2007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 2007

学科試験 問題

EXAMINATION QUESTIONS

(学部留学生)

UNDERGRADUATE STUDENTS

数 学(A)

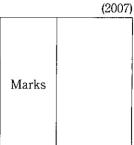
MATHEMATICS (A)

注意 ☆試験時間は60分。

PLEASE NOTE: THE TEST PERIOD IS 60 MINUTES.

MA

ATHEMATICS (A)	Nationality		No.	_
	Name	(Please print full name, underlining family name)		lining



1 Fill in the blanks with the correct numbers.

The solution of the inequality $2x^2 - 3x - 2 \le 0$ is

$$\boxed{1} \qquad \qquad \leq x \leq \boxed{2}$$

The sides of $\triangle ABC$ are AB = 6, BC = 4 and CA = 5.

Then
$$\cos \angle A = \boxed{1}$$
 and $\sin \angle A = \boxed{2}$

(4)
$$5\log_2\sqrt{2} - \frac{1}{2}\log_2 3 + \log_2 \frac{\sqrt{3}}{2} =$$

(5) If
$$x+y=5$$
, $xy=1$ and $x>y$, then $\frac{\sqrt{x}+\sqrt{y}}{\sqrt{x}-\sqrt{y}}=$

- 2 Let $\triangle ABC$ be a right angled triangle such that $\angle A = 90^{\circ}$, AB = AC and let M be the mid point of the side AC. Take the point P on the side BC so that AP is vertical to BM. Let H be the intersection point of AP and BM.
 - (1) Find the ratio of the areas of the two triangles $\triangle ABH : \triangle AHM$.
 - (2) Find the ratio BP:PC.

3 Let $\{a_n\}$ be the sequence defined by

$$a_n = \left[\frac{n^2 + 8n + 10}{n + 9}\right],$$

where [x] is the largest integer that does not exceed x.

Find the value of $\sum_{n=1}^{30} a_n$.