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For this material the secrecy is valid until the end of June the year 2002.

**NATIONAL TEST
IN MATHEMATICS COURSE A
SPRING 2002**

Part I

Instructions

- Test period 180 minutes for Part I and Part II as a whole. We recommend that you use at the most 30 minutes to work with Part I. You must not use the calculator before you have handed in Part I.
- Tools Formula sheet and ruler.
- Part I Part I is composed of short answer items, which shall be solved without the use of a calculator. A correct answer gives 1 g-point (1/0) (Pass level) or 1 vg-point (0/1) (Pass with distinction level).
- Mark limits The test gives totally (Part I + Part II) at the most 59 points, out of which 26 vg-points. To pass the test you must have at least 18 points and to get the test character Pass with distinction you must have at least 33 points out of which at least 12 points on Pass with distinction level.

Name: _____ School: _____

Adult education/study program: _____

1. $4 + 6 \cdot 3 =$ Answer: _____ (1/0)

2. What is the half of $1\frac{1}{2}$? Answer: _____ (1/0)

3. Write a whole number in the square so that the fraction gets a value between 2 and 3.
Answer: $\frac{\square}{8}$ (1/0)

4. Andreas has 4 km to school. How many minutes does it take for him to bike to the school if he keeps an average speed of 16 km/h? Answer: _____ min (1/0)

5. The table below shows the distances in kilometre between some Swedish towns.

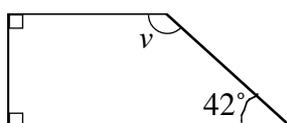
<i>Borås</i>					
421	<i>Falun</i>				
489	90	<i>Gävle</i>			
262	225	315	<i>Karlstad</i>		
436	231	181	311	<i>Stockholm</i>	
250	176	229	115	196	<i>Örebro</i>

How far is it according to the table between Falun and Karlstad? Answer: _____ km (1/0)

6. $a = 5$ and $b = 2$
Find the value of $3a - b$ Answer: _____ (1/0)

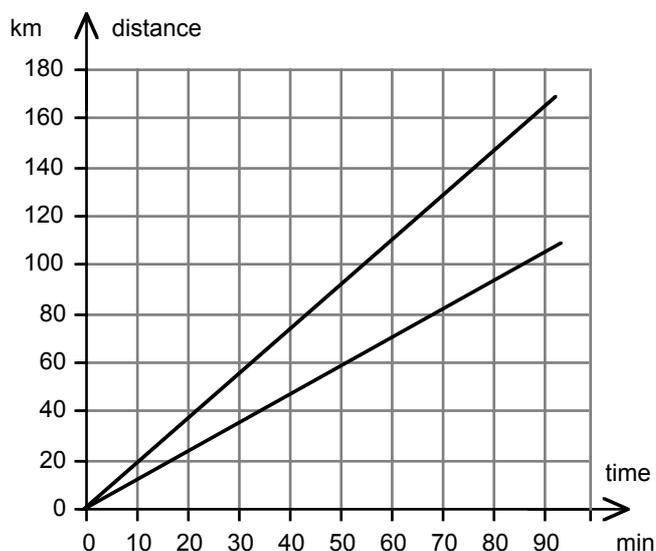
7. Investigate the pattern and give the number that is omitted.
3 5 9 15 _____ 33 (1/0)

8. Find the measure of the angel v .



Answer: _____ ° (1/0)

9. This graph shows how far one has travelled in a certain time at a speed of 70 km/h respectively 110 km/h.



- a) Find the time it takes to travel 30 km at the speed of 70 km/h. Answer: _____ min (1/0)
- b) A distance takes 50 min to drive at the speed of 110 km/h. How much longer will the travelling time be at the speed of 70 km/h? Answer: _____ min (0/1)
10. You know that $3x + 4y = 27$
Then how much is $6x + 8y$? Answer: _____ (0/1)
11. A jacket costs 980 kr. The price is first raised with 8 % and then with another 6 %. Which one of the calculations gives you the price of the jacket after both price increases. Circle your answer.

$$980 \cdot 0.08 \cdot 0.06$$

$$980 \cdot 1.8 \cdot 1.6$$

$$\frac{980}{0.08 \cdot 0.06}$$

$$980 \cdot 1.08 \cdot 1.06$$

$$980 + 980 \cdot 0.08 + 980 \cdot 0.06 \quad (0/1)$$

12. How large part of the figure is shaded?

Answer: _____ (0/1)

13. You are to increase the length, width *or* height of this cuboid with 1 cm. Which one of the measures do you have to change so that the volume will change as little as possible?

Answer: _____ (0/1)

14. Calculate the value of the expression $\sqrt{9p^2}$ for $p = 3$

Answer: _____ (0/1)

15. Solve the equation $\frac{x-0.2}{0.1} = 1$

Answer: $x =$ _____ (0/1)

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Part II

Instructions

Test period 180 minutes for Part I and Part II as a whole. We recommend that you reserve about 30 minutes to work with item 8.

Tools Calculator, formula sheet and ruler.

Part II Part II includes 10 items.

For most items a single answer is not enough. It is also expected

- that you write down what you do
- that you explain/motivate your reasoning
- that you draw any necessary illustrations.

For some items only an answer is required. They are marked with, *Only answer is required.*

After every item is given the maximum mark your solution can receive. (2/3) means that the item can give 2 g-points (Pass level) and 3 vg-points (Pass with distinction level).

Items marked with α give you a possibility to show MVG-quality (Pass with special distinction quality). This means e.g. that you use generalised methods, models and reasoning, that you analyse your results and account for a clear line of thought in a correct mathematical language.

Item number 8 is a larger item that demands a longer time to solve than other items. It is important that you make a try to solve this item. Above the item is written what the teacher has to consider at the assessment.

Mark limits The test gives totally (Part I + Part II) at the most 59 points, out of which 26 vg-points. To get the test character Pass you must have at least 18 points and to get the test character Pass with distinction you must have at least 33 points out of which at least 12 points on Pass with distinction level.

Write your name, adult education/study program and school on all sheets of paper you hand in.

Name: _____ School: _____

Adult education/study program: _____

1.

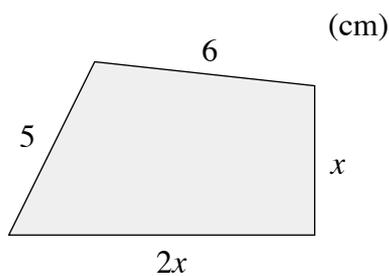


Spinning	
Single payment	40 kr
5-card	175 kr
Monthly ticket	300 kr

In April Anna and Maria went together to Spinning. Maria bought a monthly season ticket. Anna bought a 5-card and then used single payments. During the month they found time to go for Spinning 8 times. Which one of them paid the least and how much less did she pay?

(2/0)

2.



a) Give an expression for the perimeter of the quadrilateral in as simple a form as possible.

(2/0)

b) How long is the *longest* side if the perimeter is 23 cm?

(1/1)

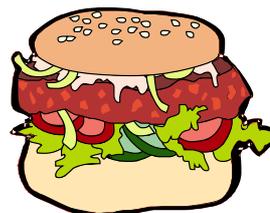
3. Investigate *isosceles triangles*, which have one angle that is 50° . Find the measure of the other angles in the triangles you find. Motivate with figures or with calculations.

(1/1)

4. The table below shows the price for a hamburger in the currency of each country, and the exchange rate at an occasion in the spring 2002.

<i>Country</i>	<i>Price</i>	<i>For 100 SEK you get in foreign currency</i>	
Iceland	422 ISK	Iceland	961,0 ISK
Great Britain	1,99 GBP £	Great Britain	6,65 GBP £
Sweden	26,00 SEK	Germany	10,91 EUR €
Germany	?? EUR €		

- a) Compare the price of a hamburger at this occasion in Iceland and in Sweden.
- b) A hamburger costs approximately as much in Germany as in Great Britain. How much does a hamburger cost in Germany expressed in the new currency euro?



(1/1)

(1/1)

5. Andreas and Lisa both got a rise in salary, each with equally many crowns. Andreas' rise was 5 % and Lisa's was 2.5 %. Investigate with calculations and reasoning for which salaries this can be possible.

(1/1) □

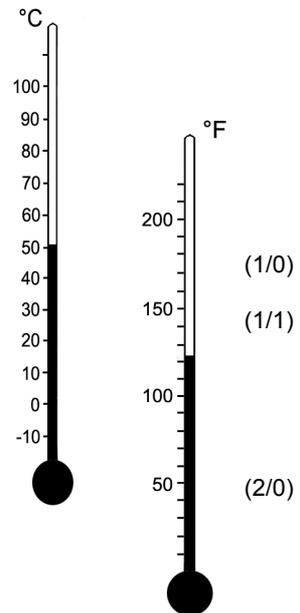
6. To convert degrees Celsius ($^{\circ}\text{C}$) into degrees Fahrenheit ($^{\circ}\text{F}$) one can follow this instruction, given in an English text.

Divide the temperature in degrees Celsius with 5, multiply the result with 9 and add 32, then you will get the temperature in degrees Fahrenheit.

- a) How many degrees Fahrenheit correspond to 25°C ?
Only answer is requested.
- b) Transform the content of the text box into a formula.
- c) In the same English text there is a simple "rule of thumb" for an *approximate* transformation from $^{\circ}\text{C}$ to $^{\circ}\text{F}$. Calculate how large the error will be if you use this "rule of thumb" to transform 25°C .

Double the temperature in degrees Celsius and add 30, then you will get the temperature in degrees Fahrenheit.

- d) ~~At which temperature in degrees Celsius do the two different ways of calculation give the same temperature in degrees Fahrenheit?~~



(1/0)

(1/1)

(2/0)

(1/2) □

7. Write a text for an exercise that can be solved with the help of the equation $x + (x + 5) = 25$

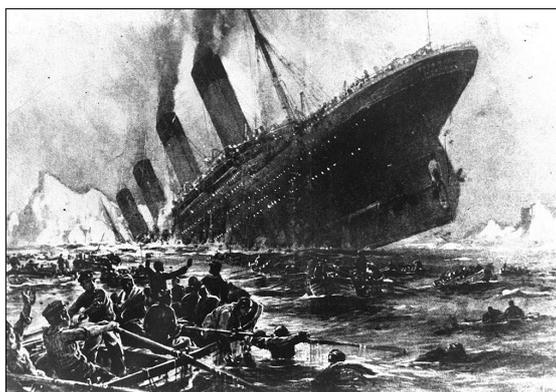
(1/1)

At the aspect assessment of your work with exercise 8 the teacher will consider

- what mathematical knowledge you have shown and how well you have carried through the task
- how well you have explained your work and motivated your conclusions
- how well you have accounted for your work.

Titanic

Late at night the 14th of April 1912 Titanic in high speed collided with an iceberg and sank. At the accident 2 223 people were on board. After the collision it took two and a half hour before Titanic sank. Therefore there was plenty of time to enter the lifeboats – but there was not room for all the passengers. Unfortunately only about half of the lifeboats were used and therefore more than 1 500 people died.



Source: Pressens Bild AB

8. In the table below the numbers of rescued and dead in the accident are given. The diagrams on the next page are based on this table.

	1st class	2nd class	3rd class	Crew	Total
Dead	123	166	528	695	1 512
Rescued	201	118	181	211	711
Total	324	284	709	906	2 223

- How many percent of the people on board were rescued?
- Use data from the table and show how two of the percentages in diagram B have been calculated.
- The diagrams A and D show among other things the part of dead among the crew. Explain why the parts in percent are different.
- In a newspaper it was after the accident stated that first of all passengers from first class were rescued. Which diagram or diagrams would you as a journalist choose to support this statement? Motivate your choice.
- Criticism was also given towards the shipping company that the crew first of all had saved themselves. Imagine that you are a representative of the shipping company. Which diagram or diagrams would you choose to defend the shipping company against the criticism. Motivate your choice.

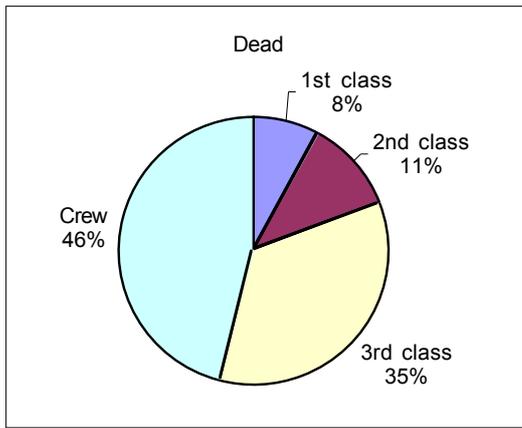


Diagram A

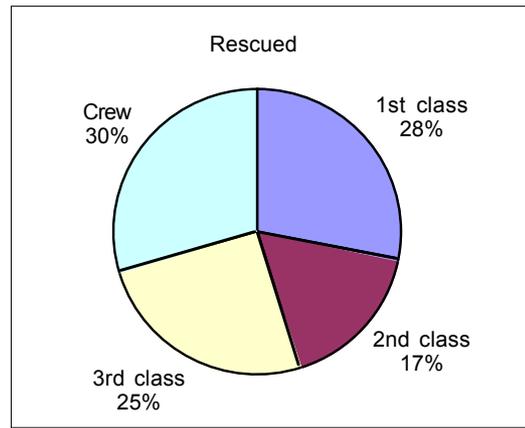


Diagram B

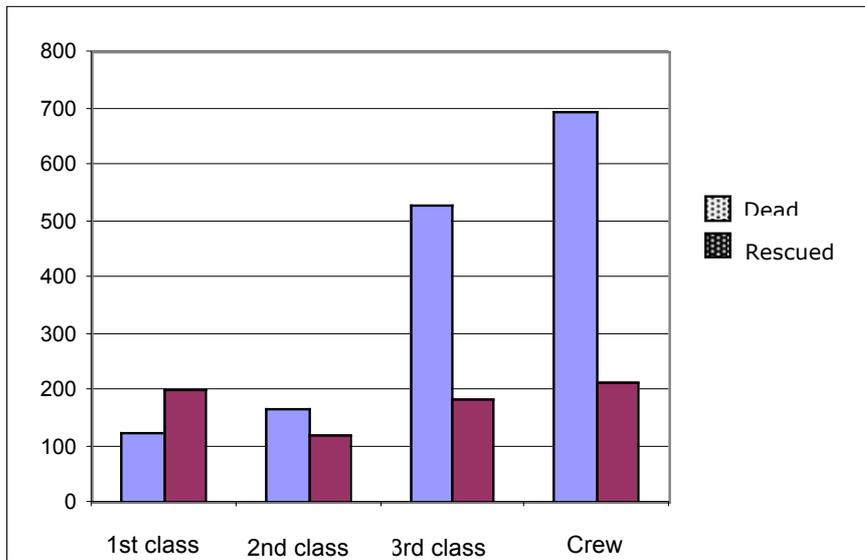


Diagram C

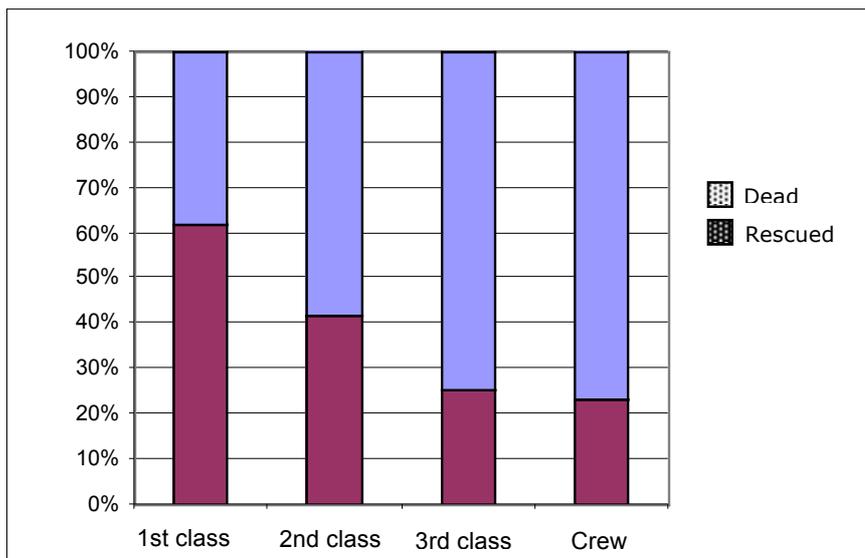
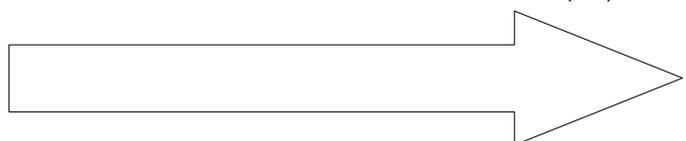


Diagram D

(5/4) □



Mark! Two exercises on the next page.

9. The mean of five *different* positive integers is 17 and the median is 20. How large can the largest of the five numbers at the most be? Explain how you got your answer. (1/2) □

10. Johanna fills coffee with a temperature of 92°C into a thermos. She then puts the thermos outdoors where the temperature is 15°C . To describe how the temperature $y^{\circ}\text{C}$ of the coffee changes with the time x hours she investigates two different models.

Formula for model A: $y = 92 - 7x$

Formula for model B: $y = 92 \cdot 0.93^x$

- a) Calculate the temperature of the coffee after three hours by formula A and by formula B. (2/0)
- b) Describe in everyday language what formula A respectively formula B says about *how* the temperature goes down. (0/2)
- c) Investigate how many hours model A respectively model B can be valid. (1/2) □

