Graphing Technology Lab

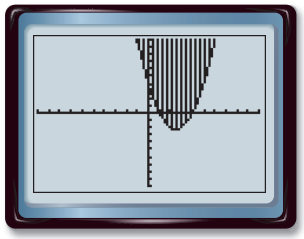
Quadratic Inequalities

Sharp EL-9900C

Graphing quadratic inequalities is similar to graphing linear inequalities. Recall that to shade above or below a graph, a lower boundary and upper boundary must be entered for each inequality. You can use a Sharp EL-9900C graphing calculator to graph quadratic inequalities.

ACTIVITY 1 Shade Inside a Parabola

Graph $y \geq x^2 - 5x + 4$ in the standard viewing window.



[−10, 10] scl: 1 by [−10, 10] scl: 1

First, clear the calculator memory. Then graph $y \geq x^2 - 5x + 4$.

The lower boundary is the related function $y \geq x^2 - 5x + 4$, and the upper boundary is Ymax or 10.

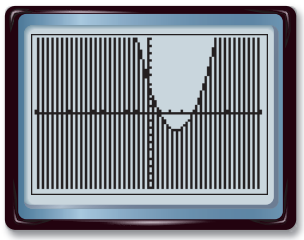
KEYSTROKES: 2ndF [OPTION] ALPHA [E] 2 CL ENTER 2ndF [DRAW] ▶

7: Shade(X/θ/T/n x^2 — 5 X/θ/T/n + 4 , 10) ENTER

All ordered pairs for which y is *greater than or equal* to $x^2 - 5x + 4$ lie *above or on* the line and are solutions.

ACTIVITY 2 Shade Outside a Parabola

Graph $y - 4 \leq x^2 - 5x$ in the standard viewing window.



[−10, 10] scl: 1 by [−10, 10] scl: 1

First, clear the graph that is displayed.

KEYSTROKES: 2ndF [DRAW] ▶ 1: ClrDraw

Then rewrite $y - 4 \leq x^2 - 5x$ as $y \leq x^2 - 5x + 4$, and graph it.

The lower boundary is Ymin or −10 and the upper boundary is the related function $y \geq x^2 - 5x + 4$.

KEYSTROKES: 2ndF [DRAW] ▶ 7: Shade((−) 10 , X/θ/T/n

x^2 — 5 X/θ/T/n + 4) ENTER

All ordered pairs for which y is *less than or equal* to $x^2 - 5x + 4$ lie *below or on* the line and are solutions.

Exercises

1. Compare and contrast the two graphs shown above.
2. Graph $y - 2x + 6 \geq 5x^2$ in the standard viewing window.
   a. What functions are used as the upper and lower bounds?
   b. Name three solutions of the inequality.
3. Graph $y - 6x \leq -x^2 - 3$ in the standard viewing window.
   a. What functions are used as the upper and lower bounds?
   b. Name three solutions of the inequality.