Part D	Problems 18-25 which require complete solutions.
Test time	120 minutes.
Resources	Digital resources, formula sheet and ruler.

Level requirements

The test consists of three written parts (Part B, Part C and Part D). Together they give a total of 55 points consisting of 23 E-, 20 C- and 12 A-points.

Level requirements for test grades
E: 14 points
D: 23 points of which 6 points on at least C-level
C: 31 points of which 11 points on at least C-level
B: 38 points of which 4 points on A-level
A: 44 points of which 7 points on A-level

The number of points you can get for a complete solution is stated after each problem. You can also see what knowledge levels (E, C and A) you can show in each problem. For example (3/2/1) means that a correct solution gives 3 E-, 2 C- and 1 A-point.

For problems labelled "*Only answer is required*" you only have to give a short answer. For other problems you are required to present your solutions, explain and justify your train of thought and, where necessary, draw figures and show how you use your digital resources.

Write your name, date of birth and educational programme on all the sheets you hand in.

Name: _____

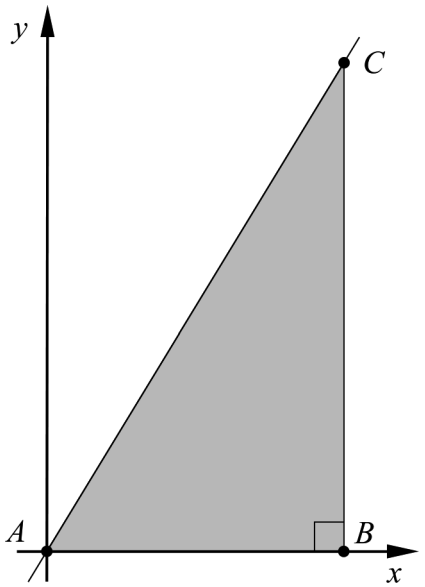
Date of birth: _____

Educational programme: _____

Part D: Digital resources are allowed. Write down your solutions on separate sheets of paper.

18. The value of a certain share can be described by $y = 46 \cdot 1.05^x$ where y is the value of the share in SEK and x is the time in years. Determine whether the value of the share increases or decreases in time. Justify your answer. (1/0/0)

19. The triangle ABC in the coordinate system has corner A at the point (0, 0), corner B at the x-axis and corner C at the straight line $y = 2x$.



Determine the length of the line segment AB so that the area of the triangle is 20.25 area units. (2/0/0)

20. Edvin and Svante are going to produce mobile phone covers. They have calculated and concluded that they can produce a maximum of 350 boxes of mobile phone covers. Each box contains 10 mobile phone covers. They write down models for revenues and costs, see below.

The revenue I SEK for x number of sold boxes: $I(x) = 650x$

The cost K SEK for producing x number of boxes: $K(x) = x^2 + 80x + 1000$

The profit V SEK is given by the difference between the revenue I SEK and the cost K SEK:

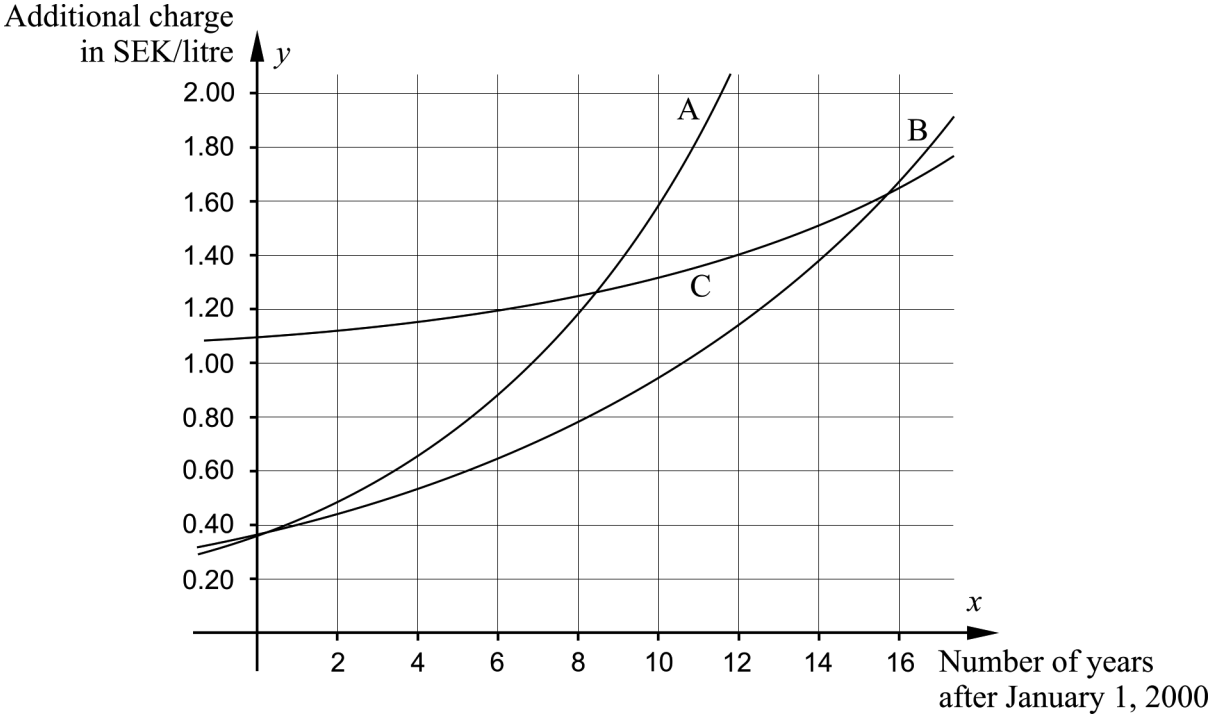
$V(x) = 650x - (x^2 + 80x + 1000)$

Assume that Edvin and Svante sell all the boxes they produce. Determine how many boxes they have to produce in order to maximise the profit $V(x)$. (2/0/0)

21. The petrol price a customer pays when filling up consists of, among other things, the pre-tax fuel price, fuel duty and the fuel companies' additional charge for things like personnel costs.

At the beginning of the year 2013, the additional charge was 1.26 SEK/litre.

The figure shows the graphs A, B and C of three different exponential functions. The additional charge is best described by $y = 0.36 \cdot 1.101^x$ where y is the increase in SEK/litre and x is the number of years after January 1, 2000.



a) Which of the graphs A, B or C best describes the additional charge? Justify your answer. (1/0/0)

b) In what year did the additional charge reach 1.40 SEK/litre?
Only answer is required (1/0/0)

22. The length of a rectangle is 10 cm longer than its width. Determine the lengths of the rectangle's sides if its area is 80 cm^2. (2/1/0)

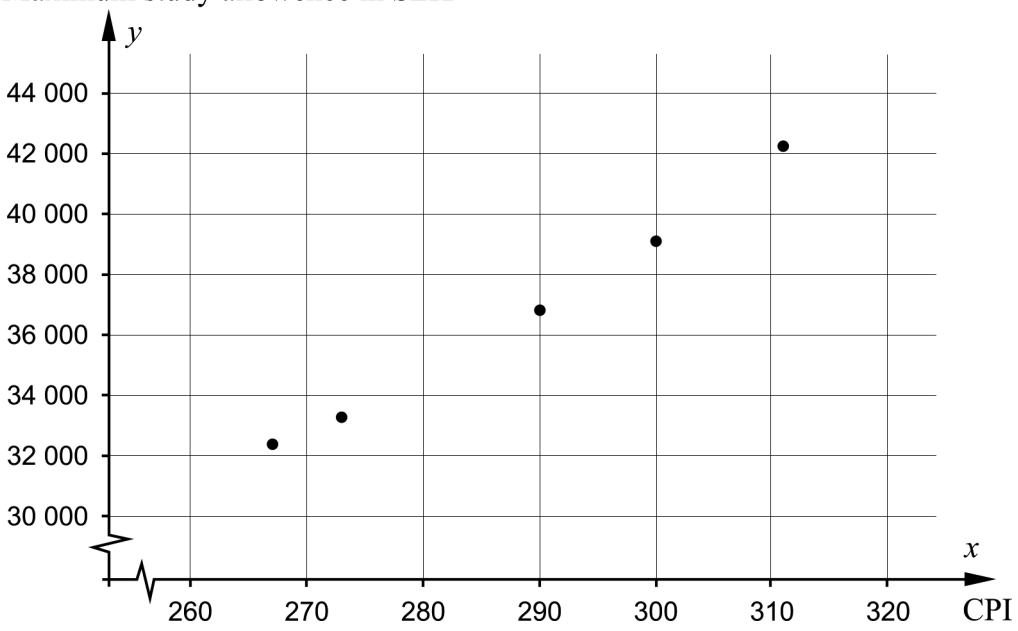
23. Solve the equation $x^4 = 963$ (1/1/0)

24. The table and the diagram show the relation between the maximum study allowance per term at full-time studies and the consumer price index (CPI) for some years between 2001 and 2011. The maximum study allowance is denoted SEK y and the CPI x.

Year	CPI x	Maximum study allowance SEK y
2001	267	32379
2002	273	33260
2007	290	36820
2009	300	39100
2011	311	42230

CPI (Consumer Price Index) is based on the price trend for all kinds of goods and services. The CPI regulates the size of pensions, study allowance, alimonies etcetera.

Maximum study allowence in SEK



a) Draw a straight line that, as well as possible, shows the relation between the maximum study allowance and the CPI. Also, determine the equation of the line. (0/2/0)

b) Use the relation in the a)-problem to determine how much the study allowance should increase, in SEK, when the CPI increases by one. (0/1/0)

25. Rut is going to do a kitchen makeover and considers what would be most cost-effective; to take time off work without pay to do all the work herself or to hire a craftsman.

She estimates that it would take twice the time if she would do the work herself compared to a craftsman. Her salary is SEK 1070 per day, after taxes, and if she buys all the material for the kitchen it would cost SEK 40 000.

She contacts a craftsman and gets an estimate:

Snickarjobb AB

Estimate J 23721
Date 2015-11-11

Rut Svensson
Vägenvägen 26
SE 300 20 Halm

Material: SEK 38 000
Cost of labour: SEK 590/hour including tax without ROT tax deduction
Working hours: 8 hours/day

When you turn to Snickarjobb AB you get a ROT tax deducation on 50% of the labour cost. This means that you only have to pay half the labour cost.

Determine for how many days Rut can hire a craftsman and still have a lower cost than if she would do the work herself. (0/0/3)