Directions

Test period	May 10 - June 1, 1996.
Test time	120 minutes without a break.
Resources	Calculator and formula sheet. The formula sheet is attached to the test.
Test material	The test material should be handed in with your solutions. Write your name, gymnasium programme/adult education and date of birth on the papers you hand in.
Test	The test is made up of 13 problems. The problems which are short answer problems (problems which can earn 1 point) require, for the most part, only an answer. Most of the problems are long answer problems (problems which can earn 2 or more points). For these problems it is not enough with just a short answer. They also require • that you write down what you do and explain your train of thought, • that you draw figures when necessary and • that you write down all your coputations Try all of the problems. It can be relatively easy, even at the end of the test, to earn some points for a partial solution or presentation.
The grading levels	The teacher responsible will explain the grade levels which are required for ”Passed” and ”Passed with Distinction”. The test can earn a maximum of 44 points.

1. a) Compute 1.2^3 *Only answer is required.* (1p)

b) Compute $\dfrac{3.5 \cdot 10^7}{2.5 \cdot 10^4}$ *Only answer is required.* (1p)

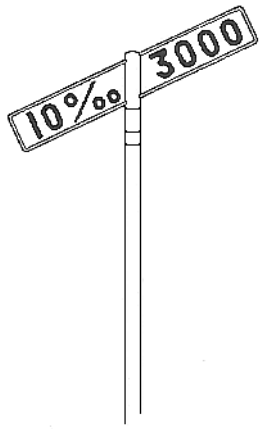
2. A shop is going to raise its prices by 15%.

a) A pair of jeans cost 520 crowns.
What do the jeans cost after the price increase? (1p)

b) Assume that you are going to compute the new price in your head.
Describe how you will do that. (1p)

c) The cashier is going around and marking up the prices of the items. What number should he multiply the old prices by to compute the new prices? (1p)

3. Beside the railroad tracks, there is a sign showing the slope of the railroad track. It is standing at the bottom of a hill and gives the change in height for the upcoming stretch of track per thousand (per mille) of the stretch's length. (3p)



a) How many meters does the height increase in the first 3000 meters?

b) How many thousandths (per mille) should be on the sign if the height increases with 50 m in the next 4500 meters?

4. Erik works 35 hours during one week. He earns 3010 crowns.
Anna has the same hourly salary. She earns 1892 crowns.

a) How many hours has Anna worked? (2p)

b) Suggest a suitable formula for Anna´s salary y, in terms of x, which is the number of working hours. (2p)

5. a) Give two numbers whose product is 10^5 *Only an answer is required.* (1p)

b) Give two fractions whose sum is $\frac{1}{6}$ *Only an answer is required.* (1p)

c) Show how you arrived at your solution in b). (1p)

6. On a bulletin board in a church hall, someone had posted this newspaper clipping with the circle diagram as an illustration. The text for the diagram was missing.

a) Write an explanation for the diagram so that one can understand how it is related to the article. (2p)

b) Why is it appropiate to use a circle diagram in this case? Motivate your answer. (1p)

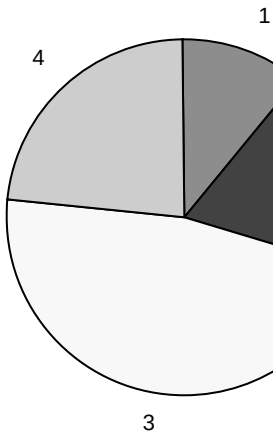
Expensive to go to Church

A common visit to a church service costs 92 crowns in Sweden. It is a little more expensive in Mälardalen where there are fewer visitors, 101 crowns, and is cheapest in southeast Sweden, 81 crowns.

The numbers have been computed by Jörgen Staarup at the Swedish Church Research Department and are based on the congregations' expenditures and their visitation statistics.

He has, in addition, computed what portion of the pastor's working time goes to the preparation for the service.

The 92 crowns which every visitor "costs" is divided in the following ways: 17:50 pastoral participation, 22 crowns church music, 42:30 maintenance costs, and 10:20 for consumable goods. (SvD)



7. Julia, Jasmine, and Jennifer have all solved the same equation, however they have gotten different answers.

$2(9-5x)=28$ $18-10x=28$ $10x=10$ $x=1$	$2(9-5x)=28$ $18-5x=28$ $-5x=10$ $x=-2$	$2(9-5x)=28$ $9-5x=14$ $9-14=5x$ $-5=5x$ $x=-1$
Julia	Jasmine	Jennifer

a) Which solution is correct? *Only an answer is required.* (1p)

b) Which errors did the others make? (2p)

8. The average age in a family with kids is 24.
Give an example of how old the family members can be.
Show how you arrived at your solution. (2p)

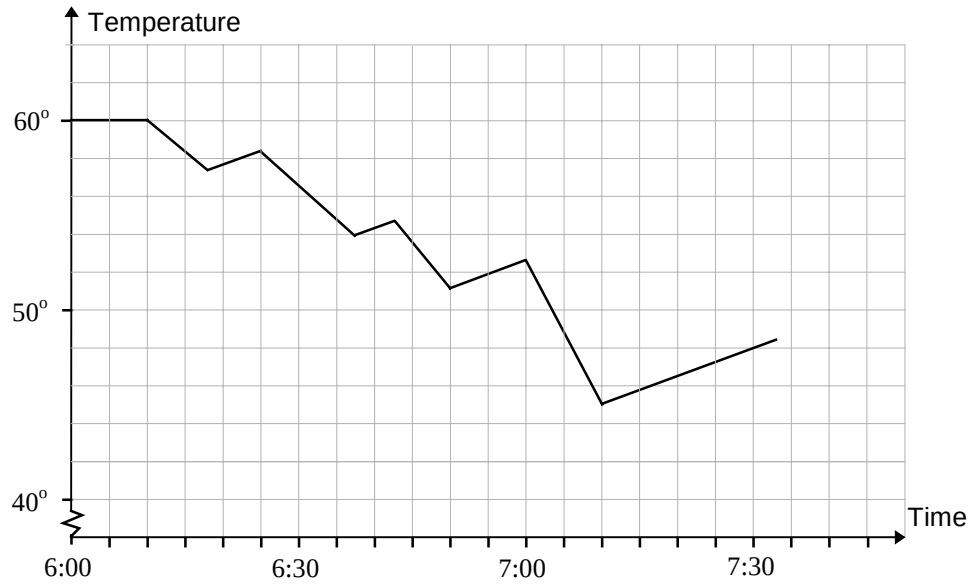
9. In a shop, custom-made carpets are sold for 295 kr/m^2. Binding the edge of the carpet costs 120 kr/m.

a) How much does a rectangular carpet with measurements of $2.50\text{ m} \times 3.20\text{ m}$, which should be binded all the way around, cost? (3p)

b) In the carpet shop, one wants to use the computer to print all of the bills. Therefore, a formula is needed for computing the price of a binded carpet of different lengths and widths.
Create such a formula. (2p)

10. The area of Gotland is 3000 km^2. Would the whole Earth's population, approximately five and a half billion, be able to stand on the island at the same time? (3p)

11. The Johansson family has a hot water tank, where the cold water is warmed up to a temperature of 60°. The diagram shows how the temperature in the hot water tank varies on a normal weekday morning. Warm water is only used for showers.



a) How many of the family members shower in the morning?
How can you read that from the diagram? (2p)

b) Mr. Johansson is the first one up. He takes a shower right away.
When does he start showering? *Only an answer is required.* (1p)

c) The daughter, Camilla takes the longest time to shower.
How long does it take her to shower? *Only an answer is required.* (1p)

d) When the family leaves at 7:30 am, the temperature in the hot water tank is 48°.
At what time is the temperature back up to 60°? (2p)

12. A round American pizza for one person has a diameter of 21 cm.
How large should the diameter be if the pizza is for two people? (3p)

13. Stina chooses a number, multiplies it by 5 and adds 12.
She then takes away her original number and divides the result by 4.
She then discovers that the number she has as a result is 3 more than the number she started with.

She says to herself:
- I believe it will be the same result no matter what number I start with.

a) Try some numbers and show that her belief seems to be correct. (2p)

b) Prove that she is correct. (2p)