

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, 2013.**

**National Test in
MATHEMATICS
COURSE A
Autumn 2007**

Part II

Instructions

Time 120 minutes for Part II.

Aids Calculator, approved formula page and ruler.

Part II Part II consists of 12 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 \square 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 58 points, of which 23 are vg-points.

Lower limits for examination grade

Pass: 19 points

Pass with distinction: 33 points of which at least 10 vg-points

Pass with special distinction: At least 16 vg-points. In addition you must demonstrate several of the MVG-qualities that are possible to show in the questions marked \square .

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

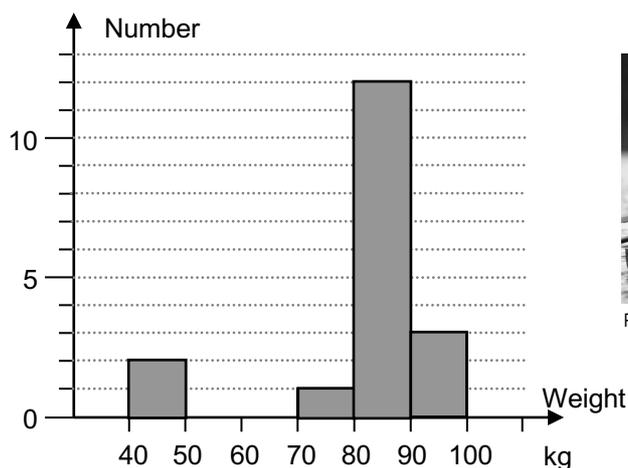
1. Calculate $\frac{1036}{161.85}$ *Only answer is required.* (1/0)

2. William is visiting Stockholm. In the hotel lobby he sees these clocks, showing the local time in several cities:

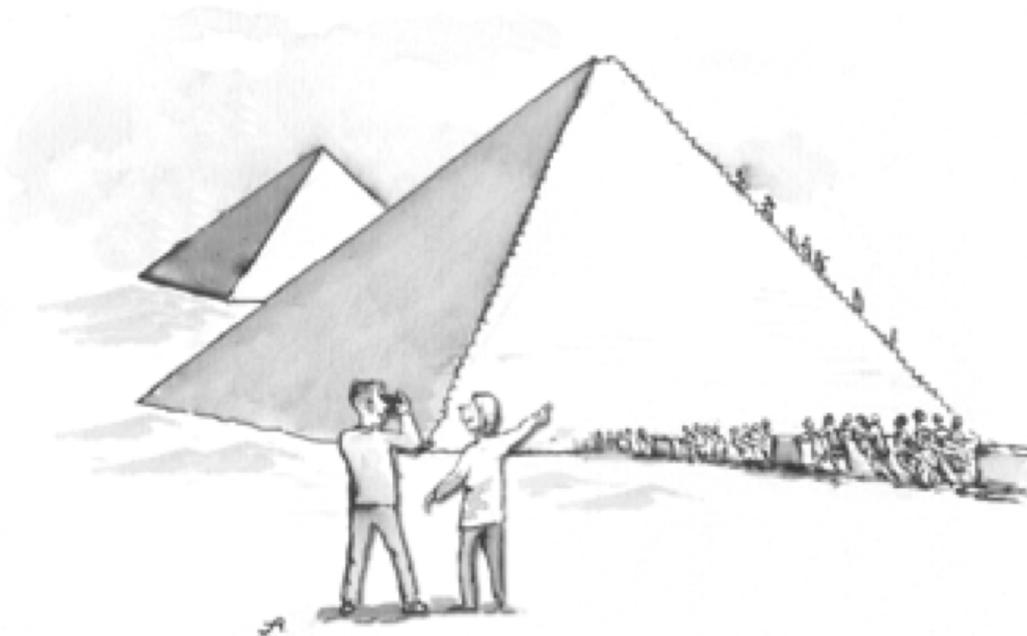


William has promised to call home to his parents in New York every Friday. They want him to call when they have quit work at 16.30. At what local time in Stockholm should William call home? *Only answer is required.* (1/0)

3. Every year there is a famous rowing contest between teams from Cambridge and Oxford Universities. Each team consists of a steersman and a number of oarsmen. Oxford won the contest in 2006. The histogram shows the distribution of the weights of the team members of both teams in 2006.

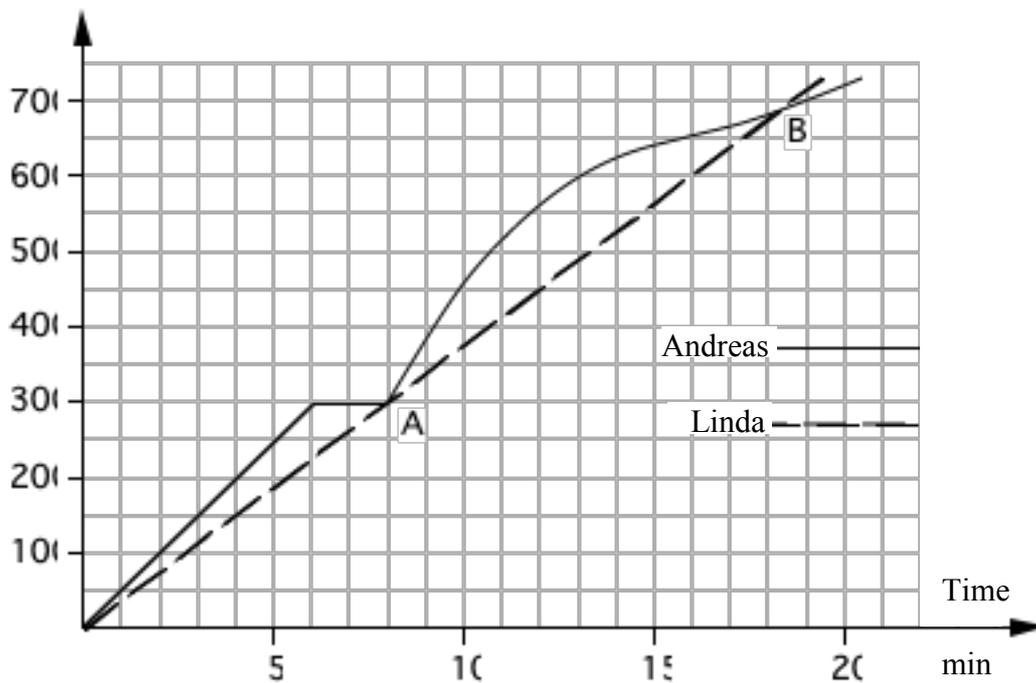


- a) How many persons were there altogether in both boats? *Only answer is required.* (1/0)
- b) A steersman should not weigh too much since he only steers the boat. How much did a steersman weigh, approximately? *Only answer is required.* (1/0)



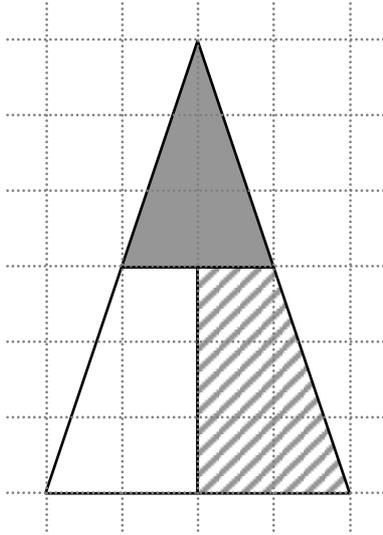
4. Linda and Andreas were in Egypt. There they climbed up the edge of a pyramid. Each step was 20 cm high. Their walk is described in the diagram below.

Number of steps



- a) How many steps had Linda gone after 12 minutes? *Only answer is required.* (1/0)
- b) Study the diagram and describe carefully, but briefly, Andreas' trip to the top. (2/1)

5.

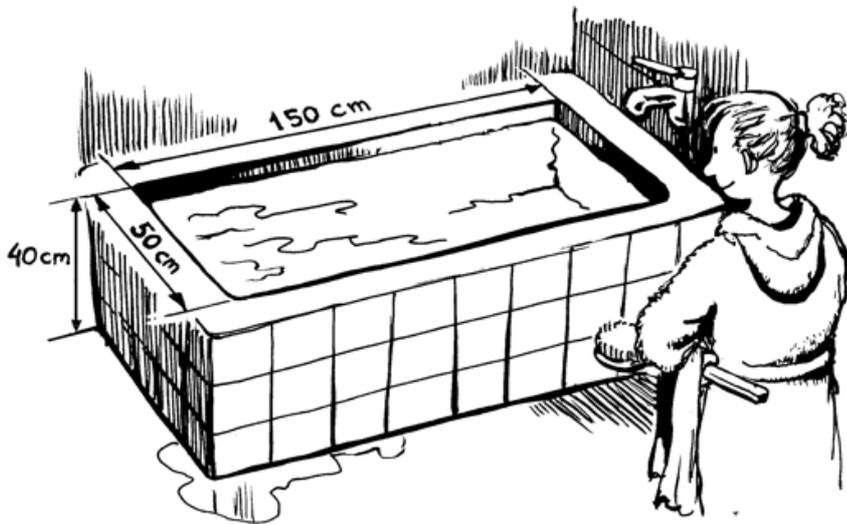


What portion (part) of the total area of the triangle is the “hatched” region marked with slanted stripes?

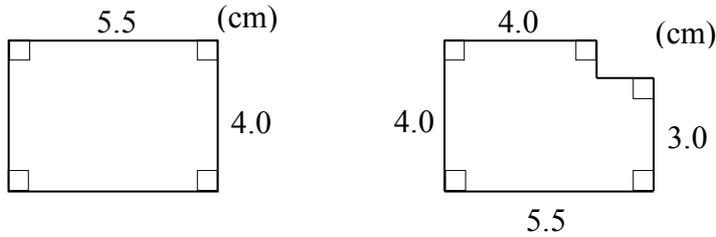
(1/1)

6. Milla, who is 15 years old and weighs 50 kg, is going to take a warm bath. She fills the bath tub up to 5 cm from the top. Then she submerges her whole body into the water. Will the water overflow? Explain your answer using calculations.

Milla’s weight in kilogram is approximately as large as her volume in liter. (2/1)



7.



a) Calculate the perimeter of each of the two figures. Compare the two perimeters. What do you discover? (2/0)

b) Show that this is true for all rectangles with a “rectangular corner removed”, where any length and width can be chosen for this corner. (1/1)

8. Matilda is studying how the price of ice-cream bars with chocolate coating has varied over a few years. She wants to draw a graph showing the price development and she uses a spread-sheet program. She makes two different diagrams.



a) Which diagram is unsuitable and why? (0/1)

Diagram I

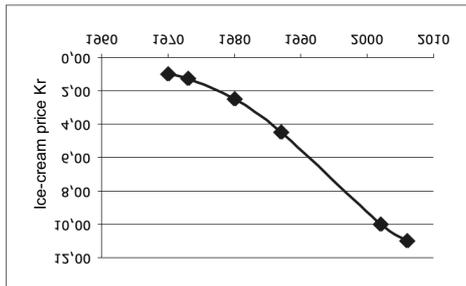
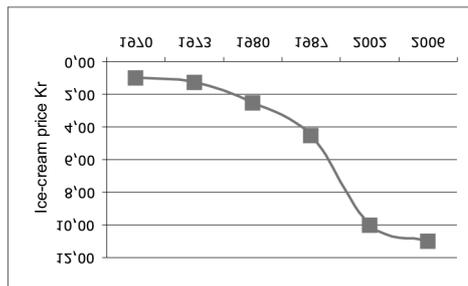


Diagram II



b) Matilda decides to make a calculation in cell G4 in the spread-sheet. What is she calculating and how much will it be? (0/2)

	A	B	C	D	E	F	G
1							
2							
3		Price for an ice-cream bar with chocolate					
4		Year	Price (kr)				$= (c10 - c5) / (b10 - b5)$
5		1970	1,00				
6		1973	1,25				
7		1980	2,50				
8		1987	4,50				
9		2002	10,00				
10		2006	11,00				
11							

9. Anton wants to compare printing costs for an advertisement brochure. Digital Press Ltd has an initial cost of 20 SEK and on top of that 24 öre per copy. Printing Services Ltd has no initial charge but they charge 36 öre per copy.

- a) Copy this table on your paper and fill in the missing values.
Only answer is required.

(2/0)

Number of copies	100	500
Cost at Digital Press Ltd		
Cost at Printing Services Ltd		

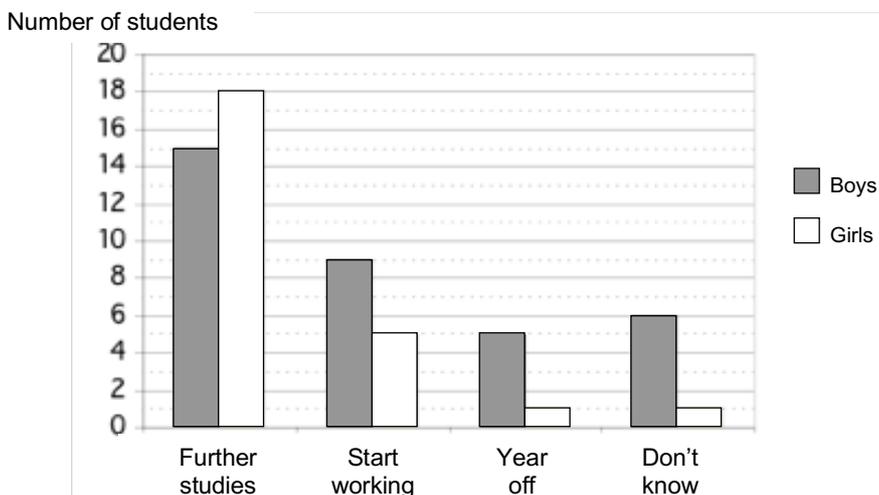
- b) Anton has 320 SEK to use for printing costs.
How many copies can he get at Digital Press for this amount?
- c) Make a formula to describe the cost of printing x brochures at Digital Press.
- d) How many copies must be printed, at least, in order that Digital Press can do the job more cheaply than Printing Services?

(2/0)

(1/1)

(1/1)

10. The diagram below presents the result of a survey done in two graduating classes in a secondary school. The students had answered the question “What do you intend to do after your graduation?”



A newspaper article presented the survey and stated:

“More than 50 % of the students intend to do further studies. The proportion of the girls who intend to study is 68 % greater than the proportion of the boys who intend to study.”

Decide using your own calculations whether the journalist has made correct percent calculations.

(2/2)

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

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

where m is the 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.
How many square meters of skin does Erik have according to the formula? (2/0)
- b) Investigate whether the formula holds for very small children. (0/2)
12. Markus has square silver plates of *different sizes*. From these plates he wants to cut out circular silver trays as shown in the figures. Investigate what percentage of the silver plate will be left over. Present your conclusions using calculations and reasoning. (1/2)

