

<b>Part D</b>	Problems 20-28 which require complete solutions.
<b>Test time</b>	120 minutes.
<b>Resources</b>	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 54 points consisting of 22 E-, 18 C- and 14 A-points.

Level requirements for test grades

E: 14 points

D: 22 points of which 6 points on at least C-level

C: 28 points of which 10 points on at least C-level

B: 36 points of which 5 points on A-level

A: 43 points of which 8 points on A-level

The number of points you can have for a complete solution is stated after each problem. You can also see what knowledge level(s) (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: \_\_\_\_\_

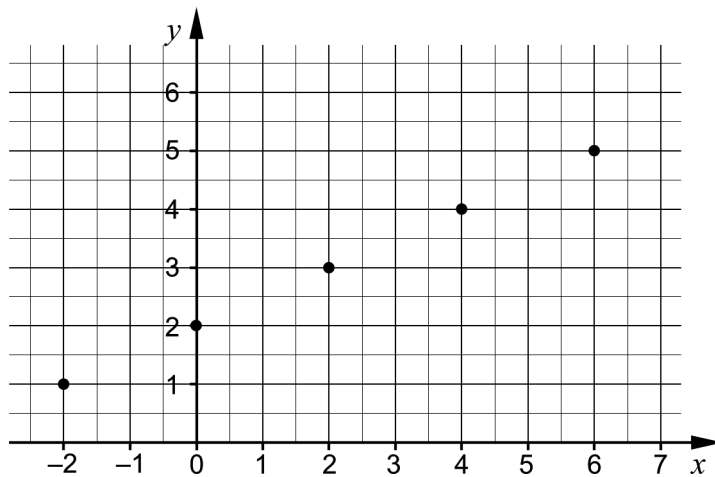
Educational programme: \_\_\_\_\_

**Part D:** Digital resources are allowed. Do your solutions on separate sheets of paper.

20. Find the equation of the straight line that passes through the points (2, 5) and (42, 125). (2/0/0)

21. Solve the equation  $x^3 = 834$  and answer to two decimal places.  
*Only answer is required* (1/0/0)





22. The figure shows a coordinate system where five points have been marked.



The points lie on a straight line. Another point  $P$  also lies on the line and it has  $x$ -coordinate 98.

Determine the  $y$ -coordinate of the point  $P$ . (2/0/0)

23. Levi buys apps for his mobile phone. He chooses apps from both price category A and B. See table below.

Apps	
Price category A SEK 7 /item	Price category B SEK 22 /item
 <b>Loffe's world</b> ★★★★★ SEK 7	 <b>Who's driving?</b> ★★★★★ SEK 22
 <b>Green energy</b> ★★★★★ SEK 7	 <b>Forest guide</b> ★★★★★ SEK 22

Over the course of one year Levi bought 47 apps at a total cost of SEK 539.  
 How many apps from each price category did Levi buy during the year?

(0/3/0)

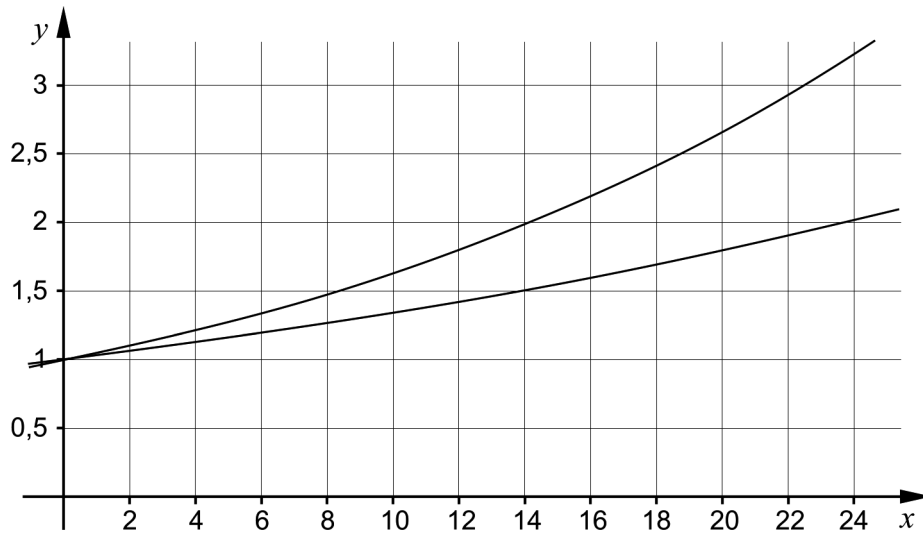
24. At a sport store there is a sale of cross-country skiing poles having lengths from 125 cm to 170 cm. The recommended pole length is 30 cm less than the skier's height.



- a) Write down the recommended pole length,  $y$  cm, as a function of the skier's height,  $x$  cm. *Only answer is required* (1/0/0)
- b) State the domain of the function in task a) if the function only should be true for the poles in the sale. *Only answer is required* (0/1/0)
- c) Explain what the domain of the function means in this context. (0/1/0)

25. Clara invests money in an interest fund. She plans to buy a car for the money. On January 1, 2014 her fund was worth SEK 40 000. She reads in the fund's information sheet that during the last few years the fund has had a yearly value increase, varying between 3 % and 5 %.

“How long will it take before I can buy a car for SEK 60 000?” Clara wonders. On her computer she plots the curves  $y = 1.03^x$  and  $y = 1.05^x$ , see figure.

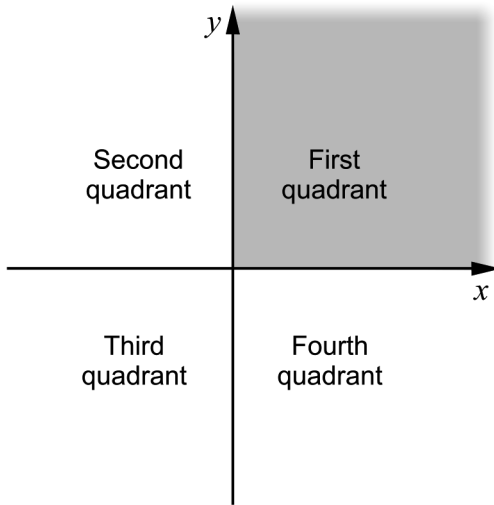


Assume that the fund continues having a yearly value increase that varies between 3 % and 5 %.

Use the curves to determine how long Clara might have to wait until her fund is worth SEK 60 000.

(0/3/0)

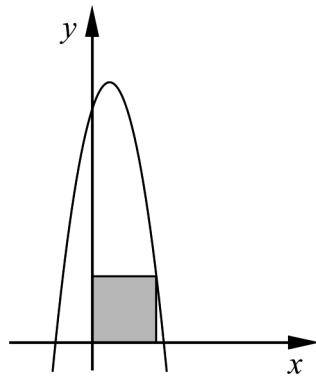
26. The two straight lines  $y = ax - 2$  and  $y = x - 1$ , where  $a$  is a constant, intersect in the first quadrant.



Investigate what possible values there are for the constant  $a$ .

(0/1/2)

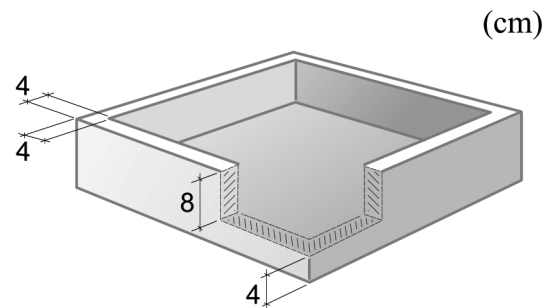
27. The figure shows the graph to the quadratic function  $y = 19.25 + 3x - x^2$  and a grey coloured square. Two of the sides of the square lie on the positive coordinate axes and one of the corners lies on the curve. See figure.



Determine the length of the side of the square algebraically.

(0/0/3)

28. Jonna is considering moulding a concrete birdbath. The birdbath should have a quadratic base and the depth from the upper rim to the bottom should be 8.0 cm. The bottom and the sides should have a thickness of 4.0 cm. See figure.



Jonna has one concrete sack that will give  $12\,500\text{ cm}^3$  ready-to-use concrete. In order to get as large a birdbath as possible she plans to use the entire sack of concrete. What will be the external side length of Jonna's birdbath?

(0/0/3)