



PYTHAGORAS QUEST

National Final



Handelskammaren
I sydsvenska företags intresse

Part 2. Time : 30 mins – 7 questions Max: 14 points (2p/question).

Allowed tools: Paper, pencil and rubber only. **Write you team name on all answer sheets.**

Only your answers are required for this part (no full solutions).

1. Digital Clock

A digital 24 h watch displays hours and minutes . What is the largest possible sum of the digits in the display?

2. Tennis Tournament

There are 100 players in a single tennis tournament. The tournament is single elimination, meaning that a player who loses a match is eliminated. In the first round, the strongest 28 players are given a bye, and the remaining 72 players are paired off to play. After each round, the remaining players play in the next round. The match continues until only one player remains unbeaten. How many matches are played in total?

3. You've Got Balls

One bag contains 2 red marbles and 2 blue marbles. Calculate the probability of randomly drawing two marbles of the same colour in two draws from the bag, without replacement. (Drawing two marbles without replacement means drawing two marbles, one after the other, without putting the first marble back into the bag.)

4. Game

A game is played with tokens according to the following rule. In each round, the player with the most tokens gives one token to each of the other players and also places one token in the discard pile. The game ends when some player runs out of tokens. Players Agnes, Bertil, and Cecilia start with 15, 14, and 13 tokens, respectively. How many rounds will there be in the game?

5. Red Card

Martin has five red cards numbered 1 through 5 and four blue cards numbered 3 through 6. He stacks the cards so that the colors alternate and so that the number on each red card divides evenly into the number on each neighboring blue card. What is the sum of the numbers on the middle three cards?

6. Algebra

If $-4 \leq x \leq -2$ & $2 \leq y \leq 4$, what is the largest possible value of $\frac{x+y}{x}$?

7. Trapezoid

In trapezoid ABCD with bases AB and CD, we have $AB=52$, $BC=12$, $CD=39$, and $DA=5$ (diagram not to scale). What is the area of ABCD?

