Mathematics

Part D
Student Booklet

1a

Elevens namn och klass/grupp

Skolverket

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 85 points.

Lower limit for test grade
E: At least 21 points.
D: At least 34 points of which at least 10 points at level C or higher.
C: At least 44 points of which at least 18 points at level C or higher.
B: At least 55 points of which at least 5 points at level A.
A: At least 65 points of which at least 9 points at level A.

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

Illustration: Jens Ahlbom

Del D

15. 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)

16. 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)

17. The diagram shows the number of billion emails sent on average in the world every day.

a) 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)

b) The diagram is misleading. What is misleading in the diagram? (1/1/0)

c) If the diagram was drawn correctly, how would this affect the appearance of the diagram? (1/1/0)
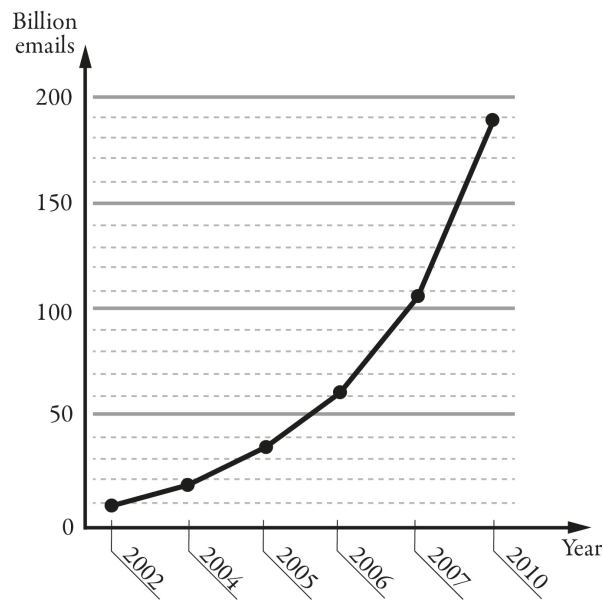
18.

Metre (m)		Foot (ft)		Centimetre (cm)		Inch (in)
1 m	=	3.281 ft	=	100 cm	=	39.37 in
0.3048 m	=	1 ft	=	30.48 cm	=	12 in

a) Glenn, an American boy, is 4 feet *(ft)* and 9 inches *(in)* tall.
Express his height in feet. (0/2/0)

b) Glenn's sister is 5 feet *(ft)* and 3 inches *(in)* tall.
Express her height in centimetres. (1/1/0)

19. 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)

20.

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/cm^2 and the mounting cost is SEK 169 for all frame sizes.


You only pay for the printed canvas area.
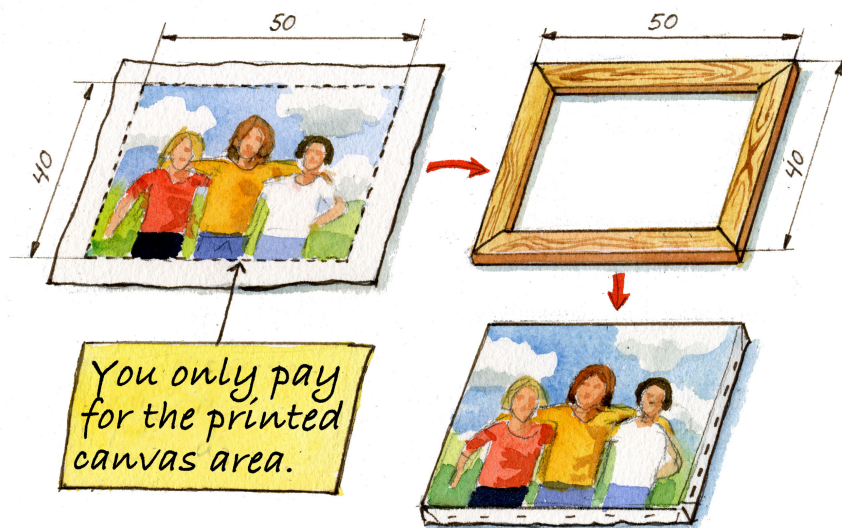
a) Yasmin wants to print a picture and have it mounted. She wants the picture to be 50 cm high and 40 cm wide. What will the cost be? (1/2/0)

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)

21. 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.

Annuity loan

Loan with straight line amortisation
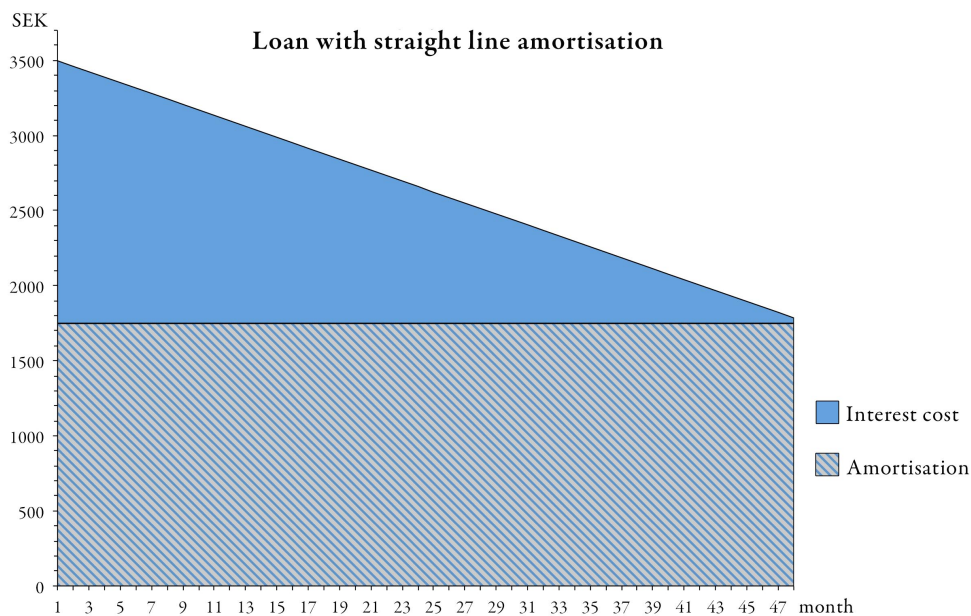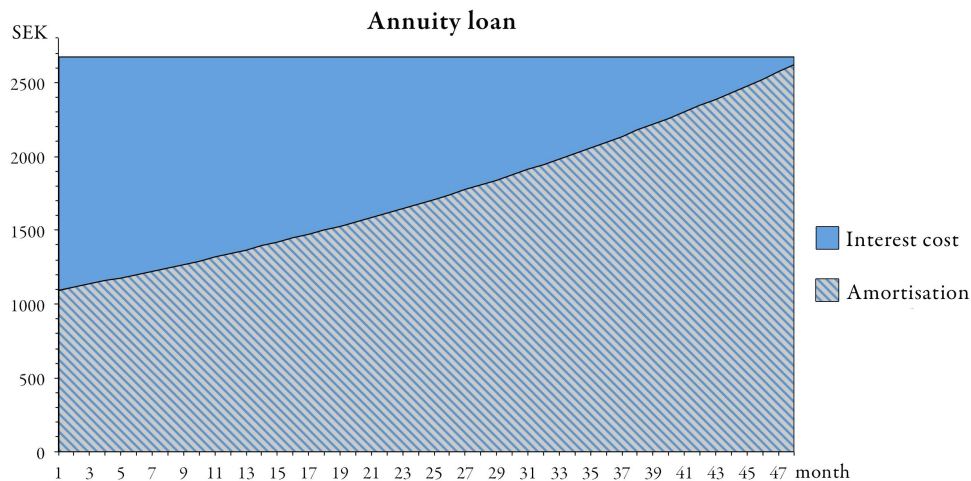
a) Use the diagrams to determine the size of the first and last payment for each loan? *Only answer required.* (1/1/0)

b) 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)

c) 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)

d) 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)

PRIM
gruppen