Worksheet 1

Problems using Vieta's formulas

1. If x_1, x_2 are the roots of the equation $x^2 + 5x - 3 = 0$, determine the value of $x_1^2 + x_2^2$.

2. If x_1, x_2 are the roots of the equation $x^2 + 11x + 12 = 0$, determine the value of $x_1^2 + x_2^2$.

3. If x_1, x_2 are the roots of the equation $x^2 + 9x + 33 = 0$, determine the value of $\frac{1}{x_1} + \frac{1}{x_2}$.

4. If x_1, x_2 are the roots of the equation $x^2 - 8x + 11 = 0$,
determine the value of $x_1^3 + x_1^2 + x_1 + x_2^3 + x_2^2 + x_2$.

5. If x_1, x_2 are the roots of the equation $x^2 - 15x + 36 = 0$, determine the value of $|x_1 - x_2|$.

6. Let x_1, x_2 be the roots of the equation $x^2 - 12x + 19 = 0$.
Determine the value of $x_1(1 - x_1) + x_2(1 - x_2)$.

7. If x_1, x_2 are the roots of the equation $x^2 - 4x + 1 = 0$,
determine the value of $(x_1 - \frac{1}{x_1})^2 + (x_2 - \frac{1}{x_2})^2$.

8. If x_1, x_2 are the solutions to the equation $x^2 - 5x + a^2 - 2a + 1 = 0$ where $a \in R$.
Find the value of a, for which $x_1 x_2$ is minimal.