

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 June 30, 2013.**

**National Test in  
MATHEMATIC  
COURSE A**

**Spring 2007  
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  $\boxplus$  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 61 points, of which 26 are vg-points.

*Lower limits for examination grade*

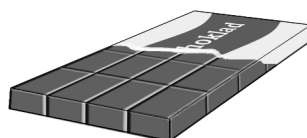
Pass: 19 points

Pass with distinction: 36 points of which at least 10 vg-points

Pass with special distinction: At least 19 vg-points. In addition you must demonstrate several of the MVG-qualities that are possible to show in the questions marked  $\boxplus$ .

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

1. A chocolate bar weighs 225 gram and consists of 45 identical squares. Suppose you are baking a cake and you need 150 gram chocolate. How many squares should you use?



(2/0)

2. An offer from a cell phone company looks like this:

**Mobile Company**

49 SEK as fixed monthly charge

59 öre/call in opening charge

59 öre/minute all day, every day

**Free SMS**



- a) Tove has a cell phone contract with the Mobile Company. When she got her first bill it contained this information:

Number of calls	Length of call in minutes
86	221

Tove's bill for the month was 230.13 SEK. Show by calculations that this amount is correct.

(2/0)

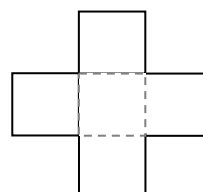
- b) Elin also has her cell phone contract with Mobile Company. Her bill for the month was 192.96 SEK. She knows that she made 30 calls. How many minutes was her total calling time?

(1/1)

- c) Another month both Tove and Elin had a total calling time of 175 minutes but their bills were different. Explain why.

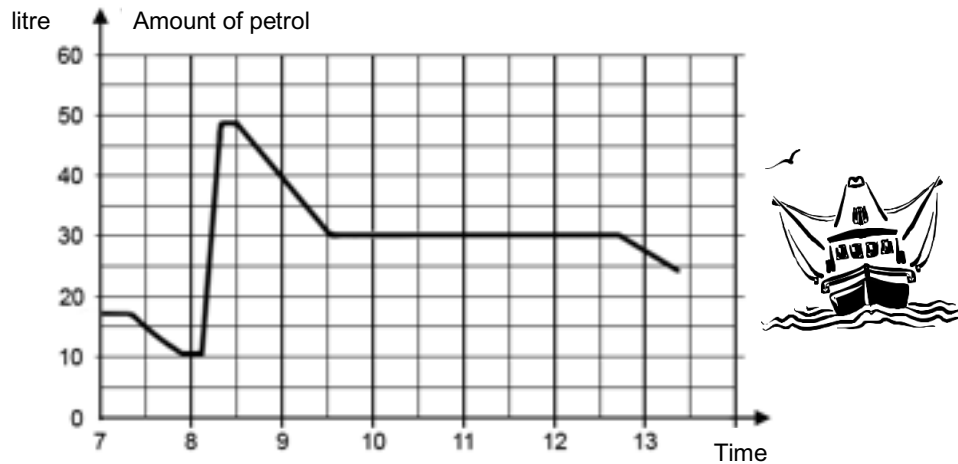
(1/0)

3. The figure shows five squares, all with the same area. The area of the entire figure is  $405 \text{ cm}^2$ . Find the perimeter of the whole figure.



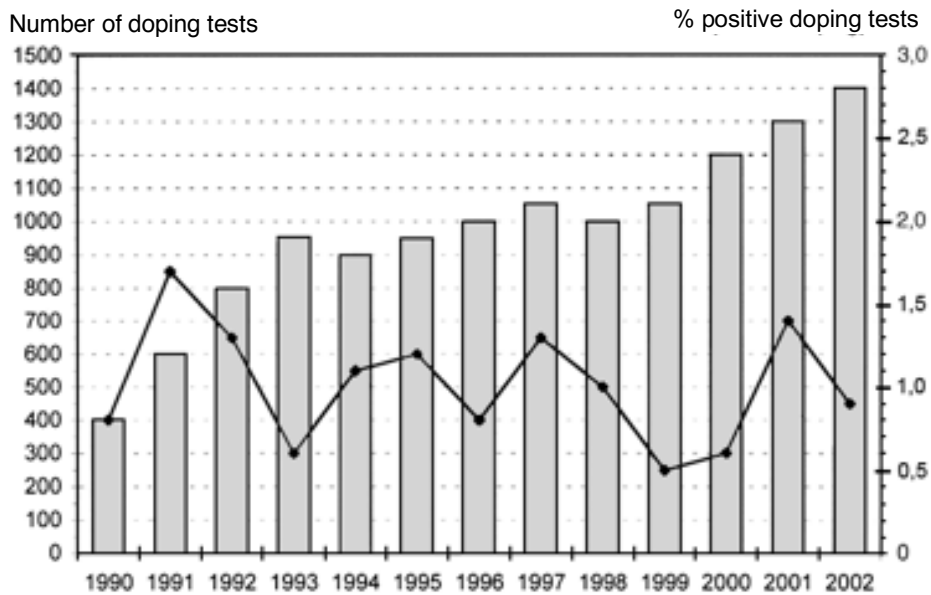
(2/1)

4. The diagram shows the amount of petrol in the tank of a motorboat during a few hours time.

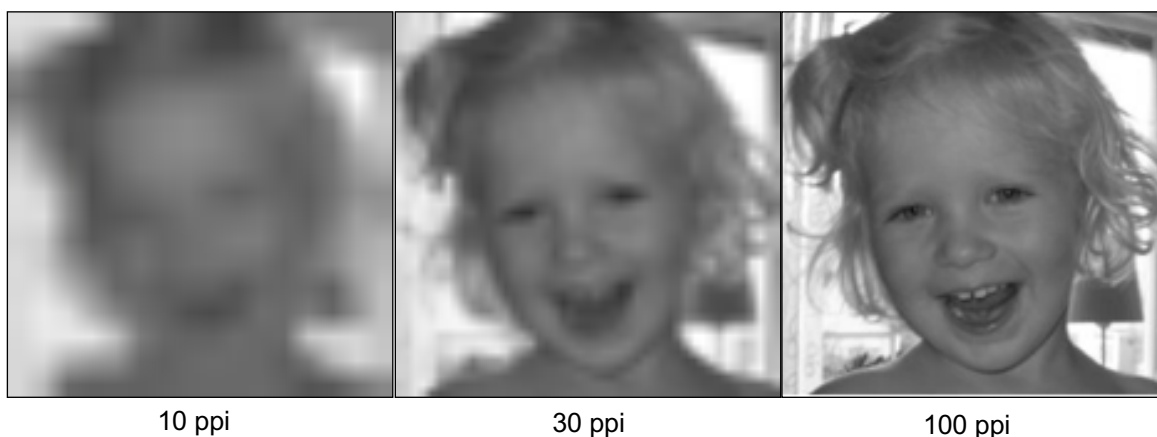


- a) What was the least amount of petrol in the tank during this part of the day? *Only answer is required.* (1/0)
- b) What happened at time 8.10? *Only answer is required.* (1/0)
- c) Between what times was the petrol consumption (litres per hour) greatest? Explain your reasoning. (0/2)
5. On the Internet Alicia finds a formula that can be used to calculate how tall you will be when you have stopped growing. The formula says that your height depends on the heights of your father and mother.  $m$  represents the mother's height in cm,  $p$  is the father's height in cm and  $d$  is the daughter's height in cm.
- $$d = \frac{p + m}{2} - 3$$
- a) How tall can Alicia expect to be according to the formula if her mother is 173 cm and her father is 171 cm? (2/0)
- b) Is it possible for a daughter to grow taller than her father according to this formula? Investigate and explain your reasoning. (1/1)

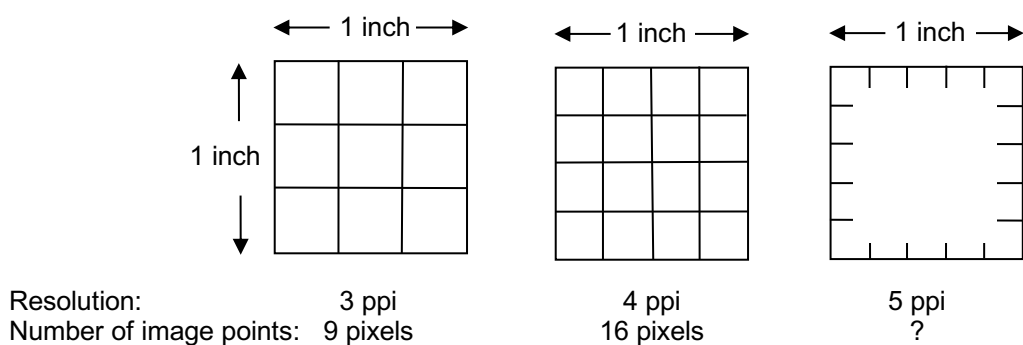
6. The diagram shows statistical data for doping tests in a European country for the years 1990 to 2002. The bars show the number of doping tests and the line diagram shows the percentage of the doping tests that were positive.



- a) What percentage of the doping tests were positive in 2000?  
*Only answer is required.* (1/0)
- b) Andreas claims that more doping tests were positive in 1994 than in 2002. Is he right? Show your reasoning with calculations and explanations. (1/2)
7. The mean for six numbers is 50, the median is 50 and the mode is 50.  
*Not all the numbers are the same.* Give an example of what the six numbers might be and show that these statements are true for your numbers. (1/2)
8. According to a prognosis the rent for an apartment is expected to rise by 4 % per year. By what percentage is the rent expected to rise over a 5-year period according to this prognosis? (0/2)

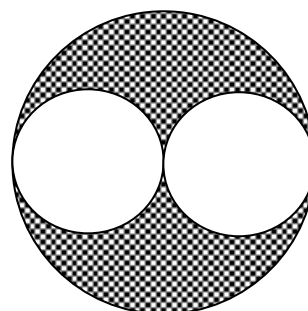


9. In order for a photo from a digital camera to be clear, it must contain many image points, called pixels. As a measure for resolution in an image we often state the number of pixels per inch (ppi). The edges are measured.



- a) How many pixels are there in the square with resolution 5 ppi?  
*Only answer is required.* (1/0)
- b) The photo in the middle is 2 inches  $\times$  2 inches.  
Find the number of pixels. (1/1)
- c) Suppose you print a 13 cm  $\times$  10 cm photo with resolution 500 ppi.  
How many pixels does the photo have? (1 inch  $\approx$  2,54 cm) (1/2)

10. Show by calculations and/or reasoning that the area of the shaded region is the same as the combined area of the two small circles.



(1/2) ▣

11. PRIMA-coffee is sold in four different sized jars, as shown.



300 g  
65.70 kr



200 g  
45.70 kr



100 g  
23.90 kr



50 g  
12.95 kr

- a) Calculate what 100 g of PRIMA-coffee costs for each of the jars. (1/0)
- b) The coffee company plans to introduce another package, a jar that contains 450 g. Josephine and Michael make an estimate of what this jar of coffee should cost. Look at their calculations below. Explain why Michael and Josephine get different answers. (1/2) ☐

Josefin's solution:

$$100 \text{ g costs } \frac{21.9 + 22.85 + 23.9 + 25.9}{4} \approx 23.6 \text{ kr}$$

$$450 \text{ g costs } 4.5 \cdot 23.6 \approx 106.50 \text{ kr}$$

Mikael's solution:

