

The National Agency for Education, referring to 4 kap 3 § Sekretesslagen, emphasises that this material is to be kept confidential. **This material must remain confidential until the end of June 2016.**

**National Test in
MATHEMATICS
COURSE A
Spring 2006
Part II**

Instructions

Time 180 minutes for Part I and Part II together. It is recommended that you use at least 20 minutes for working on question 7.

Tools Calculator, approved formula page and ruler.

Part II Part II consists of 10 questions. Most of the questions require not only an answer, you must also

- express your solutions
- express your reasoning and line of thought so that it is easy to follow
- draw clear figures when necessary.

Some questions require only the answer. These are indicated by the text “*Only answer is required*”.

After each question the maximum number of points available for your solution is shown. For example (2/3) indicates that the question can give, at most, 2 g-points and 3 vg-points.

In questions marked  you have an opportunity to demonstrate MVG-quality (Pass with Special Distinction). This means that you use general methods, models and reasoning, that you analyze your results and present a clear line of thought with correct mathematical language.

Question 7 is a larger task, which takes more time than the other questions. In the box below this question you can see the criteria the teacher uses in assessing your solution.

Grade Limits The examination (Part I + Part II) gives a maximum of 60 points of which 25 are vg-points.

Lower limits for examination grade

Pass (G): 19 points.

Pass with Distinction (VG): 36 points of which at least 11 are vg-points.

Pass with Special Distinction (MVG): At least 19 vg-points. In addition you must demonstrate several of the MVG-qualities that are possible to show in the questions marked .

Write your name, date of birth and adult education/secondary school program on the papers you hand in.

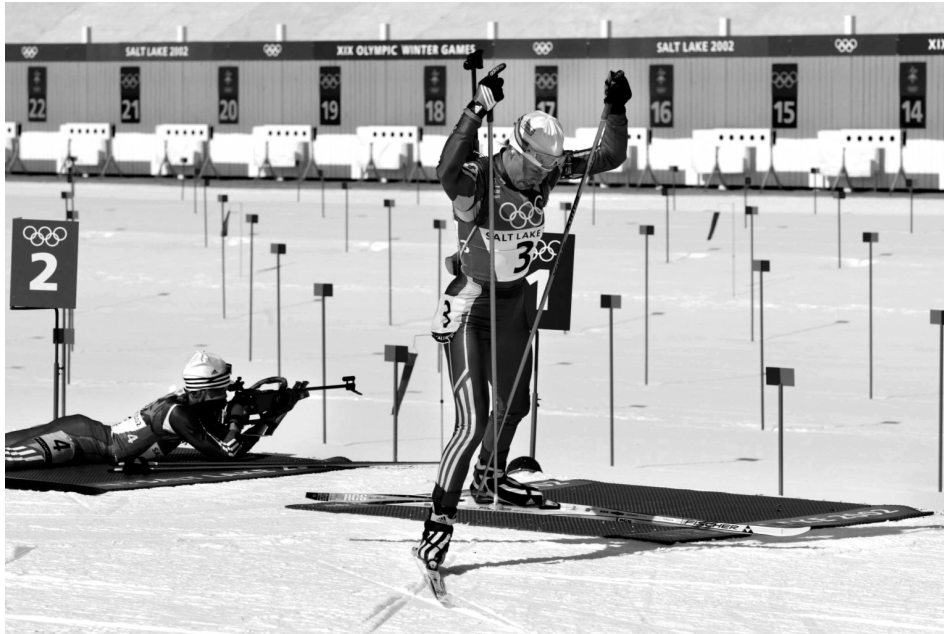


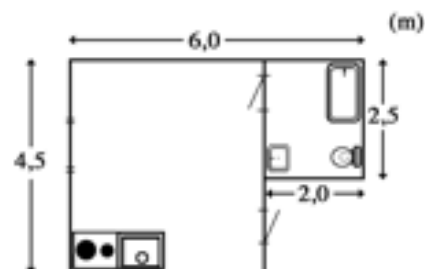
Photo: J Lindkvist/Scanpix

1. In a biathlon contest (skiing and rifle shooting) there are four different shooting stations. At each station you shoot five shots.

Shooting station	No 1	No 2	No 3	No 4
Johan	5	4	5	2
Björn	4			

- a) The table shows how many hits Johan made at the four stations. Calculate his average number of hits. *Only the answer is required.* (1/0)
- b) Björn makes 4 hits at the first station. His average number of hits for all stations was 3.5 hits/station. What might his shooting results have been at the other three stations? (2/0)

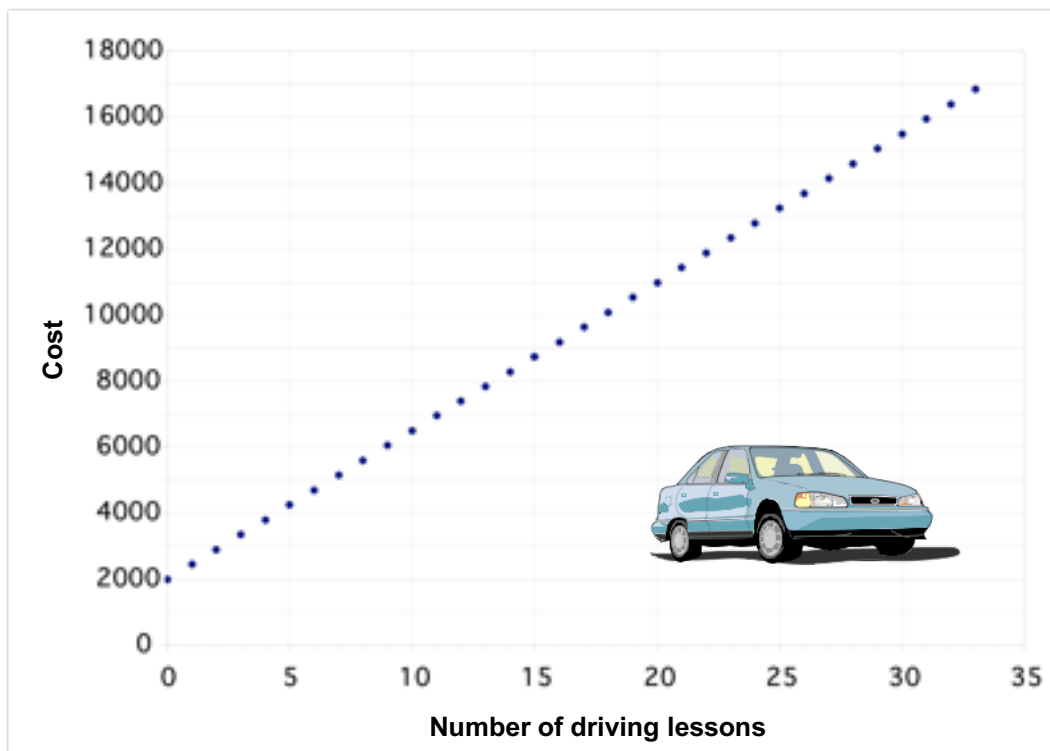
2. Suppose you rent a small apartment with a monthly rent of 1 840 kr. The contract states that the annual rent is 960 kr/m². Investigate whether the monthly rent is correct.



(2/1)

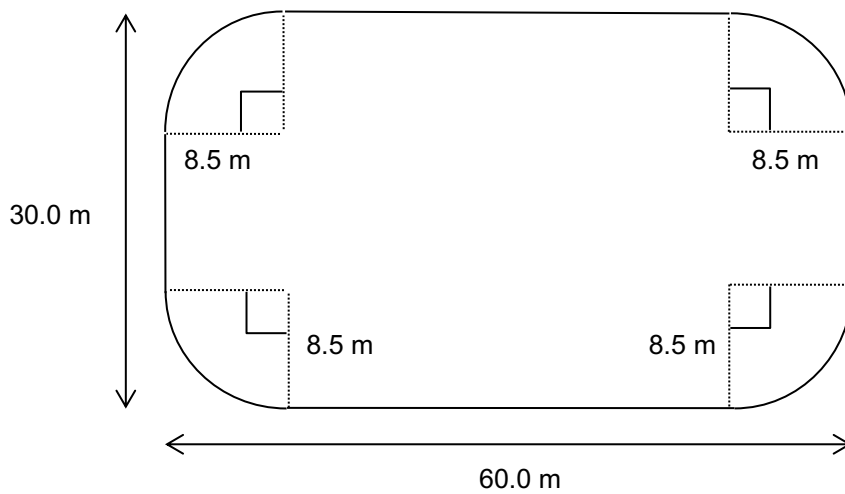
3. You wish to calculate $\frac{284}{567 - 4.2}$ on your calculator. You get the result 0.81. Your friend Agnes, who has no calculator, says that your answer is unreasonable. How can Agnes see that? (1/1)

4. Anton is going to do driver training and he investigates the prices at “Central Driving School”. The graph shows the price for the theory course and a number of driving lessons.



- a) Lotta says that she paid 6 500 kr for the theory course and some driving lessons at “Central Driving School”. How many driving lessons did she take? *Only the answer is required.* (1/0)
- b) How much does each driving lesson cost at “Central Driving School”? Explain your reasoning. (2/0)
- c) Express with a formula the cost for the theory course and x driving lessons at “Central Driving School”. *Only the answer is required.* (0/1)

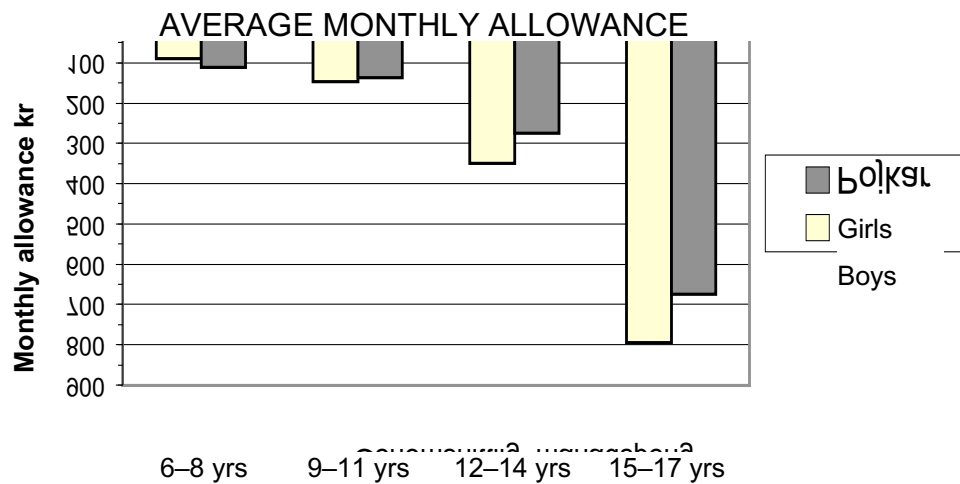
5. The figure shows the hockey rink in Österby. Each corner is a quarter circle.



- a) Stefan claims that the perimeter of the sideboards around the rink is about 165 m. Show that he is right. (1/1)
- b) The sideboards around the rink in Österby are 1.20 meters high. Of this height about 85 cm can be used for advertising. How many square meters can be used for advertising? (2/0)
- c) Österby Hockey Club needs to raise 550 000 kr in advertising sales. The club counts on selling 70 % of the total area of the sideboards for advertising. How much should the club charge per square meter? (1/1)



6. A survey in 2004 about the amount of monthly allowances for children and youth gave the following results:



Source: Temo

- a) How many percent higher is the monthly allowance for girls than for boys in the age group 15–17 yrs? (2/0)
- b) Anna gets 150 Crowns (kr) as her weekly allowance. To compare her allowance with the monthly allowances shown in the diagram she multiplies her weekly allowance by 4.3. Explain with words and calculations why she multiplies by 4.3. (1/1)
- c) In the table excerpt below you can see how many youth there were in 2004 in the age group 15–17 yrs.

Sweden's population, gender and age, 31/12/2004

Age	Women	Men
15	59 673	63 125
16	58 064	61 740
17	55 310	57 660

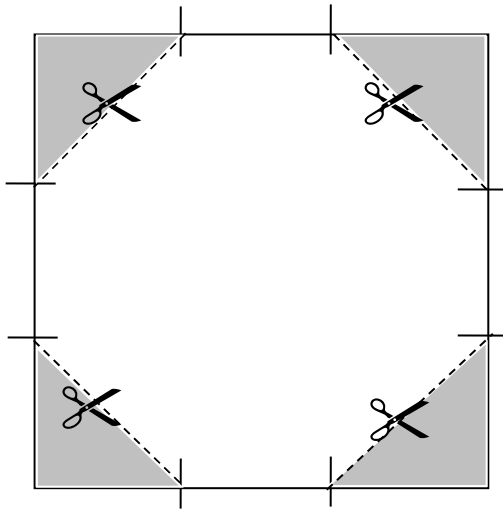
Source: SCB

Assume that all young persons got the average monthly allowance shown in the diagram. How many *million* Crowns, in total, did these youth receive in 2004? (1/2)

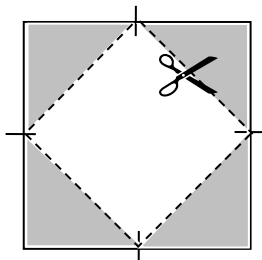
7. Cutting out squares

(5/4) ■

Each side of the square is divided into three *equal parts*. The corners are then cut off (see figure).



- What proportion (part) of the area of the square is cut off?
- Each side of another square is divided into two *equal parts*. The corners are then cut off (see figure). What proportion of the square is cut off?



- Investigate what proportion of the area of the square is cut off if you divide the side of the square into four, five or more *equal parts*.
- Write a formula that expresses what proportion of the area of the square is cut off if the sides of the square are divided into n *equal parts*.
- Show that your formula is correct.

In assessing your work the teacher will take into consideration

- what mathematical knowledge you have shown and how well you have dealt with the task.
- how well you have explained your reasoning and line of thought.
- how well you have presented your work.

8. Make a coordinate system *with length unit 1 cm*. Mark the points (1, 3), (3, 4), (5, 0) and (3, -1) in the system of coordinates. The points are the vertices of a rectangle. Find the area of the rectangle.

(2/1) 

9. It is possible to calculate the approximate area of the skin of a human being using the formula:

$$A = 1.0 + \frac{m + h - 160}{100}$$

where m is the person's weight in kg and h is the height in cm and A is the skin area in m^2 .

- a) Erik is 175 cm tall and weighs 71 kg. According to the formula, how many square meters of skin does Erik have?
- b) Investigate whether the formula holds for small children.



Photo: F Beaufrand/Scanpix

(2/0)

(0/2) 

10. Linda and Maria started a business together. Both of them were to put the same amount of money into the venture. Linda did not have enough money of her own so she had to borrow an amount corresponding to 20 % of the money she had herself. Maria, on the other hand, had 10 % of her own money left after paying her part. Maria had more money than Linda from the beginning. How many percent more?

(1/2) 