

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
MATHEMATICS
COURSE A
Spring 2007
Part I**

Instructions

- Time 60 minutes for Part I. It is recommended that you use a maximum of 25 minutes for working with the short answer questions. You may not use your calculator until you have submitted your answers to the short answer questions.
- Aids **Short answer part:** Approved formula page and ruler.
Question 13: Calculator, approved formula page and ruler.
- Short answer part This part consists of questions to be solved without a calculator. *Only the answers are required.* A correct answer gives 1 g-point (1/0) or 1 vg-point (0/1).
- Question 13 This question is a larger question which normally requires more time. In the box below the question you can see what considerations the teacher will make in assessing your solution.
- 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 ■ . |

Name: _____ Date of birth: _____

Adult education/Secondary school program: _____

Name:

Class/Group:

Part I

1. A TV which normally costs 15 000 SEK is now to be sold at a discount of 30 %. How many SEK is the discount?

Answer: _____ kr (1/0)

2. Five bags of potatoes have the following weights in kilograms (kg). Which bag weighs closest to 3.5 kg? Circle your answer.

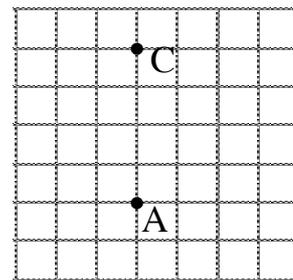
3.409 3.446 3.581 3.473 3.619 (1/0)

3. On a min-max thermometer you can read off the highest and the lowest temperatures. How great is the temperature difference this winter day?

| | |
|-------------------------------|-------------------------------|
| <p>-2.8 °C MIN</p> | <p>+5.6 °C MAX</p> |
|-------------------------------|-------------------------------|

Answer: _____ °C (1/0)

4. In a square ABCD the line AC is a diagonal. Draw the square.



(1/0)

5. A formula for calculating VAT (value-added tax) is written into a spread sheet as shown. What will the cost including VAT be?

| | A | B |
|---|--------------------|----------|
| 1 | Cost without VAT | 600 |
| 2 | Cost including VAT | =1,25*B1 |
| 3 | | |

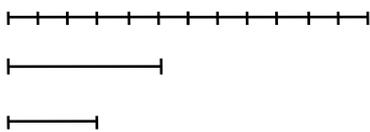
Answer: _____ kr (1/0)

6. Solve the equation $25 - 5 \cdot x = 10$ Answer: x = (1/0)

7. Calculate $5 \cdot \frac{1}{4}$
 Circle your answer.
 $\frac{5}{4}$ $\frac{6}{4}$ $\frac{20}{5}$ $\frac{5}{20}$ $\frac{1}{20}$ (1/0)

8. Which of the following expressions can be written as x^3 ?
 Circle your answer.
 $3x$ $x + x + x$ $\frac{x^6}{x^2}$ $x \cdot x \cdot x$ $x^2 + x$ (1/0)

9. A cube has the volume 27 cm^3 .
 Find the area of each face of the cube. Answer: cm^2 (0/1)

10. 
 Distance A: 
 Distance B: 
 Express the length of distance B using the distance A. Answer: B = \cdot A (0/1)

11. Which time period is the shortest?
 Circle your answer.
 $3\frac{1}{3} \text{ h}$ 195 min 3.2 h 3 h 20 min (0/1)

12. What number must you subtract from the number 5.8310^3 in order that the “eight” will become a “six”?
 Answer in decimal form. Answer: (0/1)

In assessing your work the teacher will take into consideration

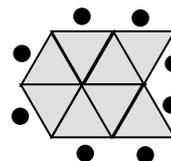
- what mathematical knowledge you have demonstrated and how good your solution is
- how well you have explained your work and presented your reasoning and conclusions
- how well you have presented your solution.

(5/4) □

Question 13 – Placement at tables

Equilateral triangles

There are tables that have the shape of *equilateral triangles*. Several such tables are to be placed side by side, with *at least one side in common*, so that they form a connected table surface. The figure to the right shows how 8 such tables might be placed together. There is space for only one person at each free side.



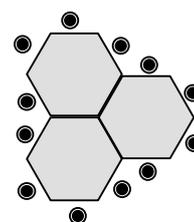
- ➔ Draw at least two other ways to place 8 such triangular tables together. What is the maximum number of persons that can be seated at your 8 tables?
- ➔ Draw the following table and fill in the empty spaces.

| | | | | | | | | |
|-------------------------------------|---|---|---|---|---|---|---|---|
| Number of triangular tables (n) | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Maximum number of persons (p) | 3 | | | | | | | |

- ➔ What is the *maximum* number of persons that can be seated if we place together n triangular tables? Describe this with words or a formula.

Regular hexagons

There are also tables shaped as *regular hexagons*. These tables too can be placed side by side. There is space for only one person at each free side. The figure shows how 3 tables might be placed together and 12 persons can be seated then.



- ➔ Investigate what is the maximum number of persons that can be seated if you place n such tables next to each other. Describe this with words or a formula.

Regular polygons

We can imagine other tables with other regular shapes.

- ➔ Investigate the *maximum* number of persons that can be seated at n tables, if the tables have the shape of *regular polygons* with s vertices. Write a relationship (formula) for calculating this number. Explain or show by some kind of reasoning that your formula is correct.