

# Mathematics

Delprov B

1c

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Elevens namn och klass/grupp



## Instructions – part B

**Time for the test** 60 minutes for part B.

**Aids** Allowed aids on part B are formula sheet and ruler.

**Tasks** This part consists of tasks to be solved without using digital devices. Answers and solutions are to be written in the test booklet. Some of the tasks require working, which is to be shown in the figure and the box next to the task. For the other tasks only the answer is required. The maximum number of points that you can get for your answer/solution is shown after each task.

**Grading limits** The test (part A–D) gives a total maximum of 87 points.

Limit for test grade

E: At least 19 points.

D: At least 32 points of which at least 12 points at level C or higher.

C: At least 43 points of which at least 22 points at level C or higher.

B: At least 55 points of which at least 7 points at level A.

A: At least 66 points of which at least 13 points at level A.

Name: \_\_\_\_\_

Date of birth: \_\_\_\_\_

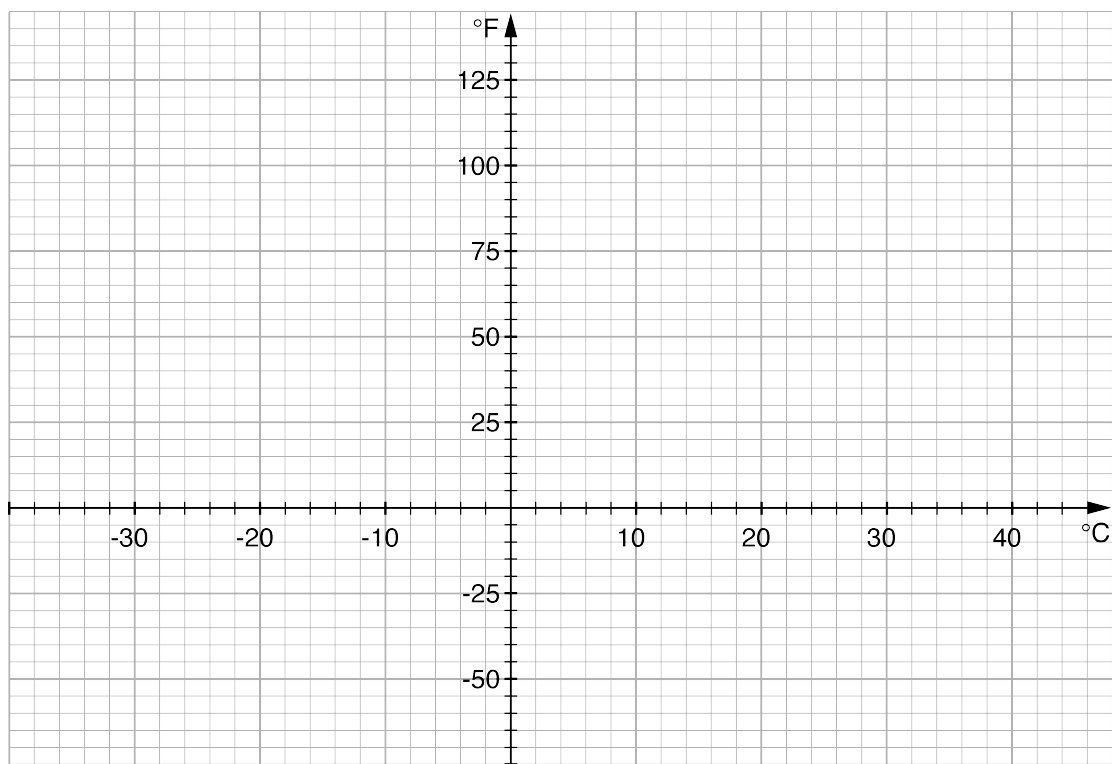
Programme: \_\_\_\_\_ Class: \_\_\_\_\_

Illustrations: Jens Ahlbom

1. Solve the equation  $12x + 5 = 12 - 2x$  Answer:  $x =$  (1/0/0)

2. Add the vectors  $\vec{u} = (3, 4)$  and  $\vec{v} = (2, -5)$  Answer:  (1/0/0)

3. The relation between temperatures measured in degrees Celsius ( $^{\circ}\text{C}$ ) and degrees Fahrenheit ( $^{\circ}\text{F}$ ) can be described as a linear relation.  $-18^{\circ}\text{C}$  corresponds to roughly  $0^{\circ}\text{F}$  and  $38^{\circ}\text{C}$  corresponds to roughly  $100^{\circ}\text{F}$ .



a) Draw a graph in the coordinate system showing the relation between temperatures measured in degrees Celsius ( $^{\circ}\text{C}$ ) and degrees Fahrenheit ( $^{\circ}\text{F}$ ). (1/0/0)

b) Use your graph to see how many degrees Fahrenheit ( $^{\circ}\text{F}$ ) correspond to  $0^{\circ}\text{C}$ .

Answer:   $^{\circ}\text{F}$  (1/0/0)

4. Take the expression  $4(x + 2) - 3(2x - 2)$

a) Calculate the value of the expression if  $x = 1$ . Answer: \_\_\_\_\_ (1/0/0)

b) Determine  $x$  so that the value of the expression is 18.  
Show your solution.

Answer:  $x =$  \_\_\_\_\_ (1/1/0)

5. Which (one or more) alternatives correspond to 0.12 %?  
Circle your answer(s).

12 ‰

1.2 ‰

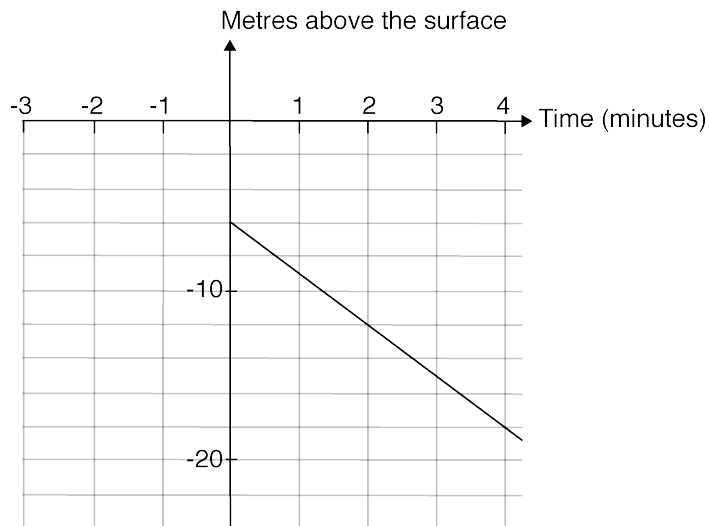
120 ‰

120 ppm

1200 ppm

(1/1/0)

6. Hamed is a diver. When he dives down from the water's surface, he moves at a constant speed. When diving, he starts his dive computer when he is 6 metres under the surface. The dive computer data is shown in the diagram.



How long does it take Hamed to go from the surface to a depth of 18 metres?

Answer: \_\_\_\_\_ min (0/1/0)

7. Lisa thinks of a whole number between 40 and 50.

- The number is *not* divisible by 2.
- The number is *not* divisible by 3.
- The number is *not* a prime number.

What number is she thinking of?

Answer: \_\_\_\_\_ (0/1/0)

8. Circle the powers that have the same value.

$0^5$      $1^4$      $2^3$      $3^2$      $4^1$      $5^0$

(0/1/0)

9. What is the value of the expression  $3x + 12$  if  $x + 4 = 12$ ?

Answer: \_\_\_\_\_ (0/1/0)

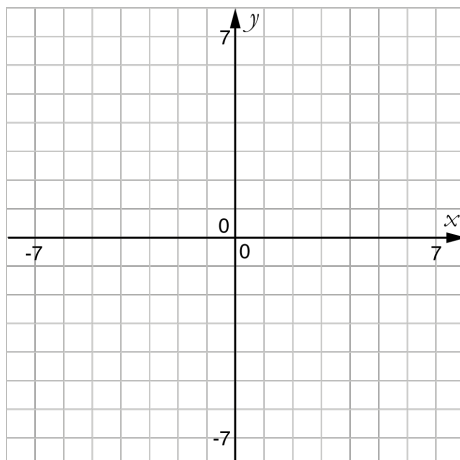
10. It is the maths teacher's birthday and her pupils want to surprise her with a cake (see picture). The teacher first wonders why only three of the six candles are lit, but then realise that the pupils have written her age in binary form, base two. How old is the maths teacher?



Answer: \_\_\_\_\_ (0/1/0)

11. Draw a possible graph for the function  $f$  in the coordinate system below. For function  $f$  it is given that:

- The domain is  $-5 \leq x \leq 6$
- $f(-3) = 0$
- The range is  $-2 \leq f(x) \leq 4$



(1/1/1)

- 12.** There are many different values of  $x$  and  $y$  that solve the equation  $8x - y = 10$ .

Find a solution for the equation  
where  $x$  and  $y$  have the same value.

Answer: \_\_\_\_\_ (0/0/1)

13. The two shortest sides of a right triangle have the lengths of  $\sqrt{3}$  and 2. Let  $\nu$  be the smallest angle in the triangle. What is the value of  $\sin \nu$ ? Circle your answer and motivate in the box.

$$\sqrt{\frac{3}{7}}$$

$$\sqrt{\frac{4}{7}}$$

$$\sqrt{\frac{3}{5}}$$

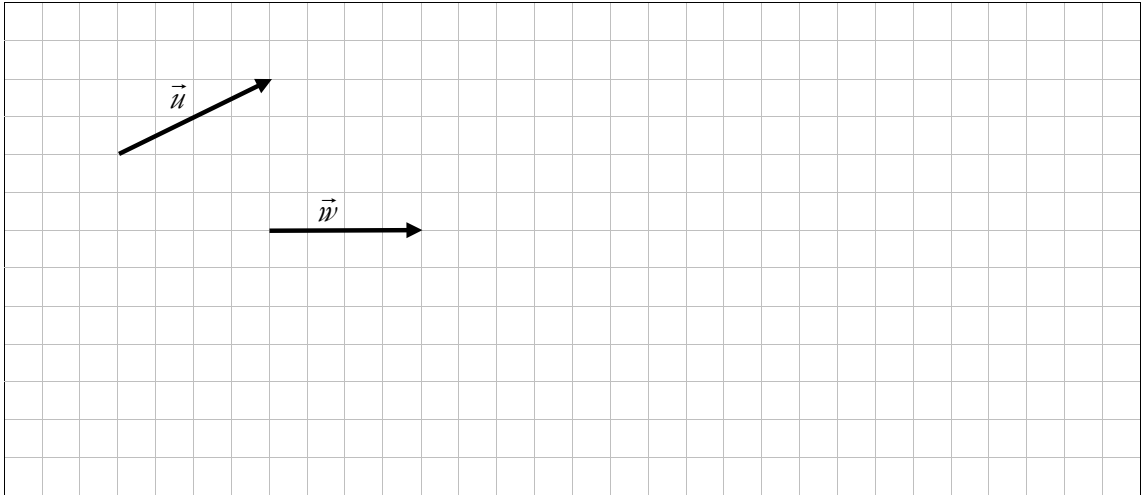
$$\sqrt{\frac{3}{4}}$$

$$\sqrt{\frac{4}{5}}$$

(0/1/2)



14. The grid shows representations of the vectors  $\vec{u}$  and  $\vec{w}$ .  
In the same grid, draw a representation of vector  $\vec{v}$  which fulfils  $2\vec{u} - 2\vec{w} = \vec{v}$ .  
Show your solution.



(0/0/2)

15. Solve the equation  $\left((\sqrt{3})^x\right)^4 = 3^6$ .  
Show your solution.

Answer:  $x =$  \_\_\_\_\_

(0/1/1)





# Compilation of student results

National test in mathematics 1c spring 2017

## Part A

	Score		
	E	C	A
Method and carrying through			
Presentation			
Total			
Maximum score	3	4	3

## Part B

	Score		
	E	C	A
1			
2			
3 a)			
3 b)			
4 a)			
4 b) 1			
4 b) 2			
5 1			
5 2			
6			
7			
8			
9			
10			
11 1			
11 2			
11 3			
12			
13 1			
13 2			
13 3			
14 1			
14 2			
15 1			
15 2			
Total			
Maximum score	8	10	7

## Part C

	Score		
	E	C	A
Method and carrying through			
Presentation			
Total			
Maximum score	4	4	4

## Part D

	Score		
	E	C	A
17 1			
17 2			
18 a)			
18 b) 1			
18 b) 2			
19 a)			
19 b) 1			
19 b) 2			
19 c) 1			
19 c) 2			
20 a)			
20 b) 1			
20 b) 2			
20 c) 1			
20 c) 2			
21 1			
21 2			
22 1			
22 2			
22 3			
23 1			
23 2			
23 3			
24 1			
24 2			
24 3			
25 1			
25 2			
25 3			
25 4			
26 a) 1			
26 a) 2			
26 b) 1			
26 b) 2			
26 b) 3			
27 a)			
27 b) 1			
27 b) 2			
27 c) 1			
27 c) 2			
Total			
Maximum score	11	19	10

Name: \_\_\_\_\_

## Summary

	E	C	A	Total
Total				
Maximum score	26	37	24	87

## Test grade

## Limit for test grade

- E: At least 19 points.
- D: At least 32 points of which at least 12 points at level C or higher.
- C: At least 43 points of which at least 22 points at level C or higher.
- B: At least 55 points of which at least 7 points at level A.
- A: At least 66 points of which at least 13 points at level A.

## Test grade

The test grade sums up the knowledge that the student has shown on the national test. The course grade does not have to be the same as the test grade since the course grade is based on all the knowledge that the student has shown during the course.