin C) nephew D) uncle E) son-in-law

20. 2 m + 2 dm + 2 cm is equal to

- A) 222 cm B) 322 cm C) 232 cm
 D) 200 cm E) 212 cm

21. In the city of Neopolis, all streets are parallel or perpendicular. The distance between two consecutive parallel streets is 100 m. How many different 400 m routes are there to get from point A to point B?

- A) 7 B) 6 C) 8
 D) 4 E) 5



22. If you were using \$5 and \$10 bills and \$2 coins, how many ways could you make change for a \$20 bill?

- A) 4 B) 5 C) 6 D) 7 E) 8

23. Two diagonals can be drawn in a quadrilateral and 5 can be drawn in a pentagon. How many can be drawn in an octagon (a polygon with 8 sides)?

- A) 20 B) 21 C) 19
D) 22 E) 18

24. A hockey game was 90 minutes long. At what time did it start if it finished at 10:40?

- A) 10:20 B) 9:00 C) 8:50
D) 9:10 E) 9:15

25. The value of N in the equation:

$$21 + 22 + 23 + 24 + 25 = 22 + 23 + 24 + 25 + N$$

- A) 25 B) 24 C) 23
D) 22 E) 21

26. Matusalem picks 30 apples in 6 minutes. At the same rate, how many can he pick in 30 minutes?

- A) 100 B) 125 C) 130 D) 140 E) 150

27. Andrea will leave for China 5 days after the fourth day before April 20. On what day will she leave for China?

- A) April 18 B) April 19 C) April 20 D) April 21 E) April 22

28. If $N \times N = 1 + 2 + 3 + 4 + 5 + 4 + 3 + 2 + 1$, then $10 \times N$ is equal to

- A) 150 B) 25 C) 250
D) 100 E) 50

29. Sixteen balls are inside a square box. Andrea wants to create something that looks like a pyramid. Using these balls as a base, how many more balls will she need to form a "pyramid"?

- A) 14 B) 15 C) 12
D) 13 E) 11

30. Melissa has bought 5¢ and 10¢ stamps for a total of 65¢. If she were to buy the same number of 5¢ stamps, but twice the number of 10¢ stamps, it would cost her 95¢. How many 5¢ stamps did she buy?

- A) 5 B) 6 C) 7 D) 8 E) 9

31. The GCD of 12, 20, and 36 is

- A) 2 B) 3 C) 4 D) 5 E) 6

