Q1.【SMO Junior 2017 R1 Q26】

If every root of the polynomial x^2+4x-5 is also a root of the polynomial $2x^3+9x^2+bx+c$, find the value of b^2+c^2.

Q2(a).【SMO Junior 2010 R1 Q22】

Given that $169(157-77x)^2+100(201-100x)^2=26(77x-157)(1000x-2010)$, find the value of x.

Q2(b).【SMO Junior 2006 R1 Q25】

What is the product of the real roots of the equation

$$\frac{x^2+90x+2027}{3}=\sqrt{x^2+90x+2055}\,?$$

Q3.【SMO Junior 2021 R1 Q20】

20. What is the number of positive integers c such that the equation

$$x^2 - 2021x + 100c = 0$$

has real roots?

Q4.【SMO Junior 2007 R1 Q28】

Find the value of a such that the two equations $x^2 + ax + 1 = 0$ and $x^2 - x - a = 0$ have one common real root.

Q5(a).【SMO Junior 2022 R1 Q10】

10. If a and b are distinct solutions to the equation

$$x^2 + 10x + 20 = 0,$$

what is the value of $a^4 + b^4$?

Q5(b). 【SMO Junior 2008 R1 Q30】

Let a and b be the roots of $x^2+2000x+1=0$ and let c and d be the roots of $x^2-2008x+1=0$. Find the value of $(a+c)(b+c)(a-d)(b-d)$.

Q6. 【SMO Junior 2009 R1 Q30】

Find the value of the smallest positive integer m such that the equation

$$x^2+2(m+5)x+(100m+9)=0$$

has only integer solutions.

Q7.【SMO Junior 2016 R1 Q31】

If a and b are integers and $\sqrt{3-2\sqrt{2}}$ is one of the roots of the equation $x^2+ax+b=0$, find the value of $a-b$.

Practice:

1.【SMO Junior 2016 R1 Q8】

Two real numbers u and v satisfy the following equations respectively.

$$2015u^2+2016u+1=0$$
$$v^2+2016v+2015=0$$

If $uv\neq 1$, find the value of $\frac{u}{v}$.

2.【SMO Junior 2005 R1 Q26】

Find the sum of all possible values of a such that the following equation has real root in x:

$$(x-a)^2+(x^2-3x+2)^2=0.$$

3.【SMO Junior 2008 R1 Q28】

Let α and β be the roots of $x^2-4x+c=0$, where c is a real number. If $-\alpha$ is a root of $x^2+4x-c=0$, find the value of $\alpha\beta$.

4.【SMO Junior 2012 R1 Q1】

Let α and β be the roots of the quadratic equation $x^2+2bx+b=1$. Find the smallest possible value of $(\alpha-\beta)^2$.

5.【SMO Junior 2013 R1 Q16】

16. Suppose that x_1 and x_2 are the two roots of the equation $(x-2)^2=3(x+5)$. What is the value of the expression $x_1x_2+x_1^2+x_2^2$?

6.【SMO Junior 2021 R1 Q15】

How many integers *k* are there such that the quadratic equation

$$kx^2+20x+20-k=0$$

has only integer solutions?