

2014年度日本政府（文部科学省）奨学金留学生選考試験

QUALIFYING EXAMINATION FOR APPLICANTS FOR JAPANESE
GOVERNMENT (MONBUKAGAKUSHO) SCHOLARSHIPS 2014

学科試験 問題

EXAMINATION QUESTIONS

(専修学校留学生)

SPECIAL TRAINING COLLEGE STUDENTS

数 学

MATHEMATICS

注意☆試験時間は60分。

PLEASE NOTE : THE TEST PERIOD IS 60 MINUTES.

(2014)

MATHEMATICS

Nationality		No.	
Name	(Please print full name, underlining family name)		

Marks	
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answer sheet

question	answer						
1	(1)						
	(2)						
	(3)						
	(4)	①		②			
	(5)	①		②			
	(6)						
	(7)						
	(8)	①		②		③	
	(9)						
	(10)						
	(11)						
2	(1)	①		②		③	
	(2)	①		②			
	(3)	①		②			
3	(1)				(2)		
	(3)				(4)		
	(5)						

(2014)

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Note that all the answers should be written on the answer sheet.

1. Fill in the following blanks with the correct answers.

- (1) The number of the integer to satisfy the inequality $x^2 - 6x + 3 < 0$ is .
- (2) $\sin 30^\circ + \cos 120^\circ + \tan 45^\circ =$.
- (3) When $2^{3x-2} = 128$, then $x =$.
- (4) The maximum and minimum of $y = x^2 - 2x + 3$ ($0 \leq x \leq 3$) are ① and ②, respectively.
- (5) When $AB = 2\sqrt{3}$, $AC = 3$, $\angle A = 30^\circ$ with $\triangle ABC$, then $BC =$ ① and $\angle C =$ ②°.
- (6) The number of positive divisors with 108 is .
- (7) When $x^2 - 2x + a$ is divisible by $x + 1$, then $a =$.
- (8) Let $f(x) = 3x^2 - 2x + 1$. Then $f(2) =$ ①, $f'(1) =$ ②, and $\int_0^2 f(x) dx =$ ③.
- (9) There is a progression $1, 2, 4, a_4, 11, 16, \dots$. Then $a_4 =$.
- (10) When two straight lines $3x - (a-3)y - 6 = 0$ and $(a+1)x + y - 1 = 0$ are vertical to each other, then the fixed number $a =$.
- (11) When $a > 0$, then the minimum of $a + \frac{9}{a}$ is .

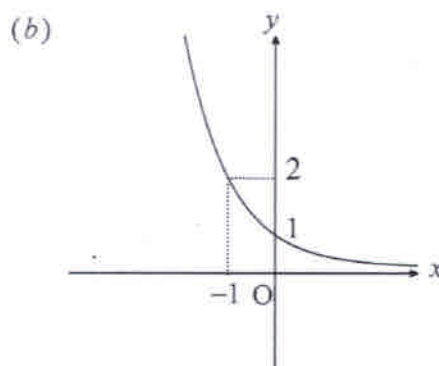
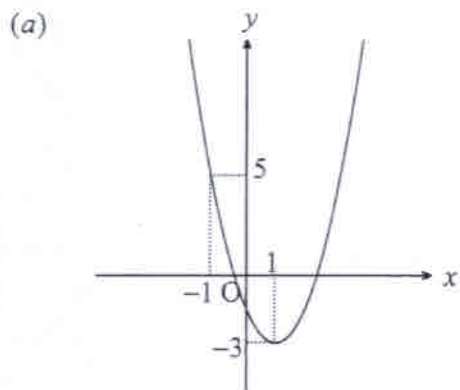
2. By assuming a circle $x^2 + y^2 - 4x + 6y + 8 = 0$, fill in the following blanks with the correct answers.

(1) The coordinates of the center P of this circle are (,) and the radius of this circle is .

(2) The equation of the tangent at a point Q (3, -5) on the circumference is $x - \text{} y - \text{} = 0$.

(3) Let there be a point R (1, -6). The scalar product of two vectors $\overrightarrow{QP} \cdot \overrightarrow{QR} = \text{$ and $\tan \angle PRQ = \text{$.

3. Choose the correct equation from ① to ⑫ to satisfy the following questions about the graphs (a) and (b), and fill in the blanks with the number.



- (1) The equation that represents graph (a) is
- (2) The equation that represents a graph when graph (a) is moved symmetrically about the origin is
- (3) The equation that represents graph (b) is
- (4) The equation that represents a graph when graph (b) is shifted by -1 on the x-axis is
- (5) The equation that represents a graph when graph (b) is moved symmetrically about a straight line $y = x$ is

① $y = 2x^2 + 4x - 1$

② $y = -2x^2 + 4x - 1$

③ $y = 2x^2 - 4x - 1$

④ $y = -2x^2 - 4x - 1$

⑤ $y = -2x^2 - 4x + 1$

⑥ $y = 2x^2 + 4x + 1$

⑦ $y = \log_{\frac{1}{2}} x$

⑧ $y = 2^{-x+1}$

⑨ $y = \left(\frac{1}{2}\right)^x$

⑩ $y = \log_2 x$

⑪ $y = 2^x$

⑫ $y = 2^{-x-1}$