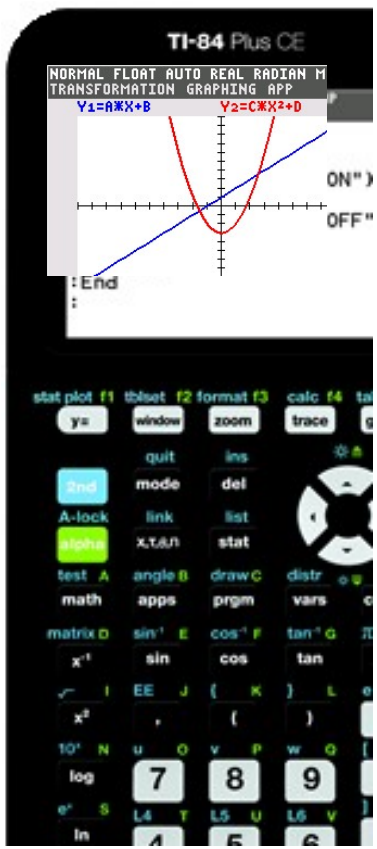

Family of functions using the TI-84 Plus Transformation Graphing App!

Discover features in Transformation Graphing to allow students to create mathematical statements!

Level: Beginner …with a hint of Novice/Advanced

TI-84 Plus CE software will be v5.4

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Texas Instruments

Image: education.ti.com

DESCRIPTION

- Transformation Graphing
  - Discuss the setup of Transformation Graphing App.
  - Explore the App as a modeling and problem-solving tool.
  - Experience using Transformation Graphing App.

- BONUS in these slides
- Images
  - Experience how to place a background Image Var in your graph.
  - Observe how to create your own Image Var.

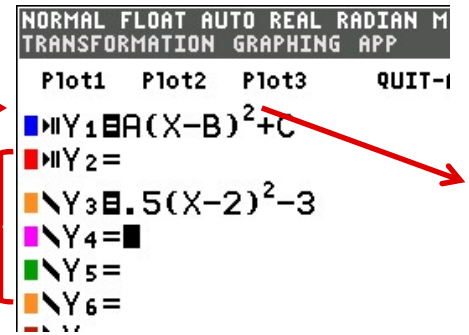
- Piecewise Graphing
  - Discuss piecewise “graphing” on TI-84 Plus
  - Experience piecewise graphing on TI-84 Plus CE.

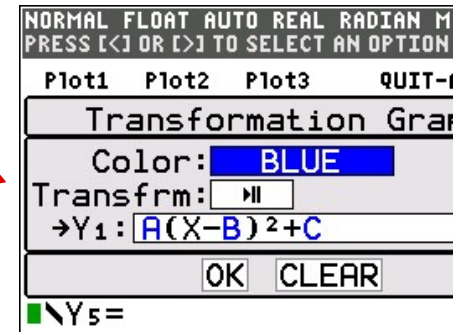
Transformation Graphing CE App v 5.3

TRANSFORMATION GRAPHING APP

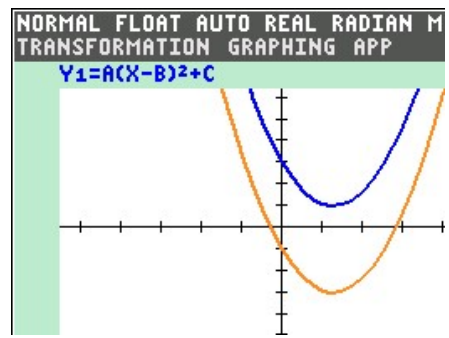
Update on CE

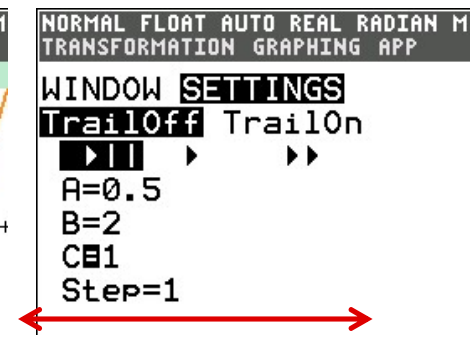
- Two transform functions!
  - Quick paste of common family of functions to YVar.
- Graphs in Y3-Y0 allowed!





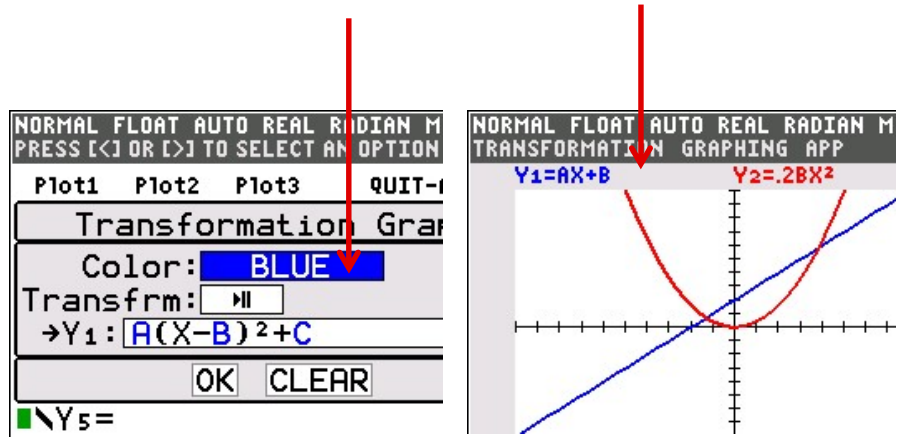
- SETUP now moves from GRAPH to SETTINGS for easy setup.



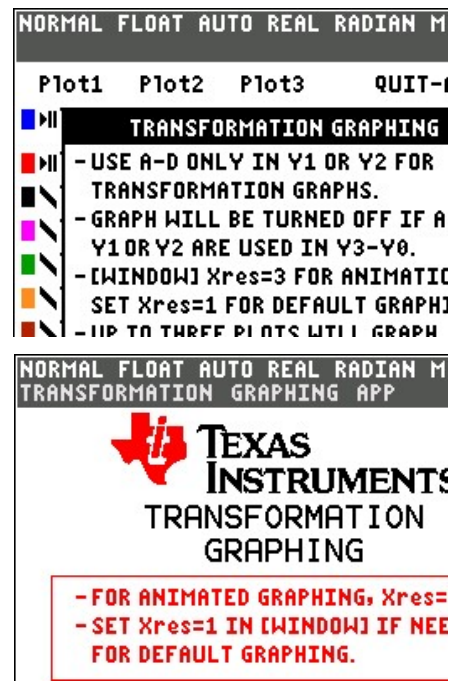


Transformation graphing App TIps

- Two transform functions! (new)
  - Use the new spinner to populate standard functions!
  - Use only A,B,C, and D for transformations (existing)

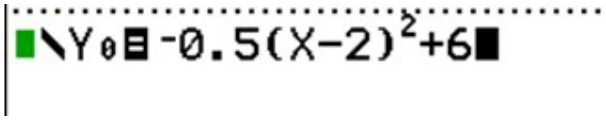


- Graphs in Y3-Y0 allowed! (new)
  - Do not reference Y1 or Y2.
  - Do not use A-D in Y3-Y0. Reserved.

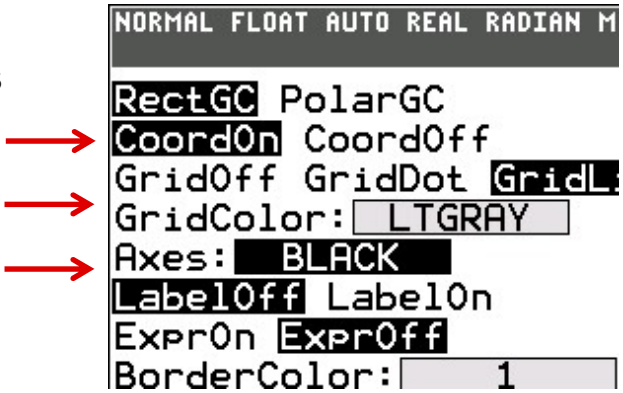


- Launches with Xres=3 vs Xres=1.
  - If Y3-Y0 are not smooth, consider changing Xres = 1 in [window] (default for OS).
  - If Xres=1, any Transformation animations will be slower than Xres=3.
  - Run App only when transformation is needed.

EXPERIENCE I: MATCH THE GRAPH!

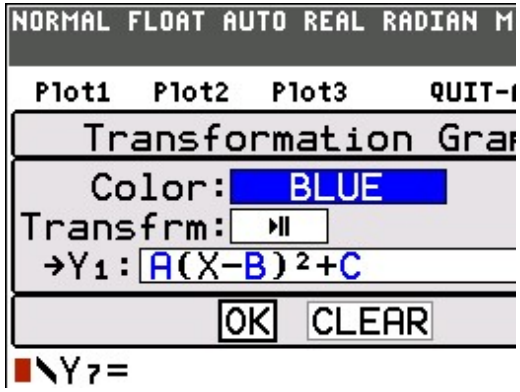


Students will vary the parameters of a quadratic in vertex form to become familiar with how the function (set of points) changes shapes.

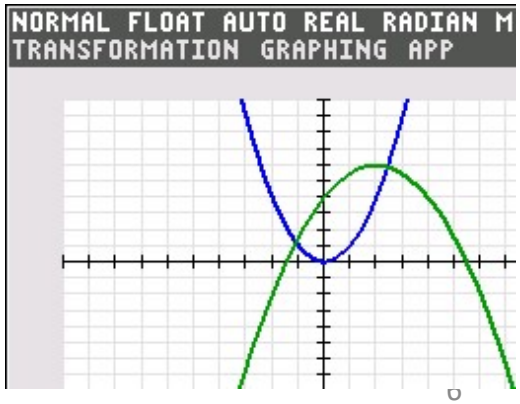


Pre-work setup →

1. From [2nd] [mem] 7:Reset 2:Defaults
2. Enter a graph in Y= <u>off screen</u> in say, Y0.
3. Set up graph format
   1. [2nd] [format] Set ExprOff, add GridLine,
4. Run Transformation Graphing App
   1. [apps] Transfrm
5. [Y=]: Set Y1=A(X-B)^2+C using spinner! Select OK.
6. [graph] [SETUP] (not shown)
   Set up the parent function.
   1. Set A=1, B=0, C=0, Step=0.5



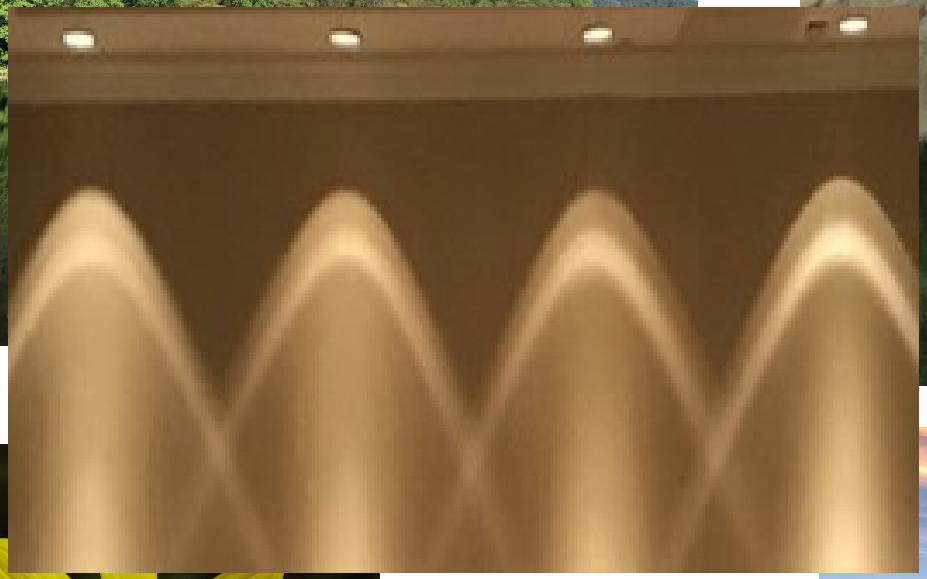
Activity with Discussion → Shift Y1 onto Y0! What questions do you ask? What if/then statements can they say?



Setup TIps in TI-SmartView CE!

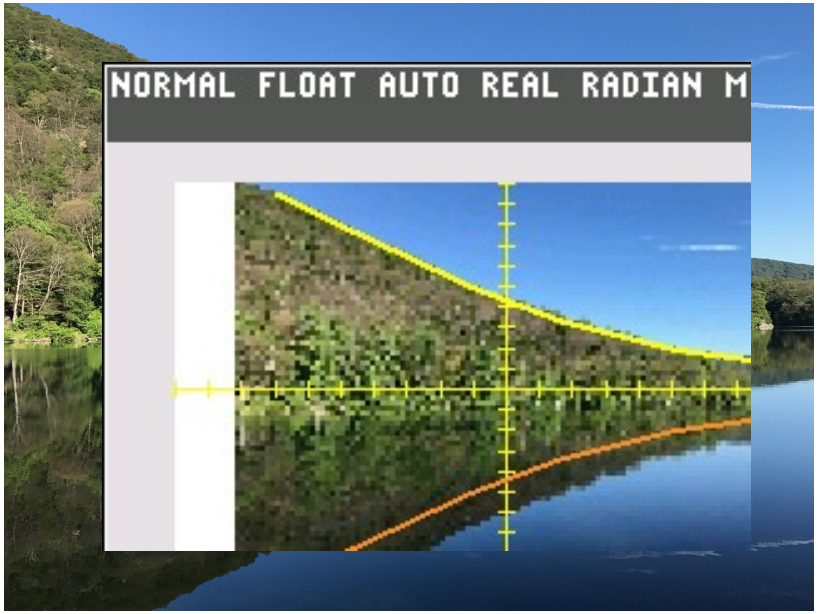
- Save the Emulator State file.
- Reload "state" to start a clean emulator activity.
- Use SmartPad CE App as a keypad for TI-SmartView. (Pre-loaded on CE.)

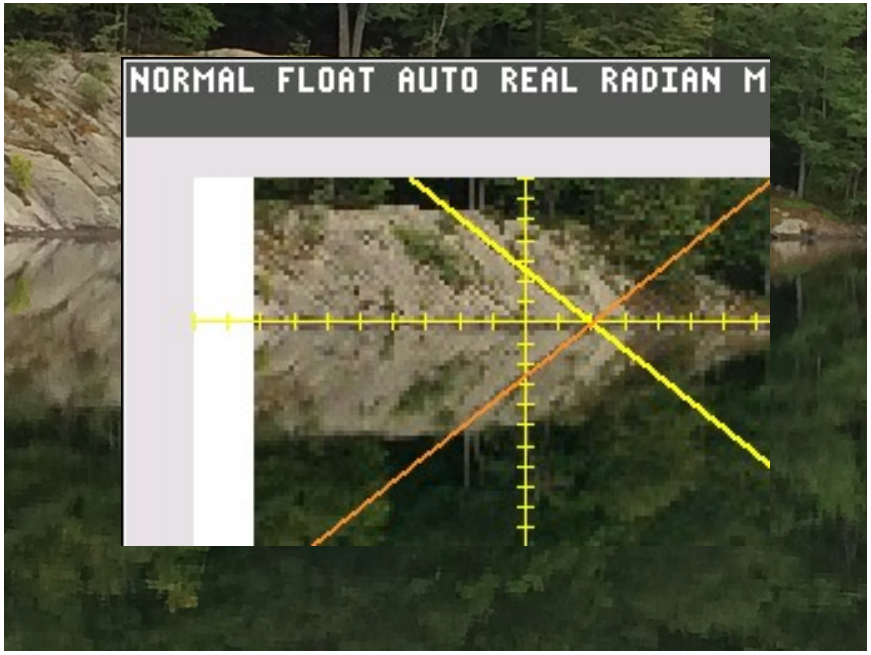
MODEL WHAT WE SEE AROUND US…

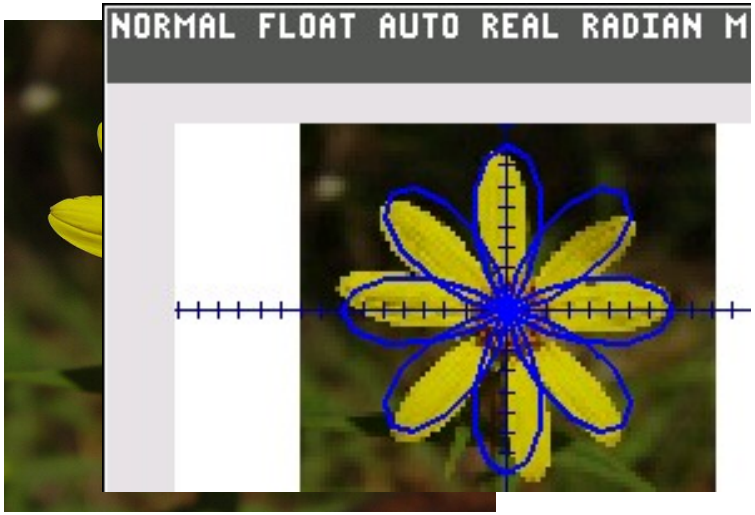


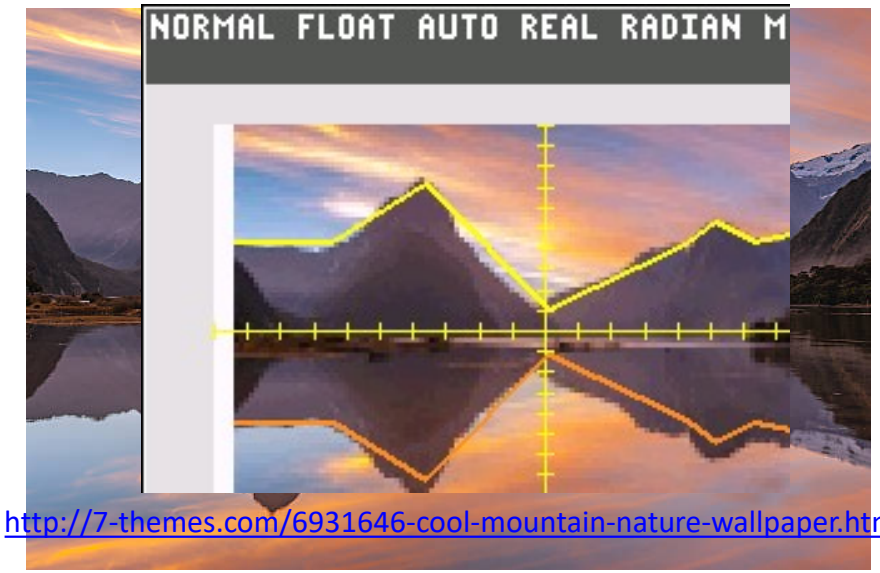
http://7-themes.com/6931646-cool-mountain-nature-wallpaper.html

MODEL WHAT WE SEE AROUND US









http://7-themes.com/6931646-cool-mountain-nature-wallpaper.html

Experience II Match to image

Clean up your calculator.

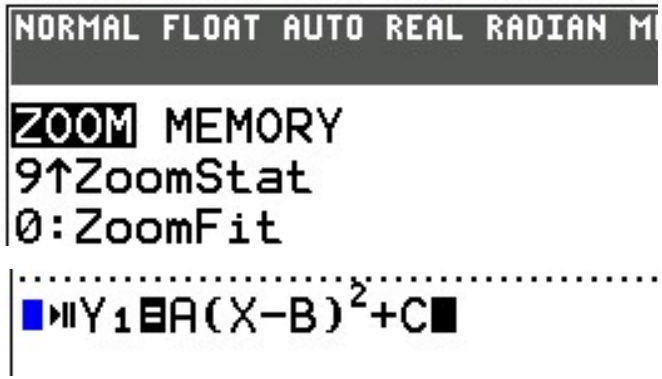
1. [2nd] [mem] 7:Reset 2:Defaults
2. Set up graph format
    1. [2nd] [format] Background Image 0
    2. GridLines select (optional)
3. Run Transformation Graphing App
    1. [apps] Transfrm
4. [Y=] [clear]
5. Set Y1=A(X-B)^2+C using spinner! Select OK.
    1. …an approximation using quadratics
6. [zoom] A:ZQuadrant1
7. [SETUP] Set up parent graph.
    1. Set A=1, B=0, C=0, Step=0.5

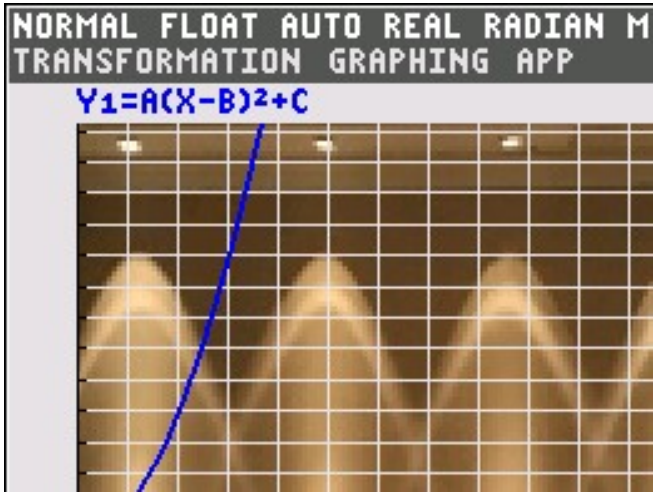
Activity with Discussion →

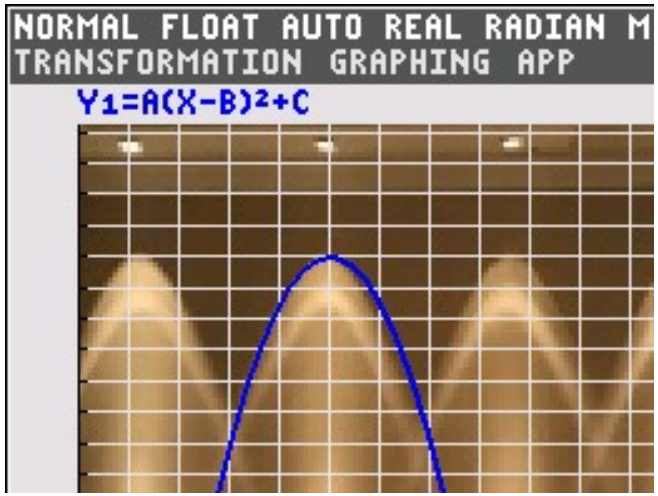
- Shift Y1 onto the image.
- Write down A, B and C.
- Create a Y2 so that Y1 shifts onto another part of the image.
- What questions do you ask? What if/then statements can they say?

Show and Tell Tip!

Use TI Connect CE Screen Capture to display students' work!
Play more with this using Graph-Table [mode] split screen.







EXPERIENCE III MAKE A MOVIE

Clean up your calculator.

1. [2nd] [mem] 7:Reset 2:Defaults
2. Set up graph format
   1. [2nd] [format] Background Image 0
   2. GridLines select (optional)
3. Run Transformation Graphing App
   1. [apps] Transfrm
4. [Y=] [clear]
5. Set Y1=AX+B using spinner! Select OK.
6. [zoom] 6:ZoomStandard then [zoom] *5:Square
7. [SETUP] See screen for setup. TrailOn and a movie!
8. Press [enter] to stop the movie.
9. IMPORTANT Press [SETUP] to change to >|| so the movie stops!

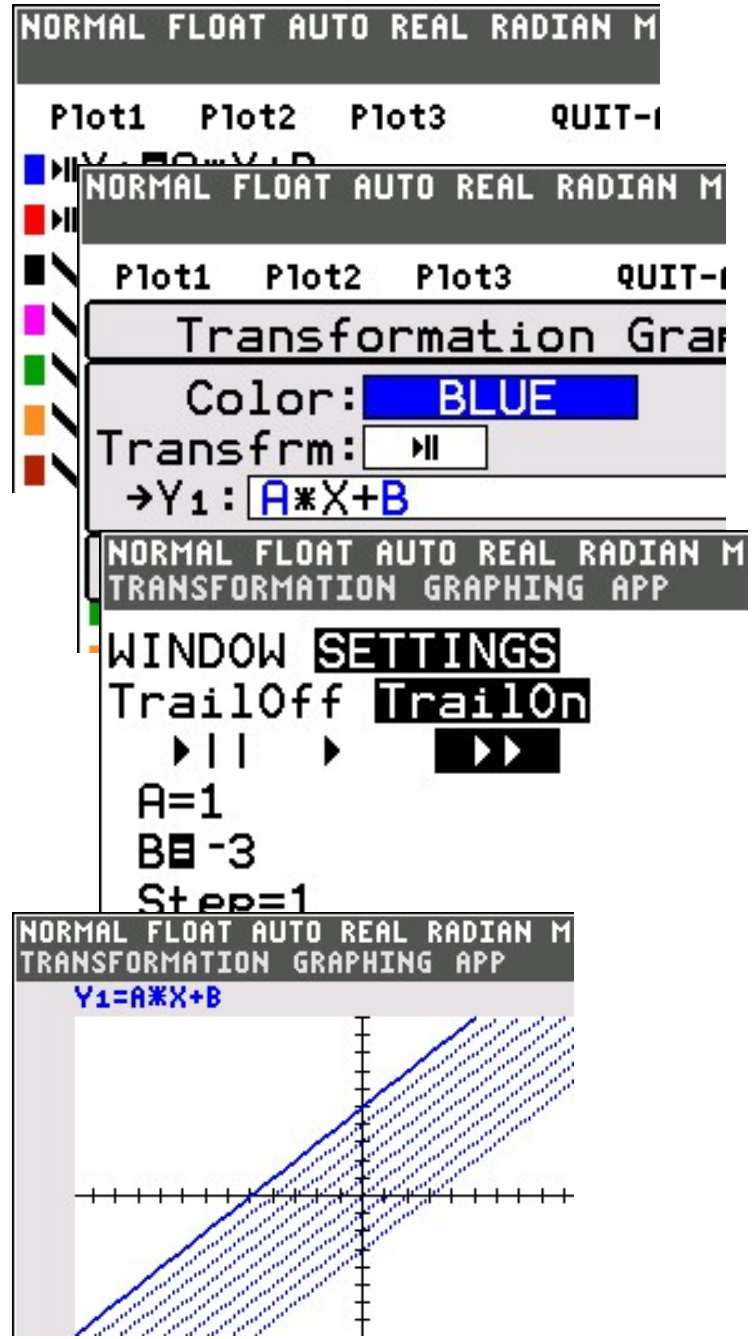
Activity with Discussion →

- When B, the intercept changes, what can you say about the shift of the graph?
- What can you say about the lines? (Parallel?)
- What questions do you ask? What if/then statements can they say?

Show and Tell TIp!

Use TI Connect CE Screen Capture to display students' work!

*Cool TIp to make the ZStandard window setting Square!! Check out [window] and look at the way ZStandard squares off!



BONUS!

How to set a background image in graph

Set up graph format

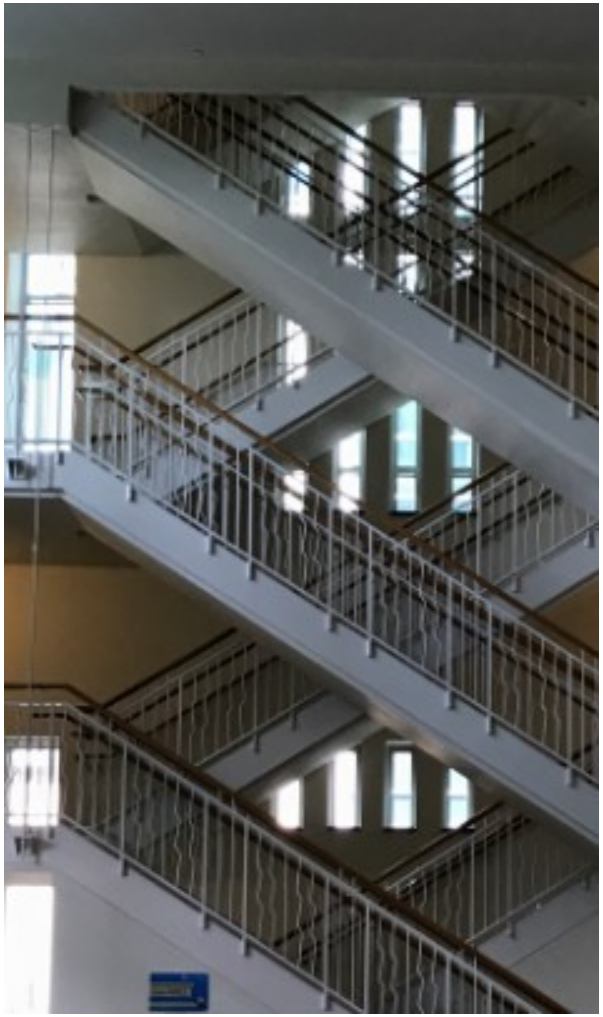
- ❑ Graph Format: [2nd] [format]
  - ❑ GridLine
  - ❑ Axes on/off & color
  - ❑ Background Image or Color

OR From [graph]

- [2nd] [draw] BACKGROUND, select 1:BackgroundOn
- Select Image using the spinner.
- Important!! Press [enter] to set!

[2nd] [draw]

How to create image vars – show & tell



Or G-T dimension 132x82 given the info in TIC CE Help file.

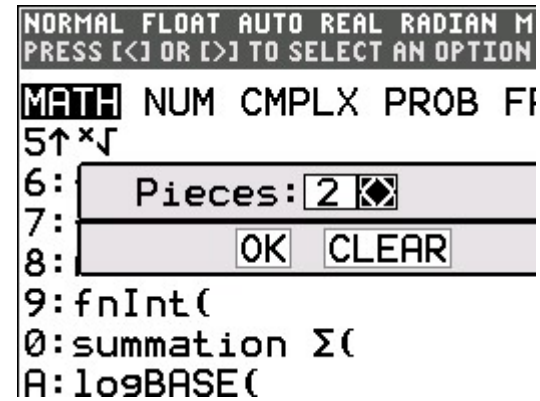
264x164

- ❑ Simple image - not too busy – not too many colors.
- ❑ Crop or scale to same proportion as graph area.
  - ❑ 264x164 pixels (or 132x82 pixels which is the G-T size.)
  - ❑ **TIP:** Use something like PowerPoint to scale your image into a screenshot of the graph screen area (100%).
  - ❑ Drag to size your image over a screen capture of the graph screen so it is the right size.
  - ❑ **Drag so it fits and save a snip!**
- ❑ Save snip to computer as png.
- ❑ Drag image to Emulator Explorer (SV CE) or Calculator Explorer (TIC CE)
- ❑ Select Image# - don't overwrite some image you want to keep! 10 Image Vars allowed.

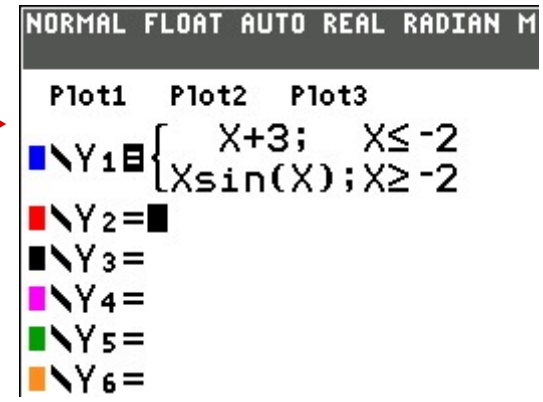
PIECEWISE FUNCTION GRAPHING

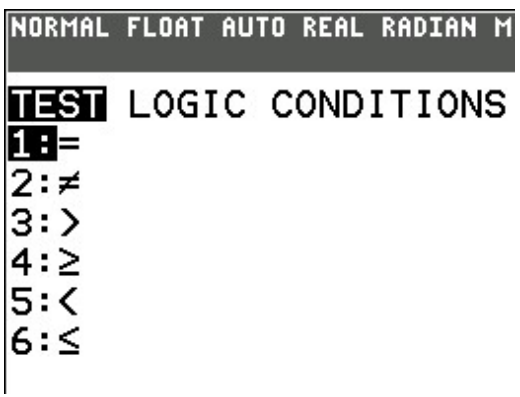
New CE Command; ***(84P uses logical divisors using T/F)***

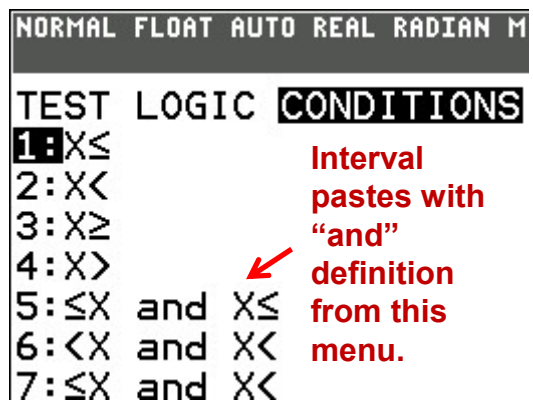
- Piecewise function template to support textbook entry.
  - [math] B:piecewise(
  - Spinner to select 1 – 5 “pieces”



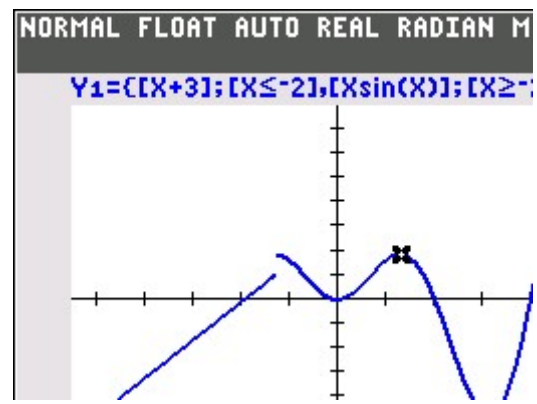
- Enter conditions
  - Use [test] TEST to enter conditions including intervals as a<X<b in textbook notation.
  - Optional: CONDITIONS submenu in [2nd] [test]
    - faster entry of characters and notice use of “and” for interval







Interval pastes with “and” definition from this menu.

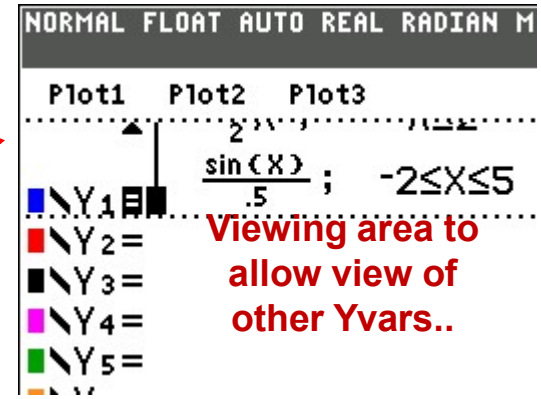


- Allowed in FUNC, PAR, POLAR, and SEQ modes
- Allowed in FULL, HORIZONTAL, and GRAPH-TABLE modes

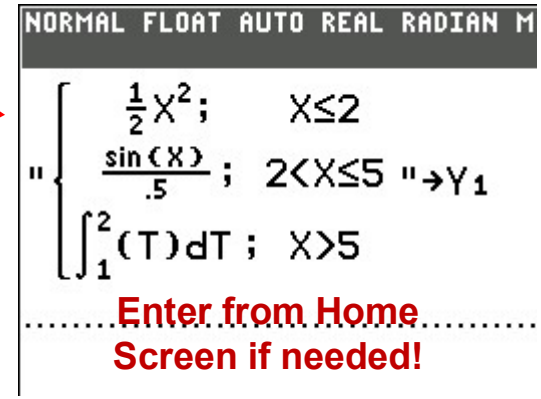
Piecewise Function Entry TIps

How to enter a piecewise function

- Directly in [Y=]
  - Small viewable area to see more YVars.
  - Use [2nd] [test] TEST menu to locate relations.

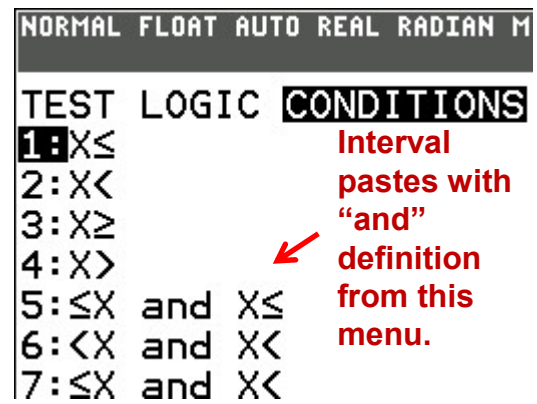


- Optional! Use the **Home Screen** to enter a function.
  - Syntax: "expression" → Yvar
    - Benefit – See a larger view of the function.
    - How to edit?
      - Use [2nd][rcl] to view Yvars on the home screen to edit and store back to Y=.



Optional CONDITION submenu in [2nd] [test] is convenient

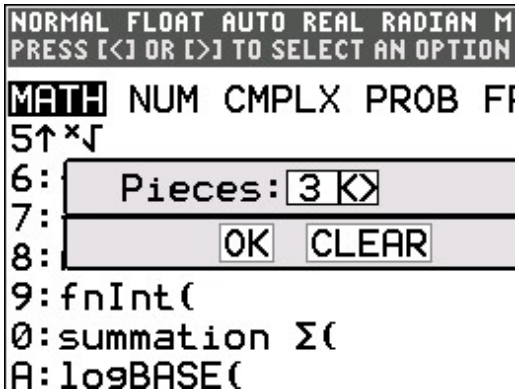
- From the CONDITION menu, an interval will paste with "and" as -2≤X **and** X≤5
- Textbook interval notation, i.e. -2≤X≤5, **is ONLY allowed in the "condition template MathPrint box."**
- **Do not expect** textbook interval notation to "work" outside of the "condition template box." Try it… the Home screen will first evaluate -2≤X for the current value of X as 0 (F) or 1(T) and then either 0 or 1 ≤5 as expected.

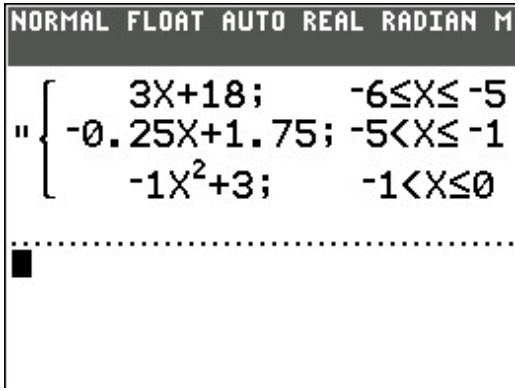


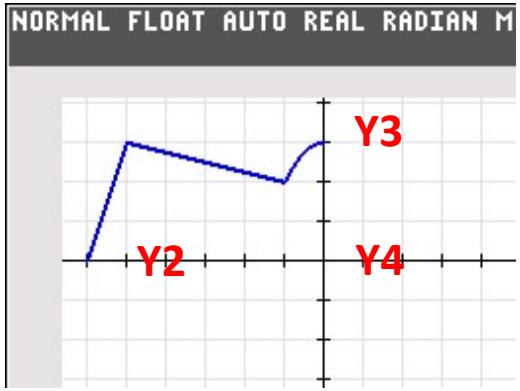
EXPERIENCE III DRAW A SHAPE!

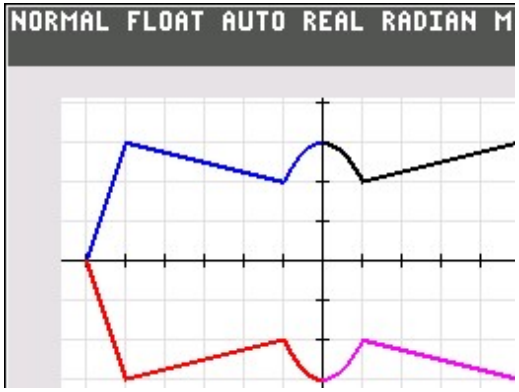
Clean up your calculator.

1. [2nd] [mem] 7:Reset 2:Defaults
2. Quit Transformation Graphing [Y=] QUIT APP
3. Set up graph format
    1. GridLines select (optional)
4. [2nd] [quit] to Home Screen
5. [alpha] ["] (above [+])
6. [math] MATH B:piecewise(
7. Select 3 pieces with OK
8. Enter functions as shown.
9. [graph]









Activity with Discussion →

- Enter Y2 to reflect Y1 about the x axis.
- Enter Y3 to reflect Y1 about the y axis.
- Enter Y4 to reflect Y2 about the y axis.

Show and Tell

Use TI Connect CE Screen Capture to display students' work!

THANK YOU

Be Safe!

Best of Health to All!