PYTHAGORAS QUEST
Distriktsfinal

Handelskammaren
I sydsvenska företags intresse

Part 2. Time : **30 min – 7 questions**   Max: **14 points** (2p/question).
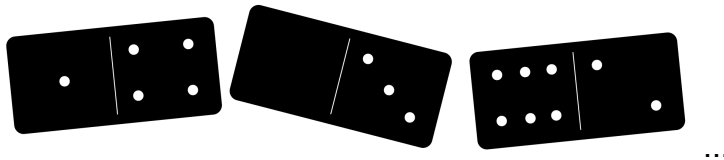
Allowed tools: Paper, pencils and rubbers (no calculator)

Write your team name on each sheet!!

Only your answer is required for Part 2!

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1.   Domino Series

Given the series of dominoes shown below, what domino brick comes next in the series?
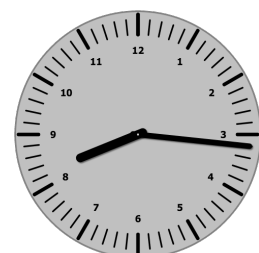

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2.   Comet Passing

In 1980 two comets passed Earth at the same. One planet has an orbit of 75 years and the other has an orbit of 21 years. Which is the next year will they both pass Earth at the same time?
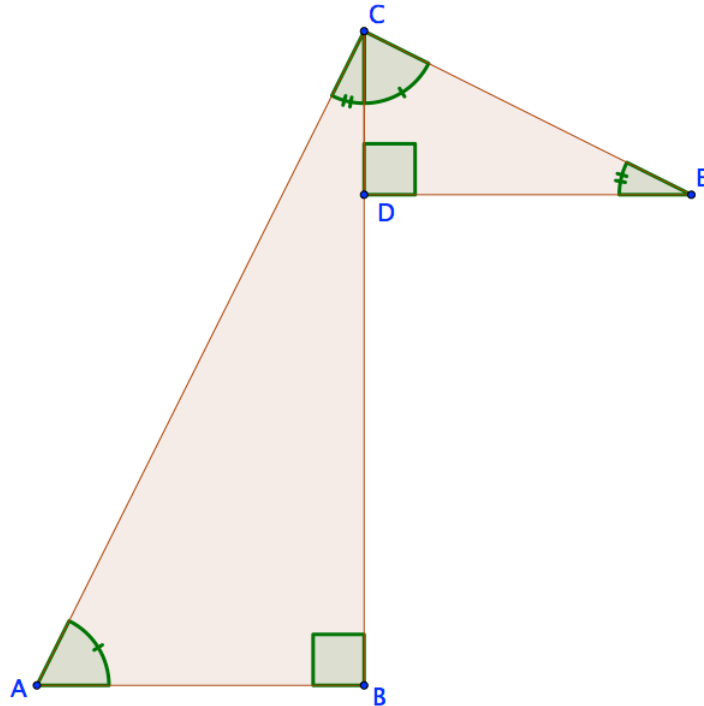
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3. 20:16

An analogue clock (see right) is such that its hour and minute hands move continuously. How many degrees are there between the minute and the hour hand when the time is 20:16 if I start from the minute hand and move clockwise until I meet the hour hand?

4.   Two triangles

In the figure below, AC = 24 and CE = 7. Also triangle ABC is similar to triangle CDE? How long is the length AE? (NB. The diagram is not to scale)

5.   Rugby team

Three members of the Borgarskola Girls Rugby Team had the following conversation.

Astrid: I just realized that our uniform numbers are all 2-digit primes.

Bella: And the sum of your two uniform numbers is the date of my birthday earlier this month.
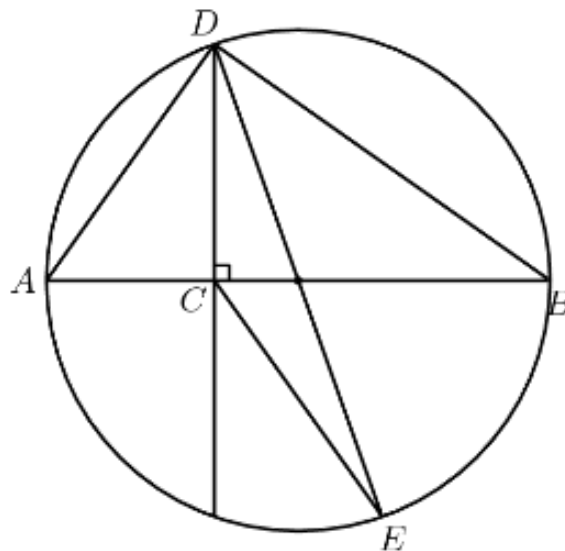
Catja: That's funny. The sum of your two uniform numbers is the date of my birthday later this month.

Astrid: And the sum of your two uniform numbers is today's date.

What number does Catja wear?

6.   The Circle and the Triangles

Let AB be the diameter of a circle below. Let C be a point on AB such that $3 \cdot AC = BC$. D is a point on the circle such that CD is perpendicular to AB (see figure) and E is a point on the circle such that DE also is a diameter. What is the ratio between the area of triangle CDE to triangle ABD?

7.   The Jog/Sprint

Malte and Lars live on the same straight piece of road. Lars' house is 50m north of Malte's house. One day they decide to go on a jog. They only run northwards on the same road the whole time. However Malte is methodical and keeps a constant speed of 5 m/s. Lars is hasty and has trouble finding his pace and therefore runs at a near world-record speed of 10 m/s, but he must stop and rest for 30 seconds every 200 m. The boys start running at the same time. How many times do they meet on their jog?