Mathematica

Let's shape together the mathematicians of the future

A. <u>You will need</u>:

1. A **blank response** form with the title "Mathematica", identical (except for the title) to the ones which are used for the Contests. Download this form and make as many copies as you need, so that your students can write the preparatory test and learn how to properly fill out a response form. (Remember that these copies cannot be used for the Contests. Your students will use the response forms that will be sent to you. Each student registered for a contest will receive a response form corresponding to the contest that he is writing. The only reason you are doing these copies is to show your students how to properly fill out a response form).

2. The **preparatory test** (this document), which your students can write to become familiar with multiple choice questions. Download this test and make as many copies as you need. (Remember that you are doing this to explain to your students the purpose of the preparatory test. The preparatory test defines the type of problems that appear in the actual contest.

3. The **answer key**. Download the answer key and make as many copies as you need.

B. <u>How to fill out a response form properly</u>:

Use an **<u>HB pencil</u>** for coding all parts of the form. Do not use a ball point pen or felt-tip marker.

In the box at the top part of the form, tell your students to **PRINT** their school's name in full as well as their city/town and province. To the right of the box, tell them to **PRINT** their date of birth and sign their name to certify that the answers given represent their own work.

In the box on the mid-left of the form, tell your students to **PRINT** their last and first names. Tell them to code each letter by filling in the appropriate circle under each letter. (If your last name is Mathews, first you code the letter M by filling in the circle containing the M right under the letter M of Mathews, then you code the A by filling in the circle containing the A right under the letter A of Mathews. Do this for every other letter of your last name and for each letter of your first name). If the last name of a student is hyphenated, for example Jones-Smith, or if his/her first name is hyphenated, like Carol-Ann, inform the student to simply write Jones Smith and Carol Ann.

The mid-right part of the form outlines important instructions which are a reminder of what to do to code the response form correctly. The lower part of this box shows examples of incorrect coding. Remind your students to **completely** fill in each circle.

The box at the bottom of the form is made of circles which your students will fill in to record their answers to the questions. Again, tell them to fill each circle completely!

C. <u>Problems</u>:

Allow your students to write the preparatory test to be sure that they understand how to properly fill out the response form and to prepare them as to the type of problems that appear in the actual contests. It is important that your students do the problems intended for them :

Pythagoras : all of the problems (# 1 to # 30)
Fibonacci : all of the problems (except # 28 and 29)
Byron-Germain : all of the problems (except # 8, 10, 14, 20, 21, 22, 23, 24, 25, 28, 29, and 30)
Thales : all of the problems (except # 8, 10, 14, 18, 19, 20, 21, 22, 23, 24, 25, 28, 29, and 30)

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PREPARATORY TEST 2008

THALES (3rd) – BYRON-GERMAIN (4th) – FIBONACCI (5th) – PYTHAGORAS (6th)

1. The number of edges of a cube plus the number of faces of a cube is equal to

A) 19 B) 16 C) 14 D) 18 E) 20

2. A number multiplied by 4 gives 12. The same number subtracted from 5 gives

A) 2 B) 4 C) 3 D) 72 E) 6

3. 1 x 2 x 3 = ?

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

4. What number is 5 more than the number that is 10 less than 40?

A) 20 B) 25 C) 28 D) 30 E) 35

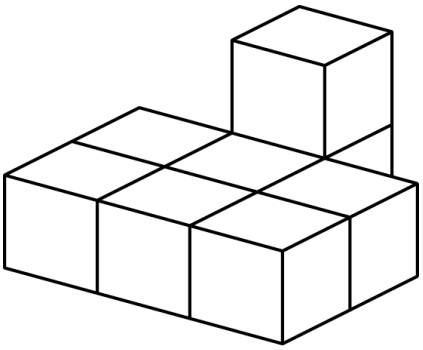
5. If today is April 16, the 27th day after tomorrow will be

A) May 7 B) May 15 C) May 14
D) May 12 E) May 13

6. (7 x 4) + (2 x 5) is equal to

A) 29 B) 40 C) 31
D) 48 E) 38

7. Eight (8) blocks have been glued together. How many faces of these blocks have glue on them?



A) 14 B) 16 C) 18
D) 20 E) 22

8. The product of 10 x 10 x 0.1 is

A) 0 B) 0.1 C) 1 D) 100 E) 10

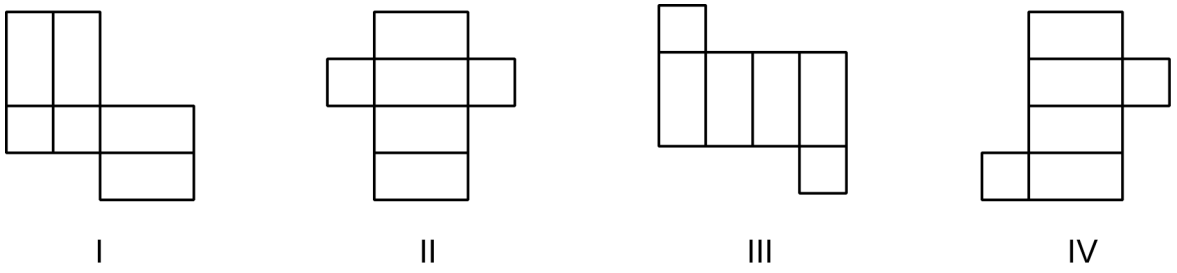
9. How many even numbers are there between 0 and 100?

A) 48 B) 49 C) 50 D) 51 E) 52

10. 25 hundreds divided by 25 tens is equal to

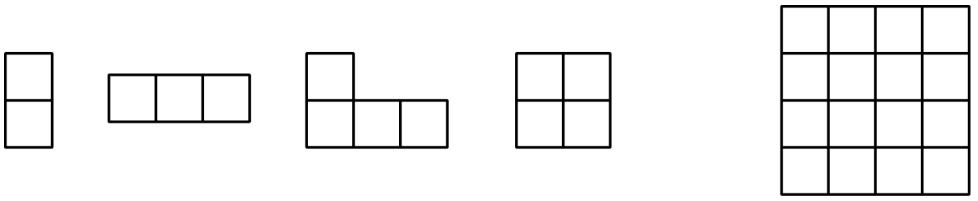
A) 10 B) 100 C) 90 D) 1 E) 0

11. Which of the following nets can form a rectangular prism?



A) II and III B) I and II C) I, II, and III D) II, III, and IV E) all four

12. By using one type of tile at a time, how many of the 4 types of tiles shown below can perfectly cover the square floor represented on the right side of the diagram?



A) 0 B) 1 C) 2
D) 3 E) 4

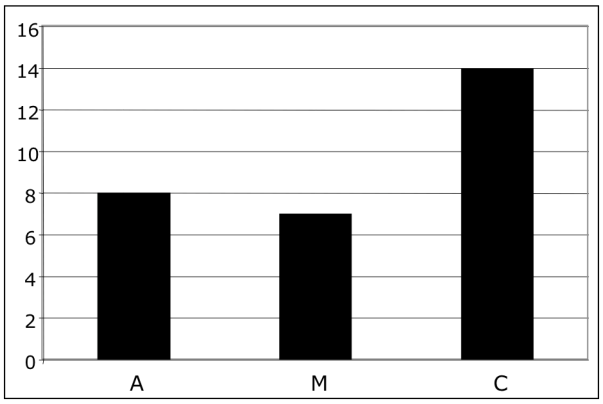
13. Mathilda has 3 playing cards: the ace of spades, the 2 of spades, and the 3 of spades. Mathew must choose two of these 3 cards. How many possible combinations of two cards can he choose?

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

14. The units digit of the 99th number in the sequence: 1, 3, 9, 27, … is

A) 9 B) 7 C) 3
D) 1 E) 6

15. The bar graph shows the number of glasses of juice that were drunk by Andrea (A), Carol (C), and Melissa (M) last week. Andrea drank how many fewer glasses of juice than Carol did?



A) 2 B) 1 C) 6
D) 3 E) 7

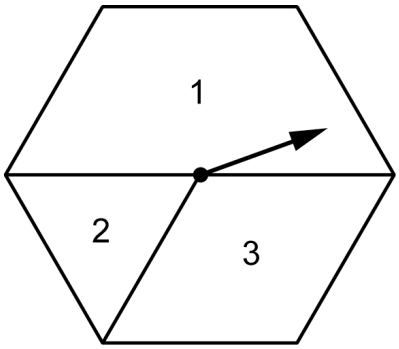
16. Carol has drawn a rhombus. The number of sides plus the number angles of this polygon gives a total of

A) 6 B) 7 C) 8
D) 9 E) 10

17. Mathew's pants are 80 cm long. Which of the following is equal to 80 cm?

A) 800 dm B) 80 m C) 8 mm D) 800 mm E) 8 m

18. Mathilda has made a hexagonal spinner like the one shown in the diagram. If she spins the spinner 36 times, approximately how many times do you expect her to get a 2?



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

19. The number of obtuse angles in a rectangle is

A) 0 B) 1 C) 2
D) 3 E) 4

20. The average of the following numbers: 2, 3, 7, 8, 14, and 20 is

A) 9 B) 9.5 C) 10 D) 10.5 E) 11

21. Which of the following fractions is equivalent to 65%?

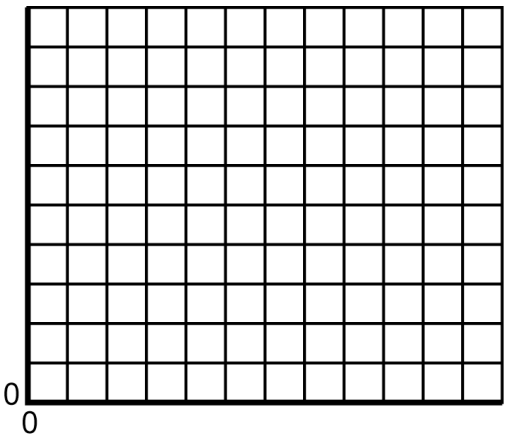
A) 2/3 B) 13/20 C) 3/5 D) 16/25 E) 4/7

22. How many prime numbers are there between 1 and 15?

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

23. Point A is at (3 , 4), point B is at (3 , 7), and point C is at (6 , 4). Find the image of point A, if at first triangle ABC is turned 3/4 of a turn clockwise about vertex A, then is moved (translation) 3 units to the right and 4 units down. The image of point A is located at point

A) (7 , 1) B) (6 , 1)
C) (7 , 0) D) (6 , 0)
E) (6 , 2)



24. When a natural number is divided by 5, the remainder is 2; when it is divided by 4, the remainder is 3. This number could be

A) 68 B) 67 C) 89
D) 28 E) 43

25. If 2 hens lay 12 eggs in 3 days, how many eggs will 1 hen lay in 1 1/2 day?

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

26. Which of the 5 numbers suggested below is equal to twice the product of its digits?

A) 30 B) 24 C) 16 D) 18 E) 36

27. The product of 10 x 10 x 10 is equal to

A) one thousand B) ten thousand C) one million D) five thousand E) one hundred

28. A 81 cm^2 square is divided into 9 smaller congruent squares. What is the perimeter of one of these smaller squares?

A) 12 cm B) 15 cm C) 18 cm D) 36 cm E) 9 cm

29. In 10 years, Mathew will be three times older than he was 10 years ago. How old is he now?

A) 40 years old B) 30 years old C) 20 years old D) 25 years old E) 15 years old

30. To go up a staircase, I can climb either 1 stair at a time or 2 stairs at a time (by skipping a stair). In how many different ways can I climb up a flight of 3 stairs?

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