Multiple Choice

For #1 to #5, choose the best answer.

1. What points on the graph of this quadratic function represent the locations of the zeros of the function?
   - A (0, 5) and (1, 0)
   - B (0, 1) and (0, 5)
   - C (1, 0) and (5, 0)
   - D (5, 0) and (0, 1)

2. What is one of the factors of $x^2 - 3x - 10$?
   - A $x + 5$
   - B $x - 5$
   - C $x - 10$
   - D $x + 10$

3. What integral values of $k$ will make $2x^2 + kx - 1$ factorable?
   - A -1 and 2
   - B -2 and 2
   - C -2 and 1
   - D -1 and 1

4. The roots, to the nearest hundredth, of $0 = -\frac{1}{2}x^2 + x + \frac{7}{2}$ are
   - A 1.83 and 3.83
   - B -1.83 and 3.83
   - C 1.83 and -3.83
   - D -1.83 and -3.83

5. The number of baseball games, $G$, that must be scheduled in a league with $n$ teams can be modelled by the function $G(n) = \frac{n^2 - n}{2}$, where each team plays every other team exactly once. Suppose a league schedules 15 games. How many teams are in the league?
   - A 5
   - B 6
   - C 7
   - D 8

Short Answer

6. Determine the roots of each quadratic equation. If the quadratic equation does not have real roots, use a graph of the corresponding function to explain.
   - a) $0 = x^2 - 4x + 3$
   - b) $0 = 2x^2 - 7x - 15$
   - c) $0 = -x^2 - 2x + 3$

7. Solve the quadratic equation $0 = 3x^2 + 5x - 1$ by completing the square. Express your answers as exact roots.

8. Use the quadratic formula to determine the roots of the equation $x^2 + 4x - 7 = 0$. Express your answers as exact roots in simplest radical form.

9. Without solving, determine the nature of the roots for each quadratic equation.
   - a) $x^2 + 10x + 25 = 0$
   - b) $2x^2 + x = 5$
   - c) $2x^2 + 6 = 4x$
   - d) $\frac{2}{3}x^2 + \frac{1}{2}x - 3 = 0$
10. The length of the hypotenuse of a right triangle is 1 cm more than triple that of the shorter leg. The length of the longer leg is 1 cm less than triple that of the shorter leg.
   a) Sketch and label a diagram with expressions for the side lengths.
   b) Write an equation to model the situation.
   c) Determine the lengths of the sides of the triangle.

Extended Response

11. A pebble is tossed upward from a scenic lookout and falls to the river below. The approximate height, \( h \), in metres, of the pebble above the river \( t \) seconds after being tossed is modelled by the function \( h(t) = -5t^2 + 10t + 35 \).
   a) After how many seconds does the pebble hit the river? Express your answer to the nearest tenth of a second.
   b) How high is the scenic lookout above the river?
   c) Which method did you choose to solve the quadratic equation? Justify your choice.

12. Three rods measure 20 cm, 41 cm, and 44 cm. If the same length is cut off each piece, the remaining lengths can be formed into a right triangle. What length is cut off?

13. A rectangular piece of paper has a perimeter of 100 cm and an area of 616 cm\(^2\). Determine the dimensions of the paper.

14. The parks department is planning a new flower bed. It will be rectangular with dimensions 9 m by 6 m. The flower bed will be surrounded by a grass strip of constant width with the same area as the flower bed.
   a) Write a quadratic equation to model the situation.
   b) Solve the quadratic equation. Justify your choice of method.
   c) Calculate the perimeter of the outside of the path.