

Imię i nazwisko:

Klasa:

Grupa 1

Wynik:

Question 1 (1 pt)

The solutions to $2x^2 - 3x = 0$ are

- A. $x \in \{0, 1.5\}$ B. $x \in \{-1.5, 1.5\}$ C. $x \in \{-1.5, 0\}$ D. $x \in \{-\sqrt{1.5}, \sqrt{1.5}\}$

Question 2 (1 pt)

How many integers satisfy the inequality $6 - x - x^2 \geq 0$

- A. 6 B. 7 C. 8 D. infinitely many

Question 3 (1 pt)

The set of solutions to $x^2 + 3x + 7 > 0$ is

- A. $x \in (3, 7)$ B. $x \in (1 - \sqrt{2}, 1 + \sqrt{2})$ C. $x \in \emptyset$ D. $x \in \mathbb{R}$

Question 4 (1 pt)

For what values of k the expression $x^2 + 2x + k$ is positive for all $x \in \mathbb{R}$?

- A. $k < 1$ B. $k < 4$ C. $k > 1$ D. $k > 4$

Question 5 (1 pt)

Let α and β be the solutions to the equation:

$$2x^2 + x - 5 = 0$$

then the expression $\frac{1}{\alpha} + \frac{1}{\beta} =$

- A. -5 B. $-\frac{1}{5}$ C. $\frac{1}{5}$ D. 5

Question 6 (3 pts)

Consider the expression $2x^2 + 3x - 2$.

(a) Write down this expression in:

i. factored form,

ii. vertex form.

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

Question 7 (3 pts)

Consider the equation:

$$2x^2 - kx + 5 = 0$$

Find the set of values of k for which this equation has two distinct real solutions.

Question 8 (3 pts)

The equation $3x^2 - x - 6 = 0$ has solutions α and β .

(a) Find the values of:

i. $\alpha^2\beta^2$,

ii. $\alpha^2 + \beta^2$.

(b) Hence find the equation with integer coefficients whose roots are α^2 and β^2 .

Question 9 (3 pts)

Solve

$$3^{2x+1} - 3^{x+3} + 9 = 3^x$$

Question 10 (3 pts)

In a volleyball tournament every team played against every other team once. A total of 66 games was played. Find the number of teams that played in the tournament.

Extra question

Find the values of m for which the equation:

$$x^2 - mx + m + 1 = 0$$

has two distinct solutions both of which are less than 1.

Hint: Consider the signs of the expressions $(x_1-1)(x_2-1)$ and $(x_1 - 1) + (x_2 - 1)$ and use Viète's formulae to form conditions on m .