# Mathematica Centrum

Together, let's shape the mathematicians of the future

# Thales 2020 contest

April 22, 2020

**Time: 45 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 **Thales Contest.**

4. This contest is composed of 30 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.

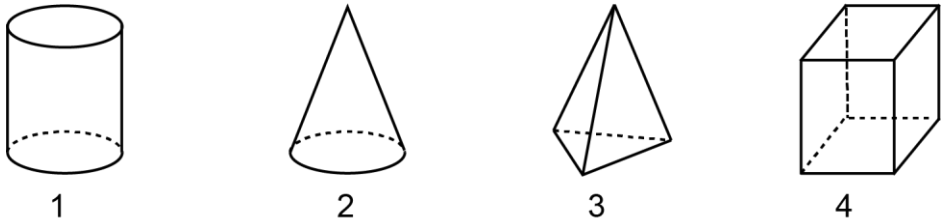
7. After the supervisor's signal, you will have exactly 45 minutes to finish. Do not lose time on a specific problem; move on to the next one.

8. When you are finished, give the question booklet and the response form to the contest supervisor.

**1.** 764 - 532 = ?

A) 232 B) 231 C) 233 D) 230 E) 332

**2**. How many of the solids shown can roll when put in movement?




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

**3.** A number divided by 5 gives 5. If 10 is subtracted from this number, the result will be

A) 10 B) 15 C) 20 D) 5 E) 25

**4.** The sum of 7 + 7 + 7 + 7 is

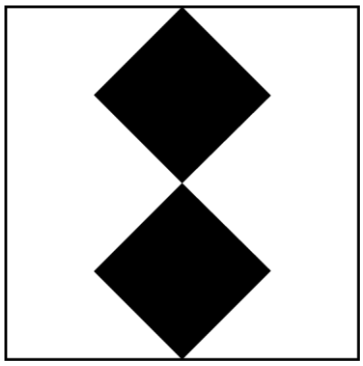
A) 21 B) 35 C) 28 D) 27 E) 29

**5.** The sixth letter after the tenth letter of the alphabet is the letter

A) m B) n C) o D) p E) q

**6.** What is the sum of the 3 unknown terms (X, Y, and Z ) in the sequence: 5, 10, 15, 20, X, Y, Z, 40 …?

A) 75 B) 80 C) 85
D) 90 E) 95



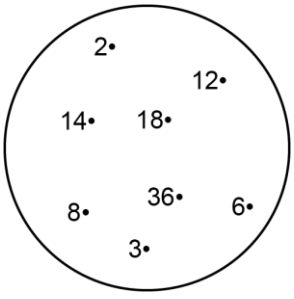
**7.** 20 nickels = 2 quarters + ? dimes.

A) 10 B) 4 C) 5
D) 6 E) 3

**8.** What fraction of the larger square do the shaded squares represent?

A) 1/6 B) 1/5 C) 4/16
D) 1/3 E) 8/16

**9.** How many elements of the set shown are divisors of 24?

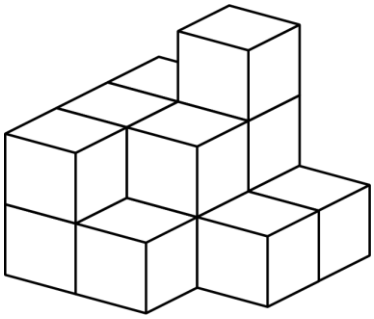



A) 1 B) 2 C) 3
D) 4 E) 5

**10.** One half of one half of 40 is less than

A) 7 B) 8 C) 9
D) 11 E) 10

**11.** How many blocks are there in the pile?

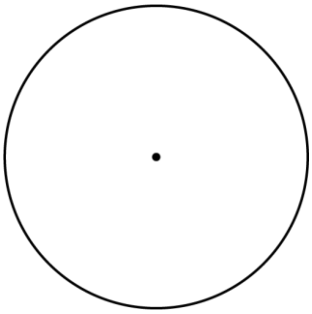


A) 10 B) 12 C) 16
D) 13 E) 14

**12.** The number of faces of a cube plus the number of vertices of a cone plus the number of sides of a pentagon is equal to

A) 12 B) 13 C) 11
D) 10 E) 14

**13.** How many even 3-digit natural numbers can be formed using the digits 2, 7, and 8?



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

**14.** The value of the unknown number in the equation $16 \div ? = 1 \times ?$ could be

A) 6 B) 2 C) 3
D) 4 E) 8

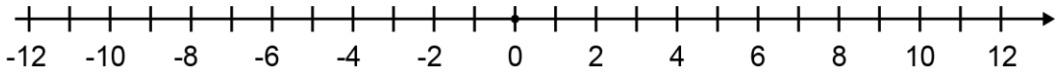
**15.** A round pizza is cut through its centre. How many pieces of pizza can be eaten, if it is cut 7 times?

A) 8 B) 16 C) 14 D) 12 E) 18

**16.** 100 cm = ? dm

A) 100 B) 50 C) 1 000 D) 1 E) 10

**17.** The initial temperature in a northern city was 11 degrees. If the temperature decreased by 3 degrees each day for 6 consecutive days, then increased by 2 degrees each day for 3 consecutive days, what was the final temperature after 9 days?




A) 0 degree B) -1 degree C) -2 degrees D) 2 degrees E) 3 degrees

**18.** The number that is equal to 15 tens is

A) 1 500 B) 15 C) 150 D) 1 505 E) 151

**19.** How many natural numbers between 99 and 150 are even?

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

**20.** Which of the following is the largest?

A) $1 \times 2 \times 3$ B) $4!$ C) $2! \times 3!$ D) $2!$ E) $3 \times 3!$

**21.** Which of the following is closest to 1 000 hours?

A) 38 days B) 42 days C) 39 days D) 50 days E) 40 days

**22.** The multiplication below shows that when a 3-digit number 2N5 is multiplied by 4, the result is another 3-digit number 86M. The value of M + N in this equation is

$$2N5 \times 4 = 86M$$

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

**23.** If a heart beats 10 times in 8 seconds, how many times does it beat in 1 minute?

A) 70 times B) 80 times C) 60 times D) 75 times E) 90 times

**24.** When a natural number is divided by 3, the remainder is even. This number could not be

A) 23 B) 8 C) 11 D) 20 E) 13

**25.** Use the information below to find the unknown value.

$$\sqrt{4} = 2,\ \sqrt{9} = 3,\ \sqrt{16} = 4,\ \sqrt{81} = ?$$

A) 8 B) 9 C) 10 D) 11 E) 7

**26.** With 2 oranges you can prepare 150 ml of juice. How many oranges do you need to prepare 750 ml of juice?

A) 10 B) 9 C) 11 D) 7 E) 8

**27.** A party starts at 9:45 and lasts 2h 20min. At what time does it end?

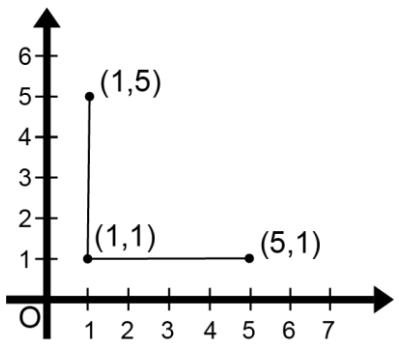
A) 12:00 B) 11:55 C) 12:05 D) 12:10 E) 12:20

**28.** A new school has built lockers for its students. All the digits from 0 to 9, together with the letters A to Y, have been used to identify the lockers. Only 4 digits have been used to identify the lockers with the letter Z. How many lockers have been built in this school, if each locker is identified by one letter and one digit?

A) 239 B) 238 C) 245 D) 254 E) 246

**29.** How many of the following points: (2, 0), (2, 4), (4, 6), (6, 4), and (6, 3) are on the same horizontal straight line?

A) 2 B) 3 C) 4
D) 5 E) 0




**30.** The sum of all the natural numbers from 1 to 100 is 5 050. What is the sum of all the natural numbers from 11 to 101?

A) 5 000 B) 5 098 C) 4 995
D) 5 096 E) 5 100

# Mathematica Centrum

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Name: _____ Contest: _____

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 11 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 21 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 31 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 41 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ |
| 2 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 12 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 22 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 32 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 42 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ |
| 3 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 13 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 23 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 33 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 43 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ |
| 4 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 14 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 24 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 34 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 44 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ |
| 5 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 15 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 25 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 35 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 45 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ |
| 6 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 16 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 26 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 36 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 46 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ |
| 7 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 17 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 27 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 37 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 47 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ |
| 8 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 18 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 28 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 38 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 48 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ |
| 9 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 19 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 29 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 39 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 49 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ |
| 10 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 20 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 30 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 40 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ | 50 | Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ |