

This material is confidential until the end of April 1999.

Directions

Test period	December 3 – December 17 1998.
Test time	120 minutes without a break
Resources	Calculator and formula sheet. The formula sheet is attached to the test.
Test material	<p>The test material should be handed in with your solutions.</p> <p>Write your name, gymnasium programme/adult education and date of birth on the papers you hand in.</p>
The test	<p>The test is made up of 10 problems.</p> <p>Most of the problems are of the <i>long-answer type</i>, where a short answer is not sufficient, but it is required</p> <ul style="list-style-type: none">• that you write down what you do• that you explain your train of thought• that you draw figures when necessary. <p>Some of the problems (where it is stated <i>Only an answer is required</i>) need only an answer.</p> <p>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.</p>
The score levels	The teacher responsible will inform you about the scores required for "Passed" and "Passed with Distinction". The maximum score is 43 points.

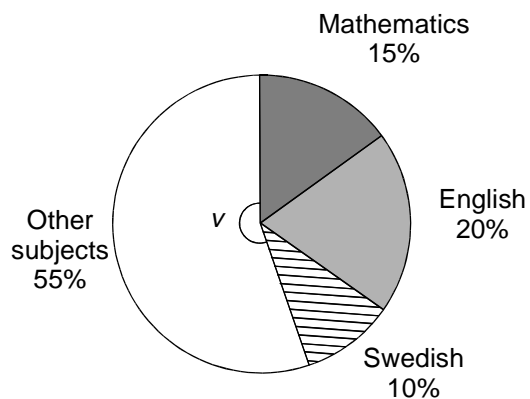
1. Calculate

a) $\frac{161}{23 \cdot 7}$ *Only an answer is required* (1p)

b) $\frac{3.17 + 3.63}{1.7}$ *Only an answer is required* (1p)

2. 200 upper secondary school pupils were given the question: Which subject is the most interesting one in school?

Below, you can see the result from the survey.



a) How many pupils answered that mathematics was the most interesting subject? (1p)

b) Calculate the angle v in the pie chart. (1p)

3. a) Write 18 hundredths on the decimal form. *Only an answer is required* (1p)

b) Give an example of a number between 0.09 and 0.1. *Only an answer is required* (1p)

c) Write down the following numbers after size, start with the smallest number
 4 ‰ 70 ppm 0.3 ‰ *Only an answer is required* (1p)

4. Use the press cutting below to answer the following questions.
- How long distance have you covered when you have ridden one lap in the Millennium wheel? (2p)
 - How many hours does the Millennium wheel at least have to be open each year? (2p)
 - The distance, s km, that you can see from the height, h metres, on a clear day can be estimated approximately from the formula $s = 3.9\sqrt{h}$.
How many km will you be able to see from the Millennium wheel?
Only an answer is required (1p)
 - To what scale do you have to build a model of the Millennium wheel, if the model has to go into a library? (2p)

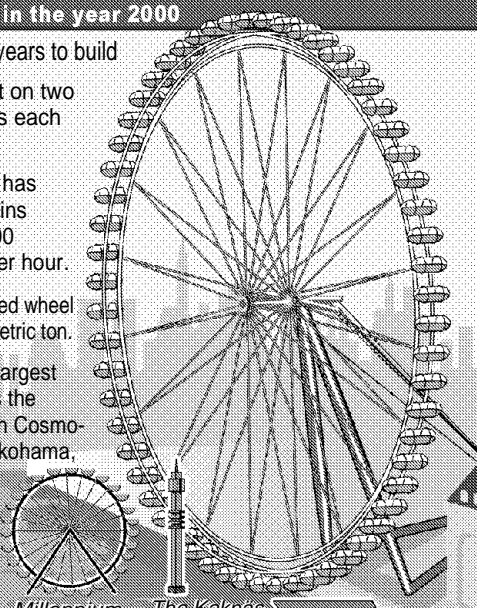
AFTONBLADET special 20/11 1996

The world's largest Ferris wheel

If you visit London after the turn of the century, you will be able to see the city from the Millennium wheel - a 150 metre high Ferris wheel. The record wheel is built to celebrate the new century.

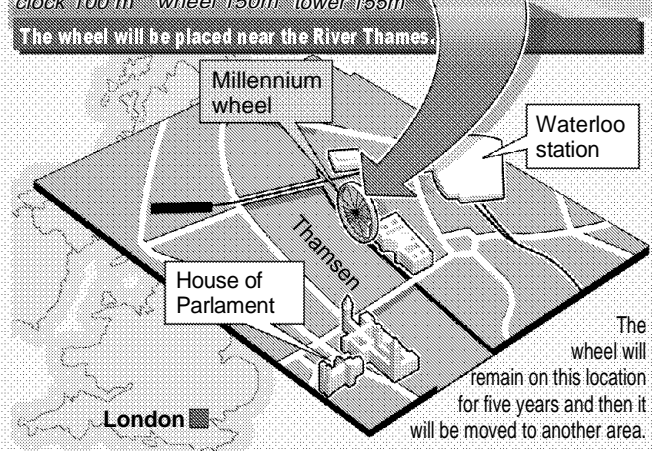
Completed in the year 2000

- ▶ Takes two years to build
- ▶ They count on two million visitors each year
- ▶ The wheel has 60 closed cabins and takes 2500 passengers per hour.
- ▶ The completed wheel weighs 1800 metric ton.
- ▶ Today, the largest Ferris wheel is the 100-metre high Cosmo-clock 21 in Yokohama, Japan



Cosmo-clock 100 m Millennium wheel 150m The Kakias tower 155m

The wheel will be placed near the River Thames.



Millennium wheel
Waterloo station
Thames
House of Parliament
London

The wheel will remain on this location for five years and then it will be moved to another area.

Graphics: GUNVOR EKSTRÖM, Reuters. Research: Lisa Säfwenberg. Source: Reuters, Guinness Book of Records.

5. A dog boarding-house takes care of dogs that for example cannot go with their owners on journeys abroad. Anyone who wants to leave his or her dog at the boarding-house has to pay a certain daily fee plus a single payment of 50 SEK. Furthermore, VAT of 25% is added. Lisa who works at the boarding-house uses a worksheet on her computer to calculate the cost, for example

	A	B
1	Number of days	10
2		45
3	Single payment	50
4	Cost excluding VAT	
5	Cost including VAT	

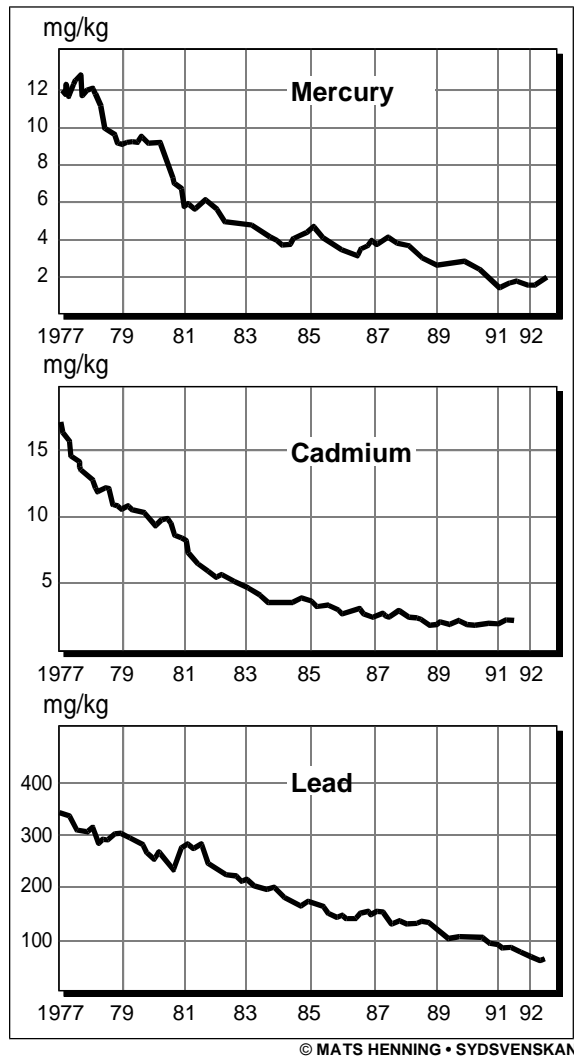
Cell B4

In the cells of the worksheet you can write words and numbers. If there are numbers in the cells, they can be used for calculations in the program.

By writing the formula = **B1** * **B2** + **B3** (* stands for multiplication) in cell B4 the cost without VAT can be calculated.

- a) Which value will it be in cell B4 when Lisa has typed the formula?
Only an answer is required (1p)
- b) Which headline can Lisa write in cell A2? *Only an answer is required* (1p)
- c) Which formula can Lisa use to calculate the value in cell B5?
Only an answer is required (1p)
6. The contents of a CD are in Stockholm but are needed in Västerås. The CD contains 650 Mb (megabytes). By a modem connection over the Internet, it is possible to transfer 5.56 kb/s (kilobytes per second). Use the fact that 1 Mb = 1000 kb.
Which of the two alternatives below is the fastest one?
1. Transfer everything on the CD via the modem connection on the Internet.
 2. Send the CD with an errand boy on a bicycle. He can keep an average speed of 25 km/h on the 114 kilometres long journey between Stockholm and Västerås. (3p)
7. Per and Anna sometimes buy groceries at their local shop, and sometimes at the hypermarket. They go by car to and from the hypermarket and they estimate their cost for that to 50 SEK. The prices at the hypermarket are on average 8% lower than at their local shop.
- a) Per and Anna buy groceries for 350 SEK at their local shop.
What would the total cost have been if they instead had gone by car to the hypermarket and done the same purchases there? (1p)
- b) How much do Per and Anna at least have to spend at the hypermarket to save money by going there by car? (2p)

8. In a newspaper article with the headline "Lesser and lesser poison in digested sludge", the following diagrams were found. They show the contents of some poisonous substances in digested sludge from local sewage treatment works.



Use the diagrams above to answer the following questions:

- By how many per cent did the contents of lead in the digested sludge decrease between the year 1979 and 1991? (2p)
- In 1989, 230 000 metric tons of digested sludge came from the sewage treatment works.
Totally, how much mercury was there in the digested sludge? (2p)
- Stina came to the conclusion that there were 5 ‰ of cadmium in the digested sludge in 1983.
Is that correct? Justify your answer. (2p)
- Pelle and Stina discuss which of the metals lead and cadmium that, according to the diagrams, has decreased the most in the digested sludge during the period 1977 to 1991.

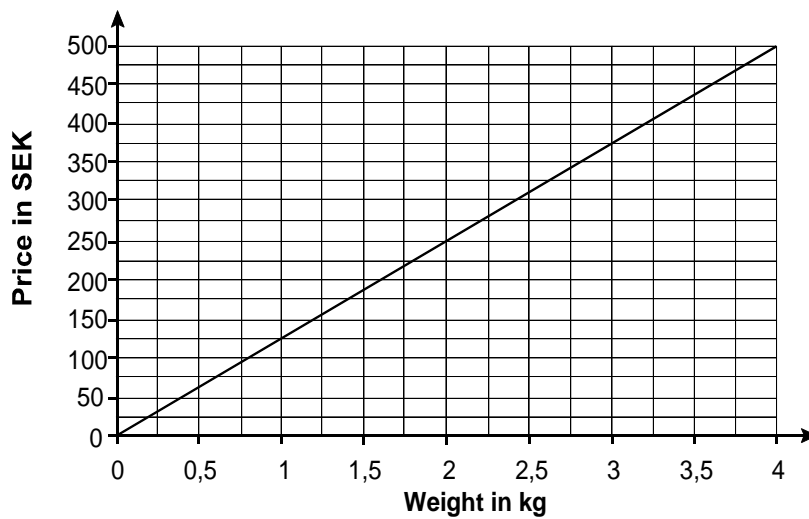
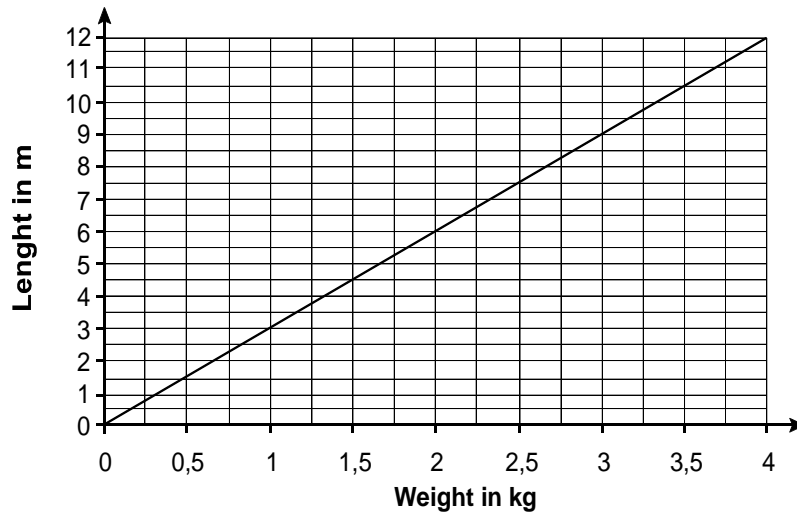
Pelle :- Lead has decreased the most.

Stina: - Cadmium has decreased the most.

Can both of them be right? Justify your answer.

(2p)

9. The price of fabrics is sometimes given by length and sometimes by weight. The two diagrams below are valid for the fabric "Summer Flower".



- a) What is the length of a piece of fabric that weighs 2.5 kg?
Only an answer is required (1p)
- b) What is the price of 9 metres of fabric? (2p)
- c) The length is proportional to the weight.
 Describe the relationship in a formula. (2p)
- d) Show that the price is proportional to the length. (3p)

10. Below is a pattern of numbers.

Row	Pattern
1 →	1
2 →	3 5
3 →	7 9 11
4 →	13 15 17 19
5 →	21 23 25 27 29
6 →	— — — — — —
etc →	— — — — — — —

- a) What is the sum of all the numbers in row no. 6? (1p)
- b) What is the sum of all the numbers in row no. 100? (3p)