Part 3: Program (70 points)

1. (20 points) Write an Android App that allows a user to input coordinates of three points and calculate the area. If the triangle cannot be formed, show the message.

Hint:
- distance(p1(x1, y1), p2(x2, y2)) = √((x1 − x2)^2 + (y1 − y2)^2)
- The area of a triangle is \( \sqrt{s(s—a)(s—b)(s—c)} \) where \( s = \frac{a+b+c}{2} \).

A possible run may look like:

Enter three points: (0, 0) (0, 3) (4, 0) Area

The area of the triangle is 6.0000.

2. (20 points) Write an Android App that allows a user to input the coefficients of an equation \( ax^2 + bx + c = 0 \) and find the roots. If the roots cannot be found, also show the message.

Hint: The roots of the equation of \( ax^2 + bx + c = 0 \) are \( \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \).

A possible run may look like:

\[ 1 \cdot x^2 + -3 \cdot x + 2 = 0 \] Solve

\( x = 1.0000, x = 2.0000 \)

3. (30 points) Write an App for a number guessing game.

(a) (8 points) Create the necessary user interface.
(b) (8 points) Randomly generate 6 different numbers between 1 and 10 and hide them.
(c) (10 points) The player picks a number and guesses whether a number is even or odd. After a number is guessed, the number is exposed. If guessing right, the player wins the points.
(d) (4 points) The game is over until all numbers are exposed.

A possible run may look like:

Numbers: * * * * * *
Pick a number: 2
Even or Odd (E|O)? 0
You guess right and win 5 points.

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Numbers: * 5 * * * *
Pick a number: 5
Even or Odd (E|O)? E
You guess wrong and win 0 points.

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Numbers: * 5 * * 7 *
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Numbers: 2 5 8 4 7 3
You win 17 points.