

The National Agency for Education, referring to 4 kap 3 § Sekretesslagen, emphasizes that this material must be kept confidential. **This material must remain confidential until December 31, 2012.**

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

Instructions

Time 120 minutes for Part II.

Aids Calculator, approved formula page and ruler.

Part II Part II consists of 11 questions. Most of the questions require not only an answer, you must also

- write your solution
- explain your line of thought and reasoning so that it is easy to follow
- draw clear figures when needed.

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 2 g-points and 3 vg-points.

In questions marked **M** you have an opportunity to demonstrate MVG-quality. This means that you use general methods, models and reasoning, that you analyse your results and present a clear line of thought with correct mathematical language.

Grading The test (Part I + Part II) gives a total maximum of 59 points, of which 24 are vg-points.

Lower limits for examination grade

Pass: 19 points

Pass with distinction: 36 points of which at least 9 vg-points

Pass with special distinction: At least 17 vg-points. In addition you must demonstrate several of the MVG-qualities that are possible to show in the questions marked **M**.

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

1. Elena is going to have a party. She wants to buy pizza and soft drinks for 21 people.

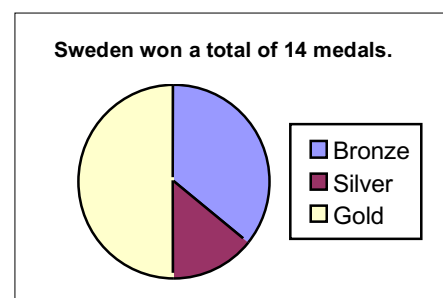
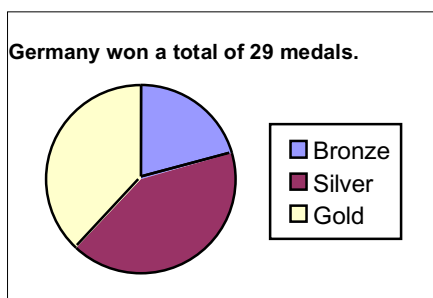
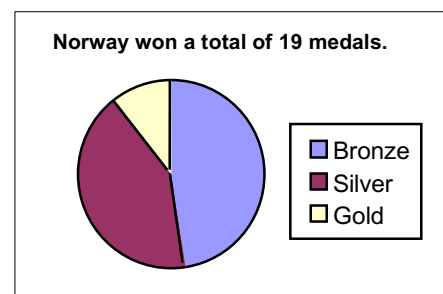
- a) She buys the soft drink in 1.5-liter bottles. She estimates that each person should have 0.5 liter of drink. How many bottles should she buy?
Only answer is required.

- b) She plans to cut up each pizza into eight slices and expects that each person will eat three slices. How many pizzas must she buy?

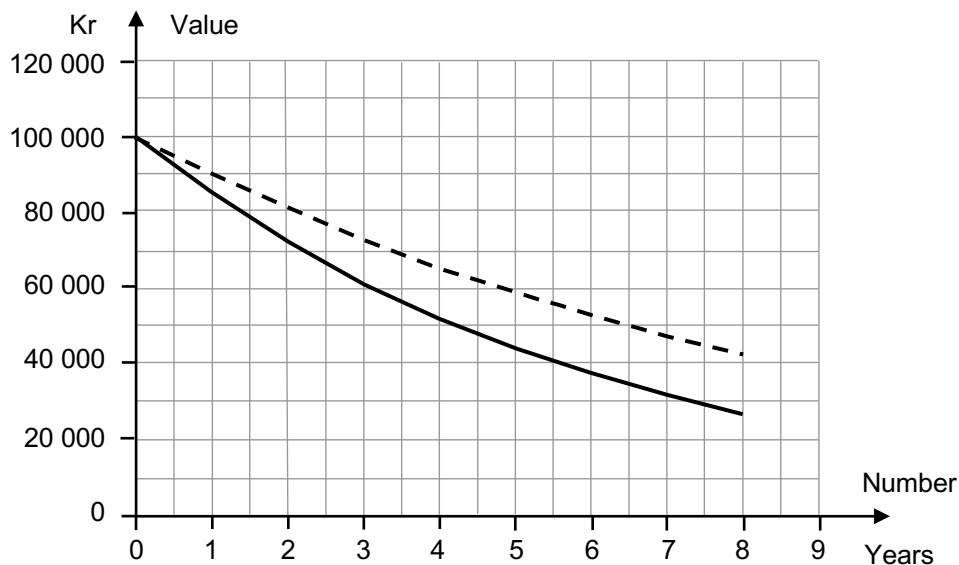


2. The diagrams show how the Olympic medals were awarded to various countries at the Olympic Games in Turin in 2006. Decide whether each of the following statements is true or false and explain why.

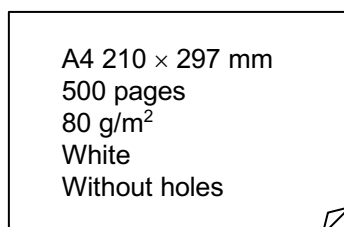
- a) Norway won more bronze medals than Sweden. (1/0)
- b) Sweden won more gold medals than Germany. (2/0)



3. Peter buys a used car for 100 000 kr. The value of the car will decrease in the coming years. The diagram shows how the value of the car will fall if it decreases by 10 % or by 15 % per year respectively.



- a) Find the value of the car after three years if the yearly percentage decrease is 10 %? *Only answer is required.* (1/0)
- b) How much longer time is required to half the value if the yearly percentage decrease is 10 % instead of 15 %? (1/1)
4. State three numbers for which the mean is 7 and the median is 5. Explain your choice. Discuss other possible choices of three numbers that give a mean of 7 and a median of 5. (2/1)
5. On a package of A-4 printing paper there is a label with information.

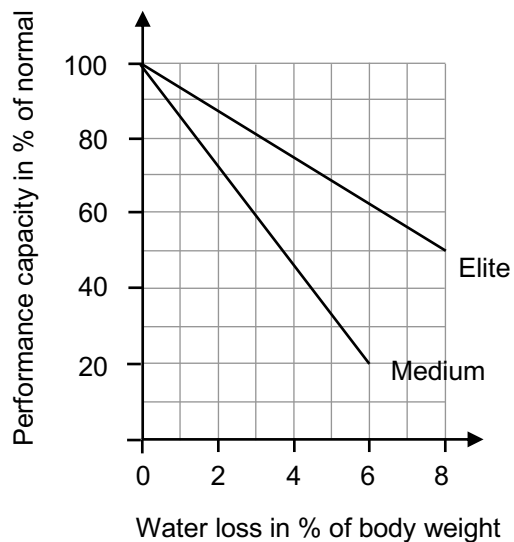


How much do 500 A-4 pages weigh? (1/2)

6. Erik has decided to start physical training. On the Web he finds the following information.

Air temperature (°C)	Water loss (liter per hour)	
	Medium rate	Elite rate
−5	0,3	0,6–1,4
+10	0,6	1,2–1,5
+20	0,9	1,6–2,4
+30	1,1	2,0–2,8

- a) How much will his water loss be if he runs *half an hour* at medium rate and the temperature is +10 °C? *Only answer is required.* (1/0)



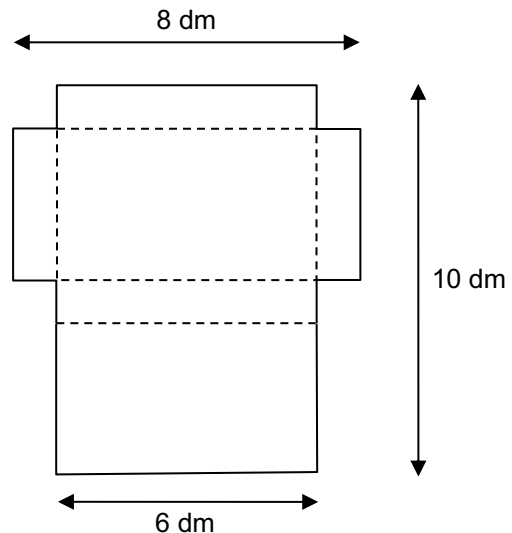
- b) Erik's sister Helena is an elite runner. After a training session she has lost 5 % of her body weight because of water loss. What percentage of her capacity does she have left? *Only answer is required.* (1/0)
- c) On a very hot summer day Erik jogs for 45 minutes without drinking. By how much does his performance capacity decrease before he compensates his water loss? Erik weighs 70 kg. (1/2)

7. Emil and Karin each get a chocolate bar. Emil eats up one third of his bar and Karin eats up two fifths of hers. Then they have eaten the same amount. Which of them had the largest chocolate bar from the start?



(0/2)

8. The figure shows a drawing of a box (a parallelepiped) The figure is not drawn in true scale.





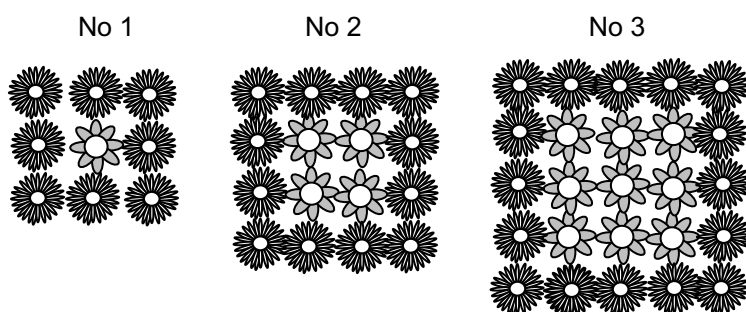
- a) Draw a picture of how the box will look when it is folded up properly. Mark the lengths of the sides. (2/0)
- b) Another box is to have twice the volume of this one. How long should the sides be? Explain your suggestion. (1/1)

9. **World record in domino effect**
The Chinese woman Ma Lihua set up 303 621 dominos. It took her 12 hours a day every day for six weeks to set up the dominos. It took four minutes for them to fall down and only six dominos were still standing afterwards.



- a) How much time did it take on the average for Ma Lihua to set up one hundred dominos? (1/2)
- b) How many milliseconds did it take on the average for one domino to fall down? (1/1)

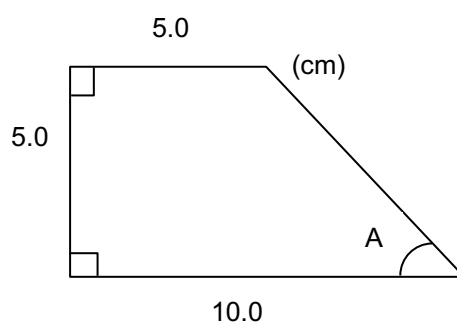
10. In a park there are many flowerbeds of different sizes. Two kinds of flower plants are planted in the beds. In the figure the middle flower plants are indicated by  and the edging flowers plants are indicated as .



- a) How many edging flowers are there in bed number 5? Explain your answer. (1/0)
- b) Lotta has 32 edging flowers. How many middle flower plants are needed to make her flowerbed with this design? Explain your answer. (1/0)
- c) Lotta came to the conclusion that the expression $n^2 + 4n + 4$ can be used to find the sum of the number of middle flower plants and the edging flower plants, where n is the bed number. Explain why this expression is correct. (0/2)



11. Show by calculations and/or reasoning that angle A is 45° .



(1/1) 