

# Mathematics competition 7.11.2007 in Finnish comprehensive school

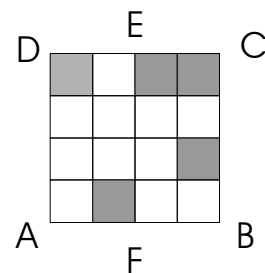


Name: \_\_\_\_\_

*The efficient working time is 50 minutes. Give this page back to the teacher. Give a sketch, some explanations, a mathematical expression or other kind of explanation for every item on the work sheet.*

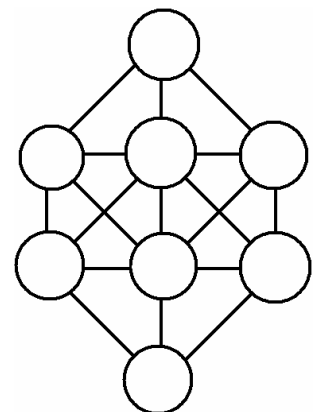
- Two equal squares with sides of 11 are laid partly on each other forming a rectangle with sides of 11 and 20. What is the area of the intersection where one square lies on another one?

- A square ABCD is formed of 16 smaller squares, some of which are coloured as shown on the picture. For each case additionally colour as few small squares as possible so that the figure becomes symmetric with respect to:
  - the line segment EF;
  - the diagonal AC;
  - the midpoint of the square.



Draw sketches on the work sheet, but not on this page.

- Place numbers from 1 to 8 in the circles on the figure so that no line links circles with two consecutive numbers.



- An old clock is fast by one minute in 24 hours. The clock is now exactly on time. When will it be exactly on time once again? The hands are not moved and the clock is going all the time.

- There are several service points for refreshments on a large sports arena. Drinks come by tubes to the service points from a large shared tank. The farthest service point is located 190 metres from the tank. The diameter of the tube is 12 mm. When the tube is washed, it must be emptied. How many portions of 0,40 litre of drink is emptied from the tube to the farthest service point before washing?

- When translating the narrative of a nature program on TV, the area of the nature reserve "one hundred square miles" has been translated as "sata kuusikymmentä neliökilometriä" (one hundred sixty square kilometres). How much does the area translated into Finnish differ from the real value of the area, if 1,000 miles is equal to 1,609 kilometres? Give the answer both in square kilometres and in percents.

- What is the next member and the  $n^{\text{th}}$  member in the number sequence:
  - 9, 16, 23, 30, 37, ...;
  - 4, 11, 30, 85, 248, ...?

- The area of an isosceles right triangle is 1 (area unit). How long is its perimeter? Give the exact value.