

Mathematica Centrum

Together, let's shape the mathematicians of the future

Pythagoras | 2015 contest

April 15, 2015

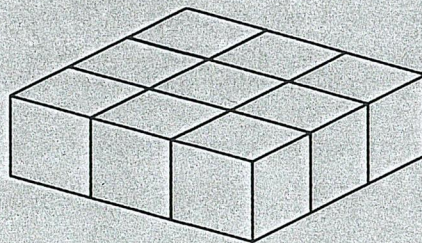
Time: 1h 15 min

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. $20 - 15 = ?$
 A) 1 B) 2 C) 3 D) 4 E) 5
2. The number of vertices of a pentagonal prism is
 A) 12 B) 8 C) 10 D) 5 E) 11
3. $3 + 6 + 4 + 7 = ?$
 A) 18 B) 20 C) 21 D) 10 E) 19
4. Which of the following products is not even?
 A) $2 \times 3 \times 4$ B) $3 \times 5 \times 8$ C) $3 \times 5 \times 7$ D) $3 \times 2 \times 4$ E) $8 \times 3 \times 19$
5. $(1 + 2 + 3 + 4 + 5 + 6) - (5 + 4 + 3 + 2 + 1) = ?$
 A) 6 B) 3 C) 5 D) 4 E) 2
6. A number multiplied by 7 gives 42. When the same number is tripled, the result is
 A) 9 B) 21 C) 12 D) 18 E) 15
7. The ten's digit of the sum of $3 + 5 + 7 + 9$ is
 A) 4 B) 2 C) 24 D) 5 E) 3
8. You go to your friend's house 3 times each month. How many times per year do you go to your friend's?
 A) 33 B) 27 C) 39 D) 30 E) 36
9. The number of multiples of 5 between 10 and 50 is equal to
 A) 9 B) 6 C) 5
 D) 7 E) 8
10. A quarter of an hour + half an hour + 7 minutes is equal to
 A) 52 minutes B) 50 minutes C) 48 minutes
 D) 62 minutes E) 56 minutes
11. Nine blocks have been glued together as shown in the diagram. How many faces of these blocks have glue on them?
 A) 24 B) 28 C) 20 D) 26 E) 22
12. Three times a number minus twice the same number is equal to 10. What is the number?
 A) 9 B) 11 C) 12 D) 8 E) 10
13. The largest 3-digit odd number that can be formed using the digits 5, 3, and 6 only once is
 A) 635 B) 563 C) 653 D) 536 E) 365

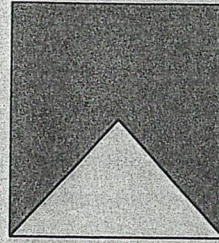


14. In Mathew's class there are twice as many boys as girls. If there are 18 boys in the class, how many students are there in all in Mathew's class?

- A) 54 B) 27 C) 34
D) 36 E) 24

15. What fraction of the square is shaded?

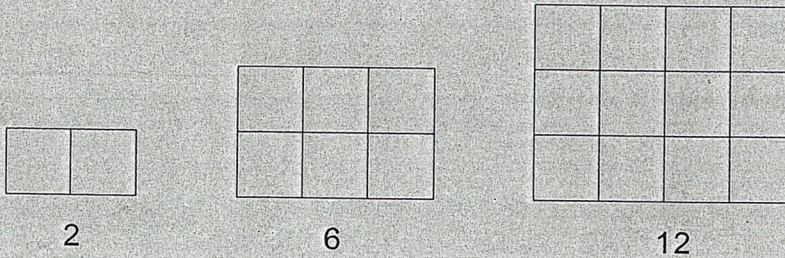
- A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{2}{3}$
D) $\frac{3}{4}$ E) $\frac{3}{5}$



16. If May 4 is a Monday, which of the following shows the dates of all Fridays in the month of May?

- A) 2, 9, 16, 23, 30 B) 3, 10, 17, 24 C) 1, 8, 15, 22, 29 D) 8, 15, 22, 29 E) 1, 8, 14, 21, 28

17. How many small squares will there be in the next figure of the sequence shown in the diagram?



- A) 24 B) 22 C) 16 D) 18 E) 20

18. If you add 1 hundred and 24 ones to the number 213, the result will be

- A) 337 B) 331 C) 326 D) 237 E) 436

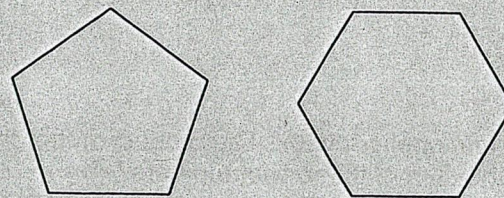
19. Which of the following equations is false?

- A) $5¢ = \$0.05$ B) $10¢ = \$0.01$ C) $\$1 = 100¢$ D) $50¢ = \$0.50$ E) $20¢ = \$0.20$

20. A rope 100 cm long is cut into 5 equal pieces. The length of each piece is

- A) 20 dm B) 10 dm
C) 25 cm D) 2 dm
E) 10 cm

21. The number of lines of symmetry in a regular pentagon multiplied by the number of lines of symmetry in a regular hexagon is equal to



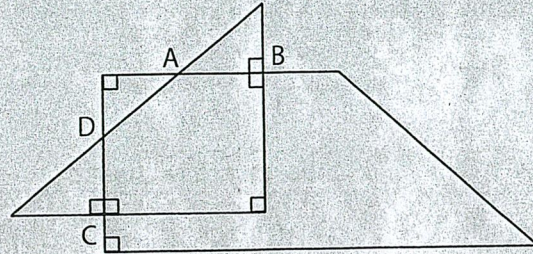
- A) 24 B) 25 C) 20
D) 30 E) 18

22. Cookies are sold in packages of 2, 3, or 6. In how many different ways can you buy 8 cookies?

- A) 5 B) 4 C) 3 D) 2 E) 1

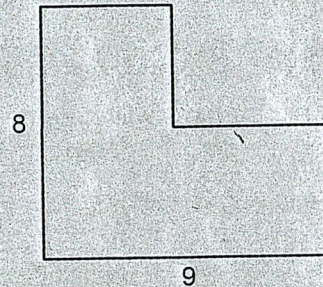
23. A right-angled triangle and a right-angled trapezium intersect at points A, B, C, and D as shown in the diagram. How many acute angles can you count in this diagram?

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



24. What is the perimeter of the figure on the right, if all its adjacent sides (sides that touch each other) are perpendicular?

- A) 34 B) 35 C) 32
D) 30 E) 31



25. The next number in the sequence: 31, 15, 7, 3, 1, ... is

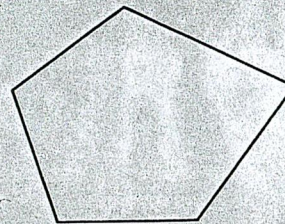
- A) 3 B) 7 C) 0
D) 6 E) 2

26. The sum of $5 + 6 + 7 + 8 + 9 + 10$ is divisible by

- A) 10 B) 13 C) 17
D) 15 E) 12

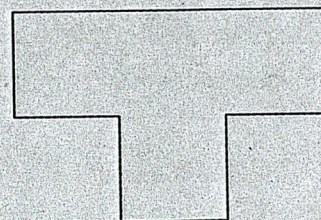
27. What is the minimum number of triangles needed to form the pentagon on the right?

- A) 5 B) 3 C) 4
D) 2 E) 1



28. Mathilda has written all the even numbers from 2 to 50 inclusive. How many numbers has she written?

- A) 23 B) 22 C) 48
D) 27 E) 25



29. What is the minimum number of tiles (like the one shown in the diagram) that we would need to form a square?

- A) 4 B) 10 C) 3
D) 8 E) 6

30. Matusalem opens a book. The product of the 2 numbers used to number the pages is 306. What is the sum of these two numbers?

- A) 33 B) 38 C) 41 D) 45 E) 35

31. The average of the two prime numbers in the following list: 5, 8, 9, 11, 16, 21 is equal to

- A) 13 B) 8 C) 10 D) 7 E) 16