Mathematics

Student Booklet

Part III

1b

Elevens namn och klass/grupp

Skolverket

Instructions – Part III

Time	120 minutes for Part III.
Aids	Digital devices, approved formula page and ruler.
Part III	Part III consists of 9 questions. Most of the questions require not only an answer, you must also

- write your solutions
- explain your line of thought and reasoning so that it is easy to follow
- draw clear figures when needed.

Some questions require only answer. These are indicated by the text *Only the answer is required.*

Grading limits   The test (oral part and written parts) gives a total maximum of 89 points.

Lower limit for the test grade
E: at least 22 points.
D: at least 34 points of which at least 10 points at level C or higher.
C: at least 47 points of which at least 19 points at level C or higher.
B: at least 55 points of which at least 6 points at level A.
A: at least 65 points of which at least 11 points at level A.

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

Illustration: Jens Ahlbom

Tests that may be re-used are subject to the security regulations of Chap. 17:4 of the Official Secrets Act. The intention is that this test may be re-used until **2012-06-30**. This should be considered when determing the applicability of the Official Secrets Act.

NpMa1b spring2012

Part III

15. The interest rate for a savings account was increased one month from 3.45 % to 3.65 %.
Calculate this increase in
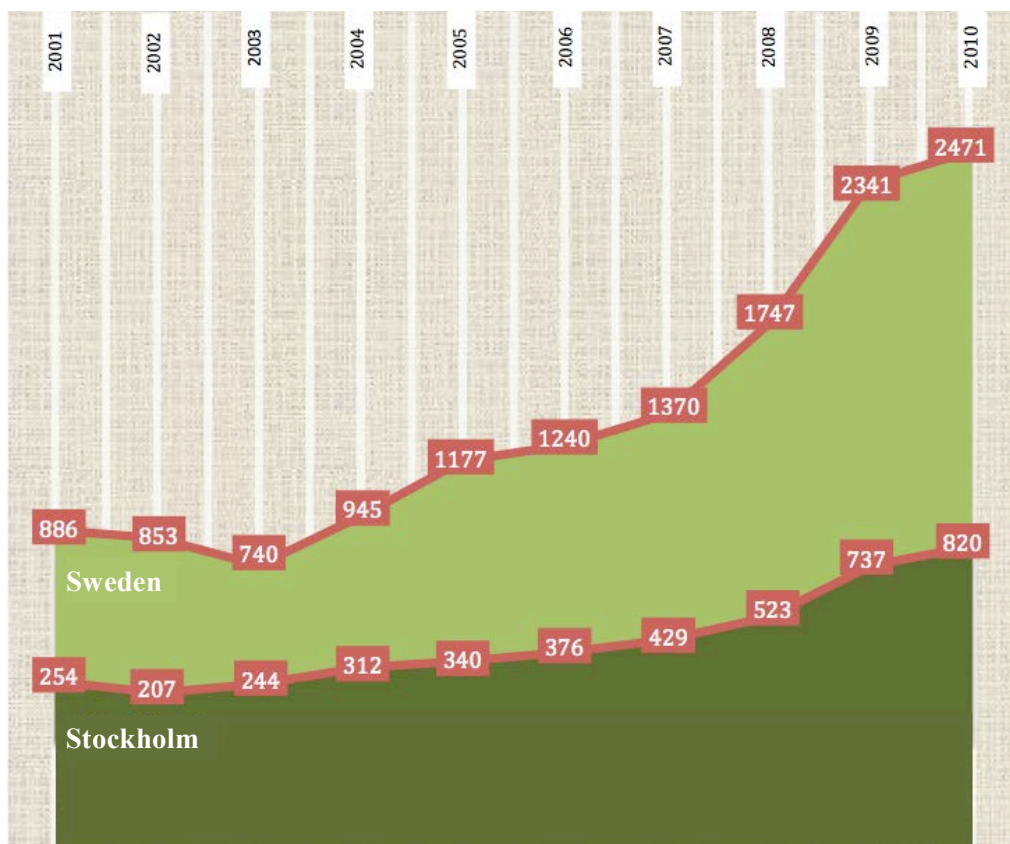
    a) percentage points   (1/0/0)

    b) percent   (2/0/0)

16. Olivia is going to do a project about kidnapping and threats.
She finds a diagram in a newspaper. According to the paper,
the diagram shows the number of kidnappings and threats per year.

Source: Metro

    a) The article says that the number of reported kidnappings and threats in Sweden has increased by 179 percent for the period 2001–2010.
    Explain why this is correct.   (2/0/0)

    b) Olivia claims that the diagram in the paper is incorrect.
    "I don't want to use this diagram. It looks as if there were twice as many kidnappings and threats in Sweden as there were in Stockholm in 2001. That surely cannot be true."
    Explain what is wrong with the diagram.   (1/1/0)

17. Adam tosses two six-sided dice. He studies the difference
between the numbers of dots on the two faces that come up.
Find the probability that the difference will be three? (1/2/0)

18. An advertising flyer shows the following information.

The repayments include amortization, interest etc.
Renée is considering borrowing 100 000 kr and repaying over 10 years.

a) Use the information in the flyer to calculate the total amount she
will have paid back to the bank when the loan is paid off. (2/0/0)

b) What proportion of the first month's payment is interest? (1/2/0)

19. A survey shows the price of hamburgers for different years. The results are shown in
the table below. The table can be used to make a price index series for hamburgers.

| Year	1990	1995	2000	2005	2010
Hamburger price (kr)	23.00	26.00	24.00	31.00	40.00

a) Calculate the price index for hamburgers for 2010 using the year 2000
as the base year. (1/2/0)

b) In 1986 the price index for hamburgers is 68.8 using year 2000 as base year.
How much did a hamburger cost in 1986? (0/2/0)

20. Anna and Erik want to determine the sum of the angles in a six-sided polygon. They split it up into parts in different ways. Here you can see how they split it up and made their calculations:
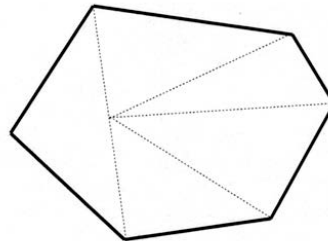
Anna's solution

$4 \cdot 180° = 720°$

SUM OF THE ANGLES IS 720°.
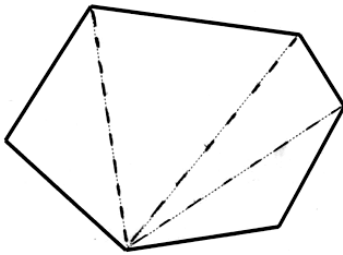
Erik's solution

$5 \cdot 180° - 180° = 720°$

ANSWER: THE SUM OF THE ANGELS IN THE SIX-SIDED POLYGON IS 720°.

Both Anna and Erik arrived at the correct result but in different ways.
Explain how Anna and Erik might have reasoned. (1/1/1)

21. The number of visitors at a web site increases by the same percentage each year , two years in a row. Find the yearly percentage increase if the total percentage increase for the two-year period is 37 %. (1/1/1)

22. What is the smallest positive integer that is divisible by all integers from 1 to 9? Explain your answer. (1/1/2)

23.

Calendar		
	Gregorian (Official calendar in Sweden)	*Islamic*
Year length (not leap year)	365 days	354 days
Month length	28–31 days	29–30 days
Number of months	12	12

a) How many months of the year in the Islamic calendar have 30 days?
   Explain your answer. (1/0/0)

b) Mohammed's flight from Mecca to Medina marks the starting point for the measurement of time for the Islamic calendar. This corresponds to July 15 in the year 622 on the Gregorian calendar. The relationship between the years in the two calendars can be described with the formula:

$$H = \frac{33(M - 622)}{32}$$

where H is the year in the Islamic calendar and M is the year in the Gregorian calendar, the official calendar in Sweden.

What year is it now, this year, in the Islamic calendar, according to the formula? (3/0/0)

c) Give an explanation for $\frac{33}{32}$ in the formula. (0/2/2)

d) In what year will both calendars show the same year, according to the formula? (0/2/2)

PRIM
gruppen