PC 11

Quadratic Inequalities – Summary

$\leq$ less than or equal to

- an inequality sign that contains a partial equal sign, this is the inequality with an "or" option
- when expressed on a number line, the boundary point is solid = shaded in because it is part of the solution
- when solving an inequality in two variables, the boundary is the graph of the parabola and all the points on the parabola are part of the solution and the graph is drawn in a solid line

$\geq$ greater than or equal to

- an inequality sign that contains a partial equal sign, this is the inequality with an "or" option
- when expressed on a number line, the boundary point is solid = shaded in because it is part of the solution
- when solving an inequality in two variables, the boundary is the graph of the parabola and all the points on the parabola are part of the solution and the graph is drawn in a solid line

$>$greater than

- an inequality sign that does not contain a partial equal sign, this is the inequality **without** an "or" option = strict inequality
- when expressed on a number line, the boundary point is hollow= empty because it is **not** part of the solution
- when solving an inequality in two variables, the boundary is the graph of the parabola and all the points on the parabola are **not** part of the solution and the graph is drawn in a **dashed** line

$<$ less than

- an inequality sign that does not contain a partial equal sign, this is the inequality **without** an "or" option = strict inequality
- when expressed on a number line, the boundary point is hollow= empty because it is **not** part of the solution
- when solving an inequality in two variables, the boundary is the graph of the parabola and all the points on the parabola are **not** part of the solution and the graph is drawn in a **dashed** line

$\neq$ different from

- an inequality sign that is often forgotten, frequently used to express restrictions
- when expressed on a number line there is a hole in the horizontal line
- when solving an inequality in two variables, the boundary is the graph of the parabola and all the points on the parabola are **not** part of the solution and the graph is drawn in a **dashed** line

1. **Quadratic inequalities in one variable:**

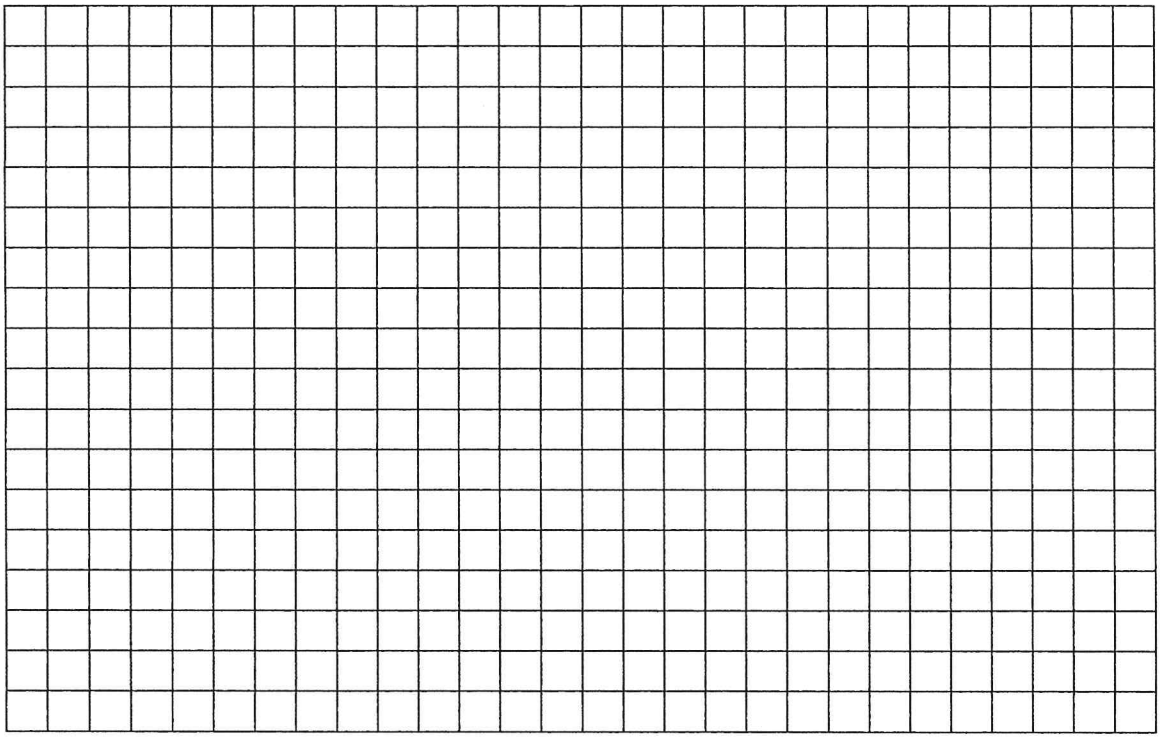
- Solve graphically or algebraically
- the solution is the values of x that make the inequality true
- the solution is best shown on a number line but it can be expressed as an inequality or two inequalities

2. **Quadratic inequalities in two variables:**

- Solve graphically
- The solution is a region of points (ordered pairs (x,y)) that are bounded by the graph of a parabola.
- The points on the parabola do not belong in the solution region when solving a strict inequality. Parabola must be drawn in a dashed line.
- The point on the parabola belong in the solution region when solving $\leq$ or $\geq$ inequality. Parabola must be drawn in a solid line.
- The solution is best shown as graph with a shaded solution region and a clear boundary graph.

Quadratic Inequalities in Two Variables

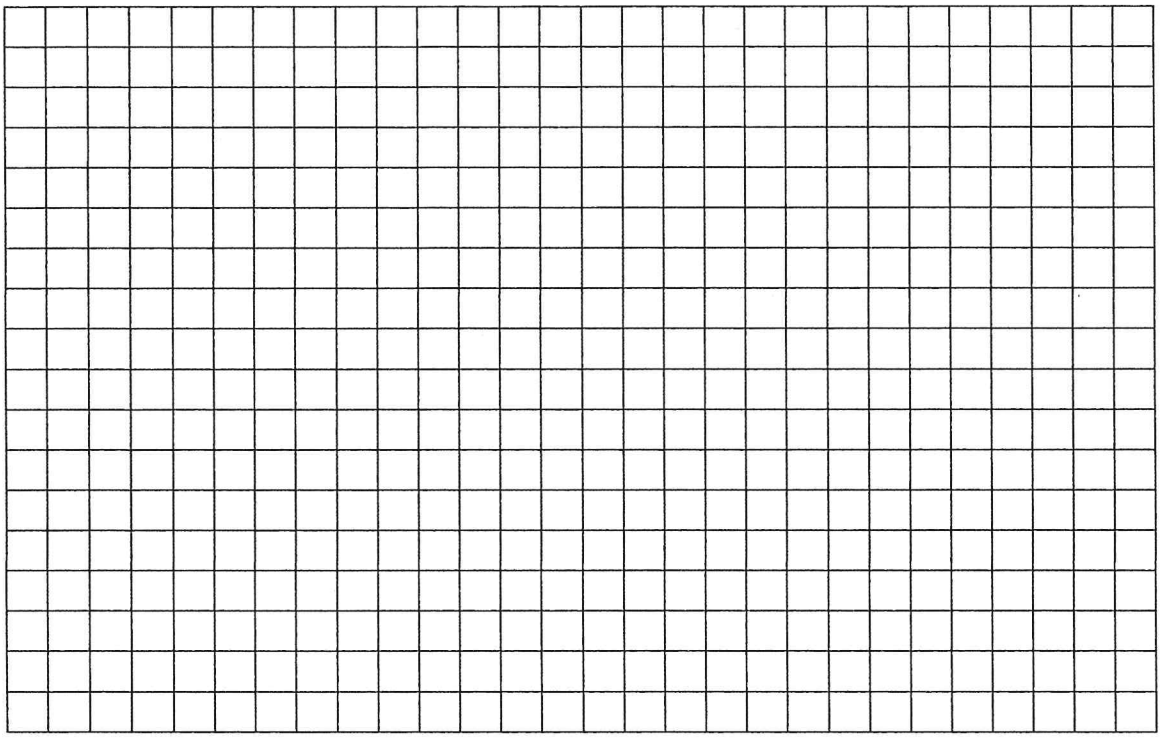
Example 1: Solve $y \leq (x+4)^2 - 1$



∴ The solution is a region _____ the graph of _____

and it _____ the points on this graph.

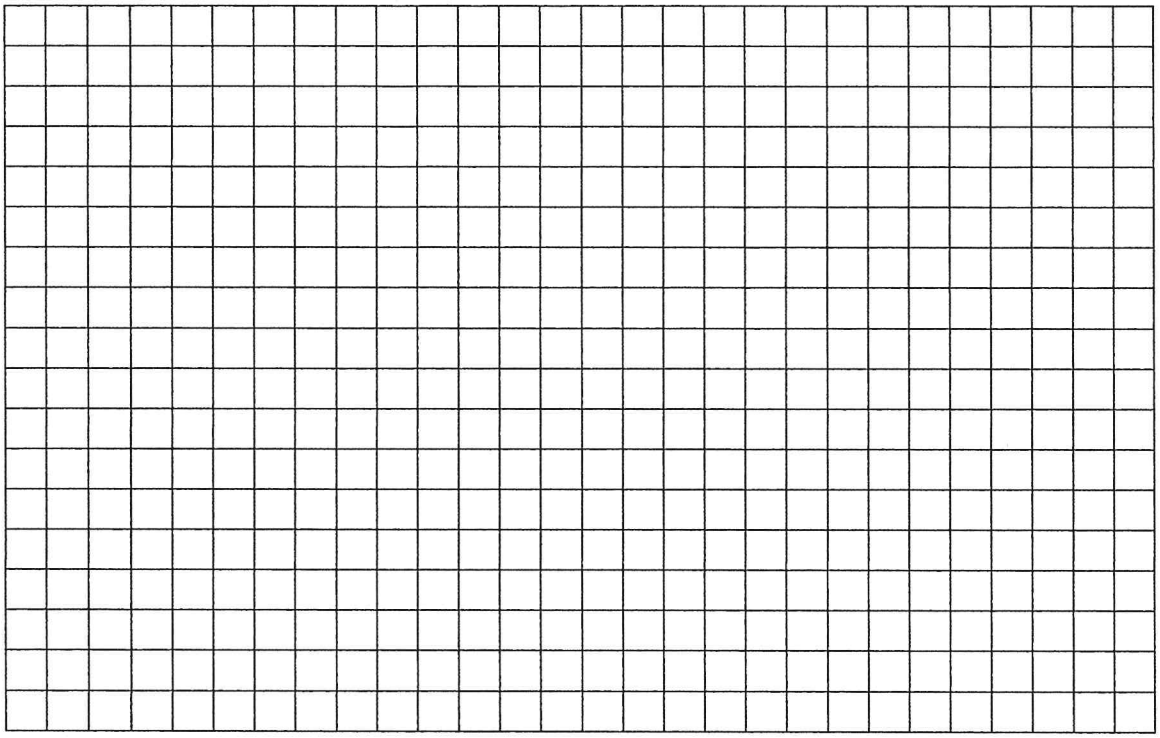
Example 2: Solve $y > -x^2 - 1$



∴ The solution is a region _____ the graph of _____

and it _____ the points on this graph.

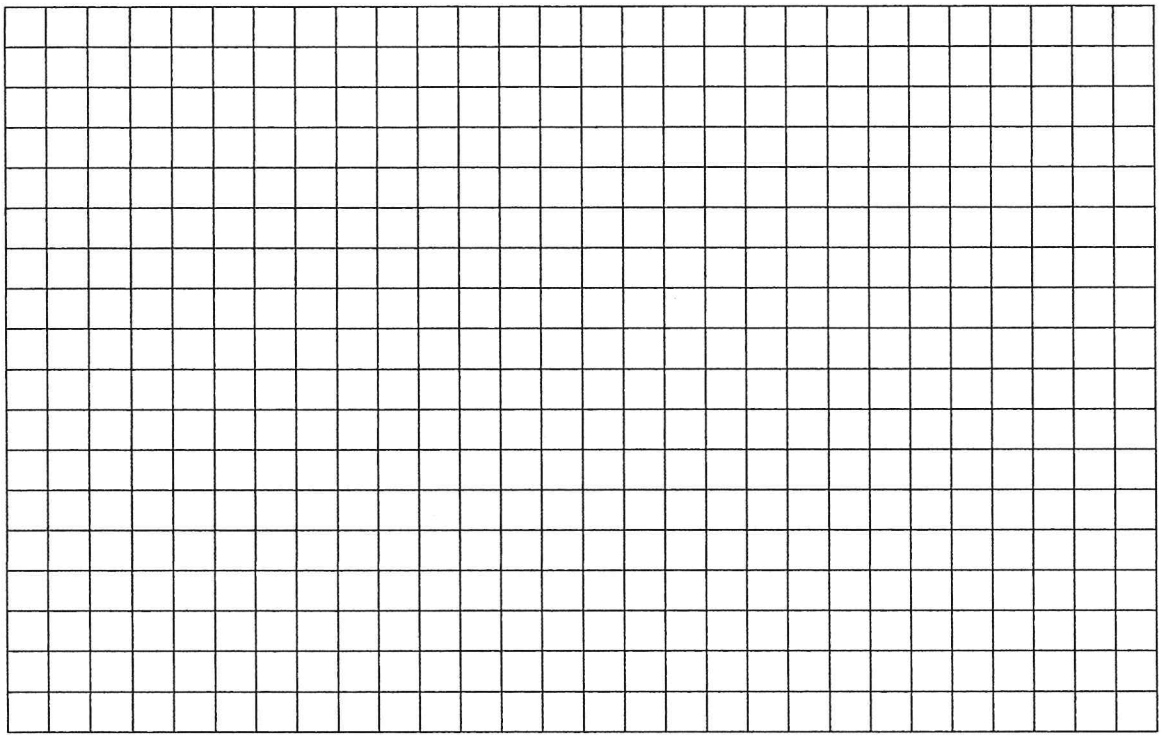
Example 3: Solve $y \geq -2x^2 + 5$



∴ The solution is a region _____ the graph of _____

and it _____ the points on this graph.

Example 2: Solve $y \neq 0.5(x-3)^2 + 2$



∴ The solution is a region _____ the graph of _____

and it _____ the points on this graph.