Kursprov, höstterminen 2015

Mathematics

Delprov D

1a

Elevens namn och klass/grupp

Skolverket

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 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 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 78 points.

Limit for test grade

E: At least 20 points.
D: At least 35 points of which at least 11 points at level C or higher.
C: At least 44 points of which at least 17 points at level C or higher.
B: At least 55 points of which at least 6 points at level A.
A: At least 64 points of which at least 10 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. The table shows the time of sunrise and sunset on different locations in Sweden on June 6.

June 6			
Town/city	**Sunrise**	**Sunset**	**Time when the sun is up**
Kiruna	The sun never sets – polar day		
Luleå	01:23	23:36	
Göteborg	04:12	22:08	
Malmö	04:25	21:48	17h 23 mins

How much longer is the sun up in Luleå than in Göteborg? (2/0/0)

17. Sizes of jeans are given in whole inches. 1 inch is equivalent to 2.54 cm.
Joseph has a waist measurement of 74 cm. What jeans size should he choose? (2/0/0)

18. A shop sells a TV at the cash price of SEK 6 599.
It can also be bought on instalments according to the following terms:

> Pay SEK 199 per month for 36 months.
> A notification fee of SEK 29 per month and
> an arrangement fee of SEK 395 will be added.

How much *more* will the TV cost in total when bought on instalments? (2/0/0)

19. In a lottery, there are a total of 16 tickets. 4 of the tickets are winning tickets.
Karin draws the first two tickets.

a) What is the probability that both are winning tickets? (1/1/0)

b) What is the probability that *exactly one* of Karin's tickets is a winning ticket? (0/2/0)

20. According to a book of records, the shortest man that ever lived measured 57 cm and the tallest 272 cm.
The average height of men in Sweden aged 16–84 is 179 cm.

This drawing of a man measures 5.0 cm and represents a man of average height.

If you were to draw the shortest and the longest man on the same scale, how tall will each of these figures be? (1/2/0)

21. Alex read in a paper about something called the Happy Planet Index, HPI. HPI claims to measure the extent to which countries provide conditions for sustainable development, while taking into consideration the well-being and life expectancy of the citizens.

HPI was calculated by using the formula $\text{HPI} = \frac{F \times U \times 0.642}{E + 3.35}$ where

F = Life expectancy in years
U = Well-being on a scale from 0 to 10
E = Ecological footprint in global hectares per person

Country (a selection)	Life expectancy (years)	Well-being (0–10)	Ecological footprint (g ha/person)	HPI
China	72.5	6.7	2.1	**57**
India	63.7	5.5	0.9	**53**
Germany	79.1	7.2	4.2	**48**
USA	77.9	7.9	9.4	**31**

Colour code
Good Average Poor

Source: Happyplanetindex.org

a) According to the article, Costa Rica has the highest HPI in the world.
The life expectancy in Costa Rica is 78.5 years.
Calculate the HPI of Costa Rica, when the value for well-being is 8.5 and the ecological footprint is 2.3. (2/0/0)

b) Sweden has an HPI of 48. Life expectancy is 80.5 years.
Our ecological footprint is 5.1.
Which value do we have for well-being in Sweden? (1/1/0)

c) Despite the fact that Germany has a lower life expectancy and a lower value for well-being, they have the same HPI as Sweden.
Explain how the value for the ecological footprint affects the value of the HPI. (1/1/0)

22. According to a forecast the rent of a flat is expected to increase by 4 % per year. By how many per cent is the rent expected to increase in a five-year period according to the forecast?

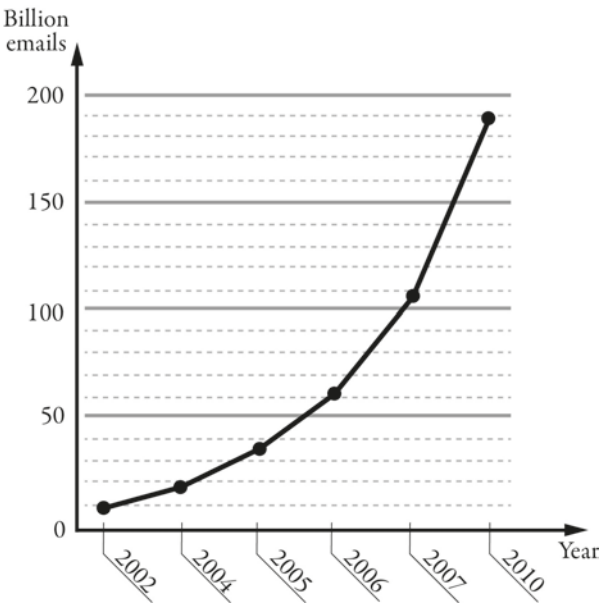
(1/1/1)

23. 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)



24. Andreas has a set of Russian dolls. The height of his smallest dolls is shown below. The ratio of the height between the dolls is the same for all dolls.

The smallest doll fits inside the next smallest doll.
Both of these dolls fit inside the next doll.
The largest doll in the picture is big enough for all the other dolls to fit inside.

What is the minimum height of a doll that fits 10 dolls inside? (0/2/2)

25. Two equally sized cans are filled with a mix of oil and petrol.
In one can, the ratio of oil and petrol is 1:9 and in the other can the ratio is 1:4.

What will the ratio between oil and petrol be if we pour the contents of the two cans into one larger can? (0/1/2)