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Test:

Sample Test C [Official Released Test]

Source:

<http://www.lf1.cuni.cz/document/40887/mathematics.pdf>

Task 1 Let $\log_c x = y$. Which of the following statements are true?

	Statement
a)	$c^x = y$
b)	$y^x = c$
c)	$x^c = y$
d)	$c^y = x$
e)	$x^y = c$

Task 2 What is the slope k of the line segment with end points $(12, 6)$, $(52, -22)$?

	k
a)	-2.8
b)	-2.1
c)	-0.35
d)	-0.7
e)	2.1

Task 3 An open cylindrical container of uniform thickness d has a mass of $m = 4$. What is the mass M of a cylindrical container made from the same material, which has both the diameter and height multiplied 6-times and thickness d ?

	M
a)	48
b)	432
c)	36
d)	144
e)	288

Task 4 The Eiffel Tower is 300 m high and the height of its accurate model is 1 m. Assume both towers are made of the same material. What is the proportion of the mass of Eiffel Tower to the mass of the model?

	Proportion
a)	90000
b)	6000
c)	300
d)	300^3
e)	3000

Task 5 Two objects are selected at random from a set consisting of 6 red objects and 4 blue objects. What is the probability p that neither is red?

	p
a)	0.0222
b)	0.0333
c)	0.0027
d)	0.0133
e)	0.1333

Task 6 A line has the parametric equation $x = -2 \cdot t + 3$, $y = 15 \cdot t + 1$. What is the slope k of this line?

	k
a)	-2
b)	-30
c)	$\frac{15 \cdot t + 1}{-2 \cdot t + 3}$
d)	$\frac{15}{-2}$
e)	$\frac{-2 \cdot t + 3}{15 \cdot t + 1}$

Task 7 What is the range of the function defined by

$$f(x) = \frac{1}{x+1} - 3?$$

	Range
a)	All reals except -3
b)	All reals except 0
c)	All reals except $-\frac{2}{3}$
d)	All reals
e)	The interval $[1, 4]$ of real numbers

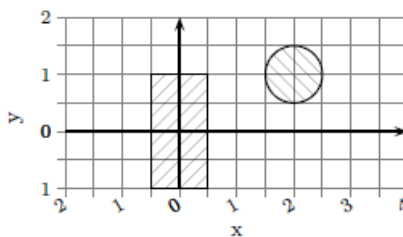
Task 8 If $0 < \theta < \pi$ and $\sin(\theta) = 0.72$, what is $\sin(\pi - \theta)$?

	$\sin(\pi - \theta)$
a)	-0.18
b)	-0.72
c)	0.18
d)	0.2687
e)	0.72

Task 9 A number x is increased by 17 and the square root of the result is -0.5. What is x ?

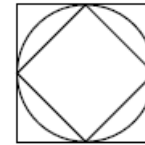
	x
a)	-0.8375
b)	16.75
c)	-167.5
d)	-16.75
e)	3.35

Task 10 R and D are the set of all points of the shown rectangle and the disk, respectively. Which statements are true?



	Statement
a)	D is the set of all (x, y) with $(x-1)^2 + (y-2)^2 \leq 0.5^2$
b)	R is the set of all (x, y) with $ x - y \leq 1.5$
c)	R is the set of all (x, y) with $ x \leq 0.5$ or $ y \leq 1$
d)	D is the set of all (x, y) with $ (x-2) + (y-1) \leq 0.5$
e)	D is the set of all (x, y) with $(x-2)^2 + (y-1)^2 \leq 0.5^2$

Task 11 B, C, S are areas of the shown big square, circle, and the small square, resp. Which statements are true?



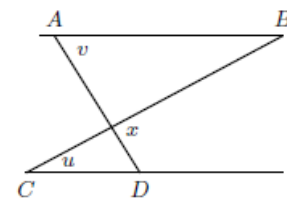
	Statement
a)	$C : B = \pi/6$
b)	$B : S = 2$
c)	$C : B = \pi/4$
d)	$C : B = 0.5$
e)	$B : S = 2 \cdot \sqrt{2}$

Task 12 The vector \vec{BC} of magnitude $b > 0$ is added to a vector \vec{AB} of magnitude $a > 0$; let c be the magnitude of the resultant vector and α the angle ABC .

Which of the following is always true?

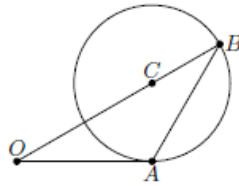
	Proposition
a)	$c = a - b $
b)	$ a - b \leq c \leq a + b $
c)	$c = \sqrt{a^2 + b^2 - 2ab \cdot \cos(\alpha)}$
d)	$c^2 = a^2 + b^2 + 2ab \cdot \sin(\alpha)$
e)	c can be $a + 2 \cdot b$

Task 13 In the figure, \overline{AB} , \overline{CD} are parallel. What is the angle x in terms of the angles u and v ?



	x
a)	$u + v$
b)	$180 - u + v$
c)	$u + 2 \cdot v$
d)	$2 \cdot u - v$
e)	$180 + u - v$

$AB?$

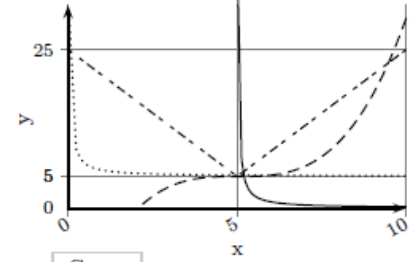


	d is
a)	$4/3$
b)	$\sqrt{3}$
c)	4
d)	$0.5\sqrt{3}$
e)	3

Task 14 In the figure, \overline{OA} is a tangent to a circle of radius 2 and the angle AOB is 30° . What is the length d of the abscissa

Task 15 Exactly one of four curves in

the graph presents the function $f(x) = 1/(x - 5)$. Which is this?



	Curve
a)	—
b)	- - - -
c)	- . - .
d)

Answer Key:

1. D
2. D
3. D
4. C
5. E
6. D
7. A
8. E
9. D*
10. C and E
11. B and C
12. C
13. A
14. D*
15. A