

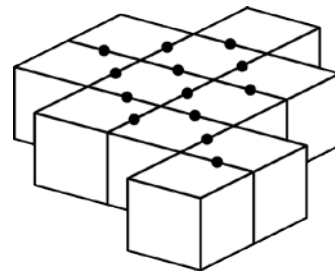
Mathematica Centrum

Together, let's shape the mathematicians of the future

THALES PREPARATORY TEST 2012 DETAILED SOLUTIONS

- The value of X in the equation: $X - 2 = 23$ is 25.
- The number that is twelve less than two hundred seven ($207 - 12$) is 195.
- The number of edges of a cube (**12**) multiplied by the number of faces of a cube (**6**) is equal to 72.
- In 8 bags there is a total of (8×10) 80 chocolates.
- The number of faces (**4**) plus the number of vertices of the pyramid (**4**) is equal to 8.
- The largest 4-digit even number that can be written with the digits 1, 8, 6, and 4 is 8 614.
- The missing number in the sequence: 3 500, 3 250, ?, 2 750, 2 500 is $(3\ 250 - 250)$ 3 000.

- Each dot in the diagram accounts for 2 glued faces. There are (13×2) 26 glued faces. The number of faces that have no glue on them is $(66 - 26)$ 40.



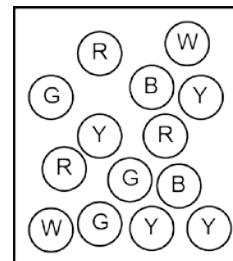
- 16 quarters = $400\text{¢} = 40$ dimes
- Write the following 5 numbers: 3 782, 2 863, 1 935, 2 926, 3 931 in increasing order (from the smallest to the largest). The fourth number written is 3 782.

- The number that is 10 times smaller than 10 is 1. The number that is 10 more than 1 is 11.

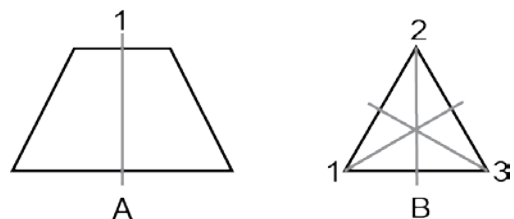
- The number of blocks in the pile is (5×3) 15.

- 11 hundreds - 280 + 14 tens = $1\ 100 - 280 + 140 = 960$.

- Without looking, Mathew picks one marble from the box. In this box there are 3 red, 3 green, 4 yellow, 2 black and 2 white marbles. Because there are 4 yellow marbles, the most prevalent colour in the box, Mathew is more likely to choose a marble of this colour.



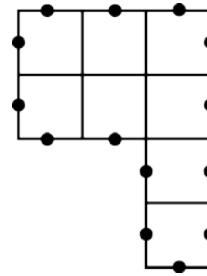
- The sum of the number of lines of symmetry of figure A (1) and of figure B (3) is equal to 4.



16. Since the digit 0 cannot be written first, we can only form (102, 120, 201, 210) four 3-digit numbers.

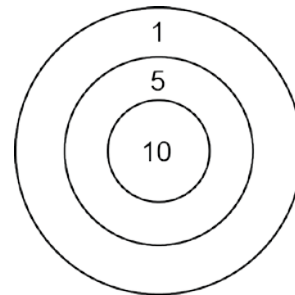
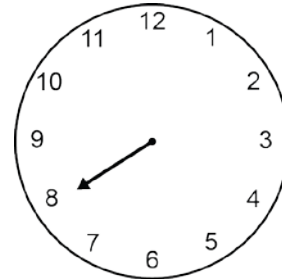
17. The perimeter of this figure is 14 cm.

18. Since Matusalem hit the target 8 times and scored 38 points, we conclude that he hit the 1-point area 3 times. The only way to score the other 35 points is to hit the 10-point area twice and the 5-point area 3 times.



19. The clock shown in the diagram has lost its minute hand at approximately 7:55.

20. Instead of trying to answer this question right away, first let us analyse a simpler form of the same problem. How many odd numbers are there between 2 and 4? Evidently, there is only one, the 3. How many odd numbers are there between 2 and 10? There are (3, 5, 7, 9) 4. How many odd numbers are there between 8 and 18? There are (9, 11, 13, 15, 17) 5. You notice that the number of odd numbers between 2 even numbers is always equal to half the difference between the even numbers. We can apply this rule to the original question. The number of odd numbers between 80 and 180 is $((180 - 80) \div 2)$ 50. Many great scientific and mathematical discoveries were made this way, by transforming the original problem into simpler models. From these we can more readily draw the mathematical law that can be used to solve all problems of the same type.



21. A 2-digit natural number is added to a 3-digit natural number. The smallest 2-digit natural number is 10. The smallest 3-digit natural number is 100. The smallest sum of a 2-digit natural number and a 3-digit natural number is $(10 + 100)$ 110. The largest 2-digit natural number is 99. The largest 3-digit natural number is 999. The largest sum of a 2-digit natural number and a 3-digit natural number is $(99 + 999)$ 1 098. The sum of a 2-digit natural number and a 3-digit natural number must be at least 110 and at most 1 098. The sum of the two numbers could be 777.