

Mathematics

Part D

Student Booklet

1b

Elevens namn och klass/grupp

Instructions – Part D

Time for the test 120 minutes for Part D.

Aids Digital devices, formula sheet and ruler.

Part D 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 some tasks only the answer needs to be given. They are marked with “*Only answer required*”.

Grading limits The test (Part A–D) gives a total maximum of 91 points.

Lower limit for test grade

- E: At least 20 points.
- D: At least 32 points of which at least 10 points at level C or higher.
- C: At least 43 points of which at least 19 points at level C or higher.
- B: At least 57 points of which at least 7 points at level A.
- A: At least 66 points of which at least 12 points at level A.

Write your name, date of birth and secondary program on the papers you hand in.

Illustration: Jens Ahlbom

Del D

14. An offer from a mobile service operator looks like this:

Mobil AB

SEK 49 as the monthly charge
SEK 0.69/call as the opening charge
SEK 0.69/minute all day, every day
Free text messages



- a) Ebba has a subscription with Mobil AB. When she got her first bill, this information was included:

Number of calls	Call time in minutes
72	183

Ebba's monthly bill was for SEK 224.95. Show that this sum is correct.

(2/0/0)

- b) Amir also has his subscription with Mobil AB. One month both Ebba and Amir had a call time of 221 minutes but the size of their bills was different. Explain why.

(2/0/0)

15. For a car with good tyres and brakes the approximate braking distance on dry asphalt is calculated using the formula:

$$s = \frac{v^2}{200}$$

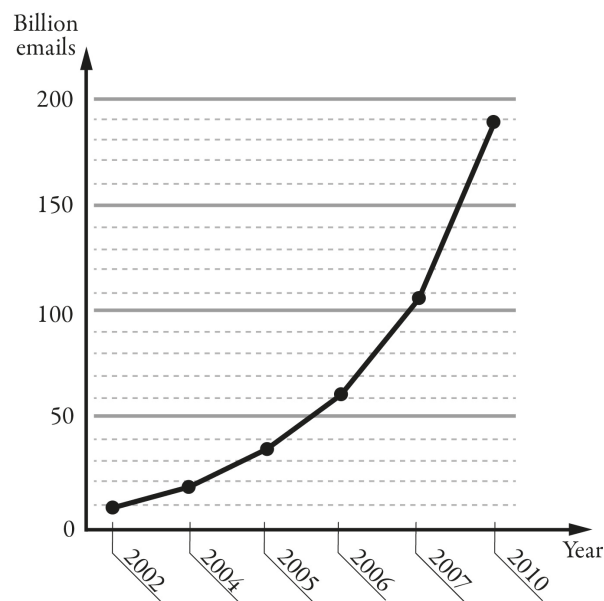
where s is the braking distance in metres and v is the speed in km/h.

How much longer is the braking distance according to the formula if you drive at a speed of 70 km/h compared with if you drive at 50 km/h?

(2/1/0)



16. The diagram shows the number of billion emails sent on average in the world every day.
- Out of all the emails sent, it is estimated that about 82 per cent are spam (unwanted email). About how many spam were sent in a day in 2010? (2/0/0)
 - The diagram is misleading. What is misleading in the diagram? (1/1/0)
 - If the diagram was drawn correctly, how would this affect the appearance of the diagram? (1/1/0)



17. Use of mobile phone in the world

In 1999, 1 person in 10 used a mobile phone.



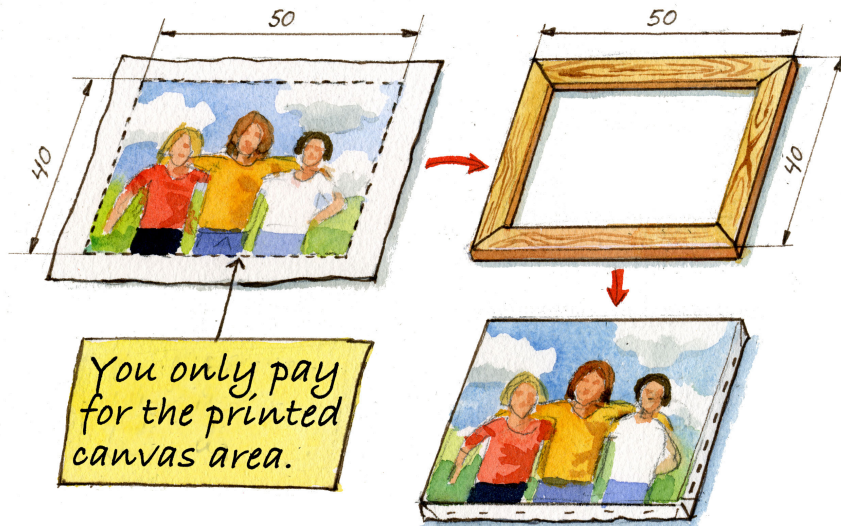
In 2009 the use of mobile phone had increased to 2 people out of 3.



By what percentage did the use of mobile phone increase between 1999 and 2009?

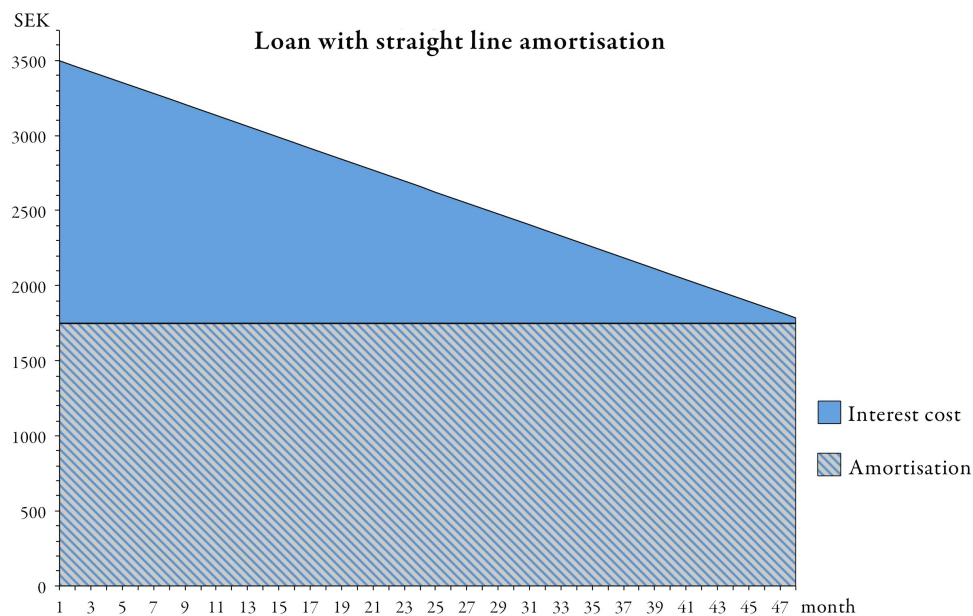
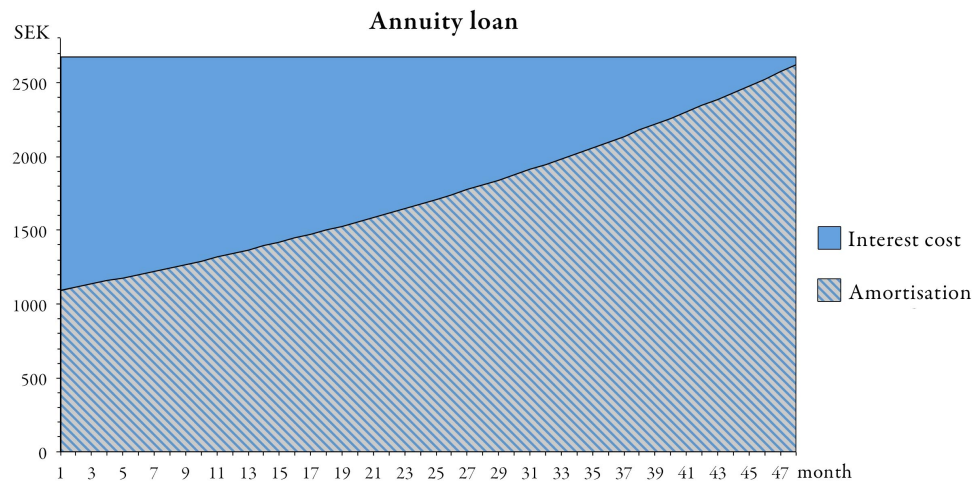
(1/2/0)

18. A camera shop prints rectangular pictures on canvas and then mounts the picture on a wooden frame. The wooden frame costs SEK 0.45 /cm. The printed canvas costs SEK 0.12 /cm² and the mounting cost is SEK 169 for all frame sizes.



- a) Yasmin wants to print a picture and have it mounted. She wants the picture to be 50 cm high and 40 cm wide. What will the cost be? (1/2/0)
- b) To calculate the price of mounted pictures the staff need a formula that includes height and width. The price has to include the canvas with print, the frame and the cost of mounting. Help the camera shop to produce such a formula. (0/2/2)
19. Three positive whole numbers, all greater than 1, have the product of 210. Examine how many different combinations of numbers there are. (1/1/1)

20. Two loans are described in the diagrams shown below, an annuity loan and a loan with straight line amortisation. Payments (interest cost and amortisation) are made every month for 4 years. Each diagram presents the amortisation and interest cost every month. The loan amounts and the interest rates are the same for both loans.



- Use the diagrams to determine the size of the first and last payment for each loan? *Only answer required.* (1/1/0)
- The loan amount is the same size for both loans. Use either one of the diagrams to show that the loan amount is SEK 84 000. (0/2/0)
- Even though the interest rate and loan amount are the same for both loans, the interest cost is different. Determine the interest cost for each loan. (0/2/3)
- The interest cost is different for the two loans even though the interest rate and the loan amount are the same. Explain why. (0/2/0)

21. PRIMa coffee is sold in jars of four different sizes, as shown below.



300 g
65.70 SEK



200 g
45.70 SEK



100 g
23.90 SEK



50 g
12.95 SEK

- a) Calculate what 100 g of PRIMa coffee costs in each jar. (1/0/0)
- b) The coffee company is planning to introduce another size, a jar that contains 450 g. Josefin and Mikael make an estimate of what that jar will cost. (See their calculations below.) Explain why Mikael and Josefin get different answers. (2/2/2)

Josefin's solution

$$100 \text{ g costs } \frac{21.9 + 22.85 + 23.9 + 25.9}{4} \approx \text{SEK } 23.6$$

$$450 \text{ g costs } 4.5 \cdot 23.6 \approx \text{SEK } 106.50$$

Mikael's solution

