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TEXAS INSTRUMENTS

TI-84 Plus CE

TI-84 Plus CE
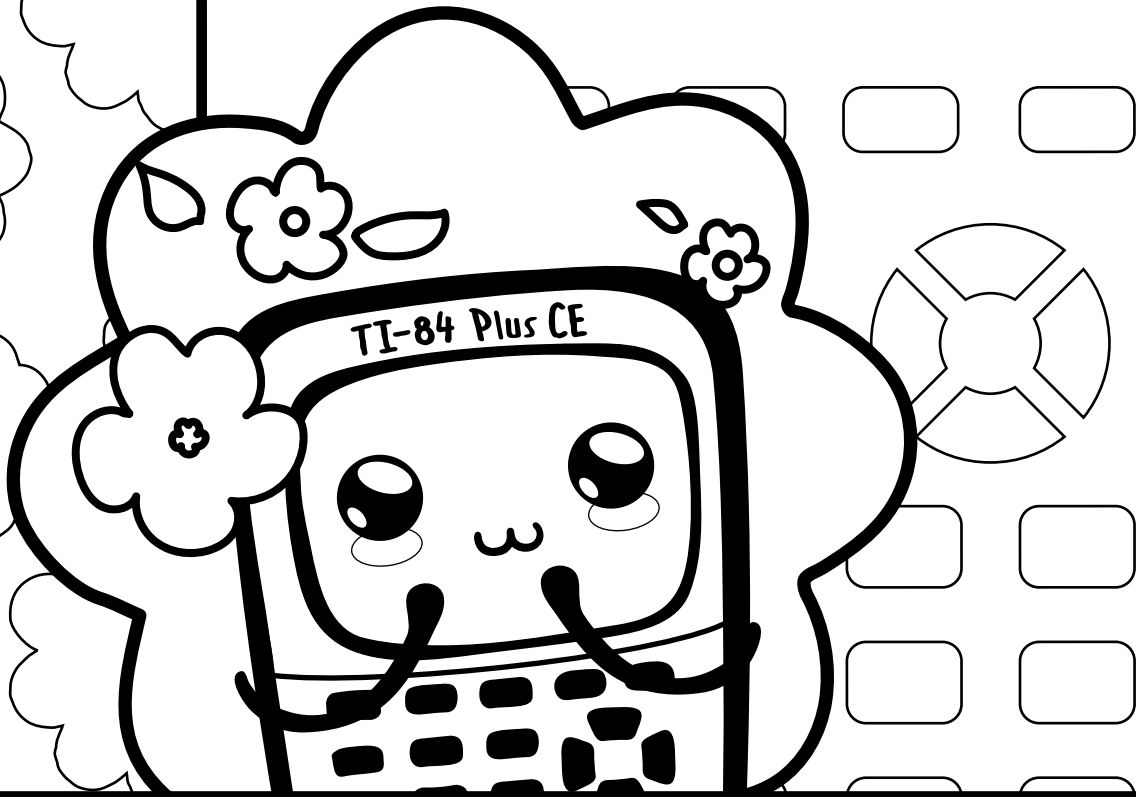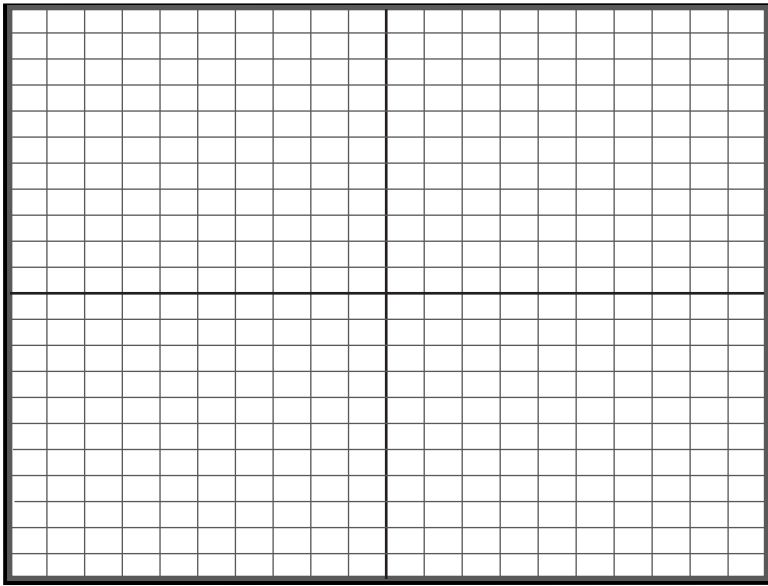
**Use the equations and color key below
to draw a secret image on the graph.**

Magenta

$$f(x) \leq \begin{cases} \sqrt{4-(x+8)^2}+4; & -10 \leq x \leq -6 \\ \sqrt{1-(x+3)^2}+2; & -4 \leq x \leq -2 \\ \sqrt{4-(x-2)^2}+3; & 0 \leq x \leq 4 \\ \sqrt{1-(x-7)^2}+4; & 6 \leq x \leq 8 \end{cases}$$

$$f(x) \geq \begin{cases} -\sqrt{4-(x+8)^2}+4; & -10 \leq x \leq -6 \\ -\sqrt{1-(x+3)^2}+2; & -4 \leq x \leq -2 \\ -\sqrt{4-(x-2)^2}+3; & 0 \leq x \leq 4 \\ -\sqrt{1-(x-7)^2}+4; & 6 \leq x \leq 8 \end{cases}$$

Green

$$f(x) = \begin{cases} -\frac{1}{4}(x+5)^2-3; & -10 \leq x \leq -1 \\ -\frac{1}{6}(x-5)^2-1; & -1 < x \leq 10 \end{cases} \qquad f(x) = \begin{cases} -\frac{1}{4}(x+5)^2-6; & -10 \leq x \leq -1 \\ -\frac{1}{6}(x-5)^2-4; & -1 < x \leq 10 \end{cases}$$

$$f(x) = \begin{cases} -\frac{1}{4}(x+5)^2-4; & -10 \leq x \leq -1 \\ -\frac{1}{6}(x-5)^2-2; & -1 < x \leq 10 \end{cases} \qquad f(x) = \begin{cases} -\frac{1}{4}(x+5)^2-5; & -10 \leq x \leq -1 \\ -\frac{1}{6}(x-5)^2-3; & -1 < x \leq 10 \end{cases}$$

$$f(x) = \begin{cases} (-8x-62); & -8 \leq x \leq -7 \\ (-7x-20); & -3 \leq x \leq -2 \\ (-7x+16); & 2 \leq x \leq 3 \\ (-6x+45); & 7 \leq x \leq 8 \end{cases}$$

**Next, graph the equations on your calculator using the
Inequalities Application. How do your images compare?**
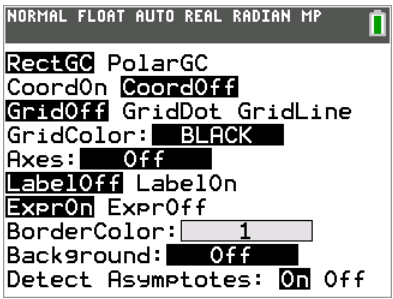
# *Graph your work*

For an uncluttered graph screen:

[2nd] [zoom] (format)

Toggle to and select CoordOff

Toggle to and select GridOff.

Toggle to Axes and select Off.

```
NORMAL FLOAT AUTO REAL RADIAN MP
RectGC PolarGC
CoordOn CoordOff
GridOff GridDot GridLine
GridColor:    BLACK
Axes:        Off
LabelOff LabelOn
ExprOn ExprOff
BorderColor:      1
Background:      Off
Detect Asymptotes: On Off
```

Next, turn on the Inequalities Application: [apps] (angle B) Select: 5: Inequalz
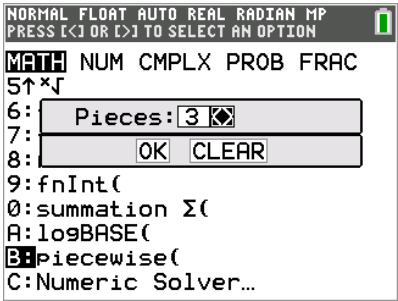

Enter equations into the [y=] (stat plot f1) screen

To change colors and inequality symbols: Arrow left until
the desired Yx = line is outlined with a box. Press enter.
Hint: pay attention to the inequality symbols.

Use the dialogue box to select settings.

```
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS [<] OR [>] TO SELECT AN OPTION
X=  Plot1  Plot2  Plot3  QUIT-APP
 ■\Y1◁
 ■      Color:   NAVY   ◄►
 ■        Y    ≤
 ■      Style:  ▶
 ■         OK  CLEAR
 ■\Y7=
 ■\Y8=
 ■\Y9=
```
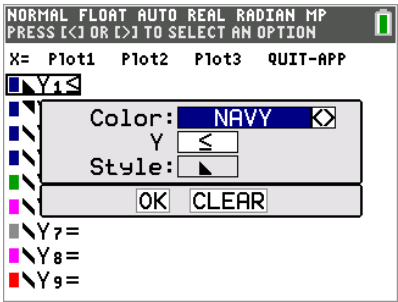
To enter multiple functions in a Yx = row, use the
piecewise template: [math] (test A) Select: B: piecewise(

Use dialogue box to select quantity of pieces per Yx = line.

```
NORMAL FLOAT AUTO REAL RADIAN MP
PRESS [<] OR [>] TO SELECT AN OPTION
MATH NUM CMPLX PROB FRAC
5↑ˣ√
6:     Pieces: 3 ◄►
7:
8:        OK  CLEAR
9:fnInt(
0:summation Σ(
A:logBASE(
B:piecewise(
C:Numeric Solver…
```

Finally, to color in your flowers: [2nd] [trace] (calc f4) ⬦ 2: Inequal Intersection, select magenta

---

[graph] (table f5) your work when all math is entered. Double check your equations.

Spring into math - teacher notes

Hidden image reveal: Sunglasses! Share this image with your students when you see fit.

Reminders: Take note of the inequality symbols on Yx lines to get the proper shaded in areas to produce the designs.

When entering multiple functions per Yx line, use the piecewise template.

The last step to fill in the shape is crucial to get the desired reveal.

Experiment! Using color, line and background settings, how could students make the image their own?

How could they alter the math to make their own designs?