(2016)

MATHEMATICS

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

Marks	

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

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

(1) The number of integers x that satisfy the following inequalities

$x^2 - 5x + 1 < 0$ is $\boxed{}$.

(2) When $-1 < a < 2$, then $\sqrt{a^2+2a+1} + \sqrt{a^2-4a+4} = \boxed{}$.

(3) When $2^x - 2^{-x} = 4$, then $2^{2x} + 2^{-2x} = \boxed{①}$, $2^{3x} - 2^{-3x} = \boxed{②}$.

(4) When $\log_3(x-3) - \log_9(x-1) = 0$, then $x = \boxed{}$.

(5) When $\mathrm{AB} = x+2$, $\mathrm{BC} = x$, $\mathrm{AC} = x-2$, $\angle\mathrm{C} = 120°$ with $\triangle\mathrm{ABC}$, then $x = \boxed{}$.

(6) Four - digit numbers are made using the digits {0,1,2,3,4} where each digit is different.

How many four - digit numbers are there? The answer is $\boxed{①}$.

How many four - digit odd numbers are there? The answer is $\boxed{②}$.

(7) $1^2 + 2^2 + 3^2 + 4^2 + 5^2 = \boxed{①}$.

$6^2 + 7^2 + 8^2 + 9^2 + 10^2 + 11^2 + 12^2 + 13^2 = \boxed{②}$.

(8) Let $\vec{a} = (-1, 2)$, $\vec{b} = (1, x)$. When $2\vec{a} + 3\vec{b}$ and $\vec{a} - 2\vec{b}$ are the parallel vectors, then $x = \boxed{}$.

(9) Let $f(x) = x^2 + 2x - 1$, $g(x) = x + 1$

(i) If $f(x) = g(x)$, $x = \boxed{①}$ or $x = \boxed{②}$.

(ii) The coordinate of the vertex point of the parabola $y = f(x)$ is

$(\boxed{①}, \boxed{②})$.

(iii) The equation of the tangent to the parabola $y = f(x)$ at the point $(0, f(0))$ is

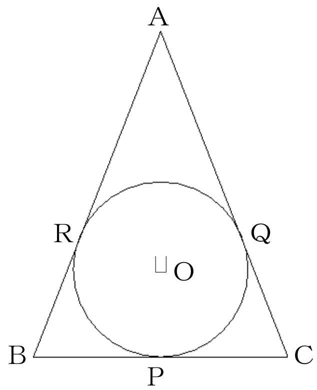
$y = \boxed{}$.

(iv) The area bounded by the parabola $y = f(x)$ and the line $y = g(x)$ is $\boxed{}$.

2. The circle O is an inscribed circle of $\triangle ABC$ and points P, Q and R are the points of tangency of sides BC, CA and AB respectively.

AB = AC = 13, BC = 10.

Fill in the following blanks with the correct numbers.



(1) AR = $\boxed{\quad}$.

(2) $\sin\angle AOR$ = $\boxed{\quad}$.

(3) $\tan\angle AOR$ = $\boxed{\quad}$.

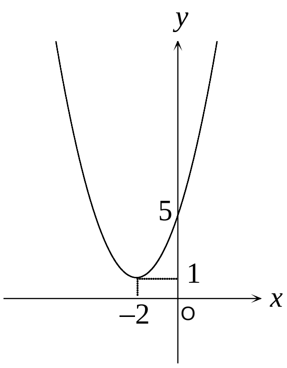
(4) The radius of the inscribed circle O = $\boxed{\quad}$.

(5) The scalar product of two vectors $\overrightarrow{AB}\cdot\overrightarrow{AO} = \boxed{①}$, $\overrightarrow{AB}\cdot\overrightarrow{BC} = \boxed{②}$.

3. The graphs of function $y = ax^2 + bx + c$ on the plane xy are shown below.

Fill the blanks with the appropriate values of a , b and c for each graph.

(1)

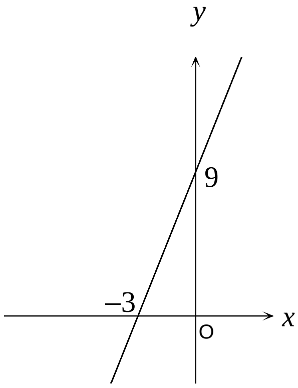


$a = \boxed{①}$

$b = \boxed{②}$

$c = \boxed{③}$

(2)

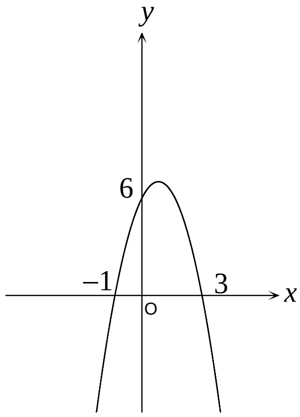


$a = \boxed{①}$

$b = \boxed{②}$

$c = \boxed{③}$

(3)



$a = \boxed{①}$

$b = \boxed{②}$

$c = \boxed{③}$