

# Mathematics

Delprov D

1a

---

Elevens namn och klass/grupp



## Instructions – part D

**Time for the test** 120 minutes for part D.

**Aids** Allowed aids on part D are digital devices, formula sheet and ruler.

**Tasks** This part consists of several different tasks. The solutions are to be written on separate paper, which is to be submitted together with the test booklet. For most of the tasks in this part it is not enough to only give an answer, you also have to

- show your solutions
- explain/motivate your thinking
- draw figures when required.

For one task only the answer needs to be given. It is marked with “*Only answer required*”.

**Grading limits** The test (part A–D) gives a total maximum of 76 points.

Limit for test grade

E: At least 18 points.

D: At least 30 points of which at least 8 points at level C or higher.

C: At least 40 points of which at least 15 points at level C or higher.

B: At least 51 points of which at least 5 points at level A.

A: At least 60 points of which at least 9 points at level A.

Name: \_\_\_\_\_

Date of birth: \_\_\_\_\_

Programme: \_\_\_\_\_ Class: \_\_\_\_\_

**Also write your name, date of birth, programme and class on the sheets you hand in.**

Illustrations: Jens Ahlbom

16. Amina has taken out an interest-only mortgage of SEK 800 000. How much does she pay in interest per month if the annual interest rate is 3.6 %? (2/0/0)

17. 1 mm of rain has fallen. How many litres of water have then fallen on 1 m<sup>2</sup>? (2/0/0)

18. The peak of Mt. Kilimanjaro, Africa's highest mountain, is 5 892 metres above sea level. Johan is climbing the mountain. When he takes a break to boil some tea water he finds that the water begins boiling at 85 °C. He knows that the boiling point of the water decreases the higher he climbs. The relation between boiling point and height above sea level can be described by the formula

$$t = 100 - \frac{h}{300}$$

where  $t$  is the water's boiling point in degrees Celsius and  $h$  is the height above sea level measured in metres.

- a) At what temperature will water boil at the top of Mt. Kilimanjaro?  
*Only answer required.* (1/0/0)
- b) At what height above sea level is Johan when he boils his tea water? (1/1/0)

19. An aid organisation is collecting money to buy blankets. 80 % of the collected money is spent on blankets that cost SEK 25 each. Assume that there are 10 million people in Sweden and that you want to purchase 32 000 blankets. How much must each Swede on average give to cover the cost of the blankets? (1/2/0)



20. 15 million mobile phones are lying around unused in people's homes. All together, they contain 162 kilograms of gold.

The average weight of a mobile phone is estimated at 150 grams.  
What ppm of gold does a mobile phone contain on average?

(1/1/0)

21. Eva is out cycling for exercise. She cycles her normal route to a lake and back. The distance between her home and the lake is 15 km. There are many downhill stretches on the way to the lake, and her average speed is 30 km/h. On the way home her average speed is 20 km/h.

a) How long does it take her to cycle the full distance?

(2/0/0)

b) What is Eva's average speed for the full distance?

(0/1/0)



22. Albin is laying a new floor in his apartment and is choosing between two different floors.

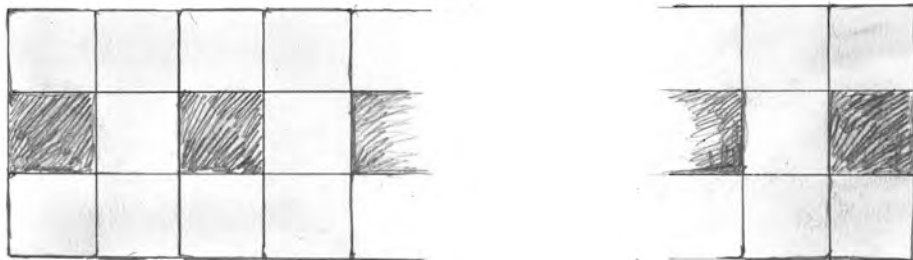
Floor A: SEK 345/m<sup>2</sup>

Floor B: SEK 395/m<sup>2</sup>

For floor B there is a SEK 4 000 discount on the total price if you buy 50 m<sup>2</sup> or more.

- a) How much would floor A and floor B each cost if Albin buys 20 m<sup>2</sup>? (1/0/0)
- b) Write a formula for how much floor A costs depending on the number of square metres of floor you buy. (1/0/0)
- c) At what floor area are the floors' costs equal? (0/1/1)

23. Teo is making a garden path with the pattern below. The picture shows how the pattern starts and ends. He has decided that the slabs may not cost more than SEK 1 900. One white slab costs SEK 25 and one black slab costs SEK 35. The slabs are square with sides that are 30 cm. How long a garden path can he make?



(1/2/0)

24. Oskar wins SEK  $x$  in a competition.

Ahmed wins 40 % more than Oskar.

Stina wins 20 % less than Oskar.

How many percent bigger is Ahmed's prize compared to Stina's?

(1/1/1)

25. The Social Democrats received 33.4 % of all votes in an opinion poll.  
This was an increase of 1.7 percentage points compared to the previous poll.  
The Moderates increased by 1.2 percentage points to 23.6 %.  
Kalle claims that the increases are equally large.  
How can Kalle have been reasoning?

(1/1/1)

26. The music class in a school is having a concert. Adult tickets cost SEK 100 and child tickets cost SEK 50. The pupils devise a formula for the ticket revenue of sold tickets, SEK  $I$ , that depends on the number of adult tickets sold  $x$ .

$$I = 100x + 50(650 - x)$$

How many child tickets were sold if the revenue was SEK 52 500?

(1/1/1)

27. Nora wants to create a flower bed in a half circle. She has bought a roll of sheet metal with measurements 8 m  $\times$  0.4 m to put around the flowerbed. She wants the flowerbed to have the greatest possible area and wants to use her entire roll of sheet metal.  
What is the area of the half circle?



(0/1/2)

