Name:_____ Date:_____

Vieta's Formula Challenging Questions

1. Let $f(x) = x^3 - 5x^2 + 12x - 19$ and have roots "a", "b", and "c". Find the value of $\frac{1}{ab} + \frac{1}{bc} + \frac{1}{ac}$

2. If two factors of $x^3 - ax + b$ are $(x+1)$ and $(x+2)$, find the roots of $x^2 - ax + b$

3. Let "a" and "b" be real numbers, such that one of the roots of $x^3 + ax^2 - 4x + b = 0$ is $1+i$, then what are the other two roots?

4. Find the value of $(2+r)(2+s)(2+t)(2+u)$ if "r", "s", "t", and "u" are the roots of $f(x) = 3x^4 - x^3 + 2x^2 + 7x + 2$

5. Find the two values of "k" for which $2x^3 - 9x^2 + 12x + k$ has a double root.

6. Let r_1, r_2, and r_3 be the 3 zeroes of the cubic polynomial $x^3 - x - 1 = 0$. Then the expression $r_1(r_2 - r_3)^2 + r_2(r_3 - r_1)^2 + r_3(r_1 - r_3)^2 = k$, where "k" is a rational number. Find the value of "k".

7. Determine the value of $(a+b)(b+c)(a+c)$, if "a", "b", and "c" are three real roots of the polynomial $x^3 + 9x^2 - 9x - 8$

8. Let "a", "b", and "c" be the distinct roots of $x^3 - x^2 + x - 2 = 0$. Find the value of $a^3 + b^3 + c^3$

9. Let 'P", "Q", and "R" be the distinct roots of the polynomial $x^3 - 22x^2 + 80x - 67$. It is given that there exist real numbers "A" ,"B", and "C" such that

$$\frac{1}{s^3 - 22s^2 + 80s - 67} = \frac{A}{s-p} + \frac{B}{s-q} + \frac{C}{s-r}$$

for all $s \notin \{p, q, r\}$. What is $\frac{1}{A} + \frac{1}{B} + \frac{1}{C}$?