

CREATING DESMOS eTOOLS

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Using Desmos

Creating & Using a Desmos Account (Top Black Bar)

Students and teachers would benefit by attaining a Desmos Account in order to save their work and share with others.

EXPLORE:

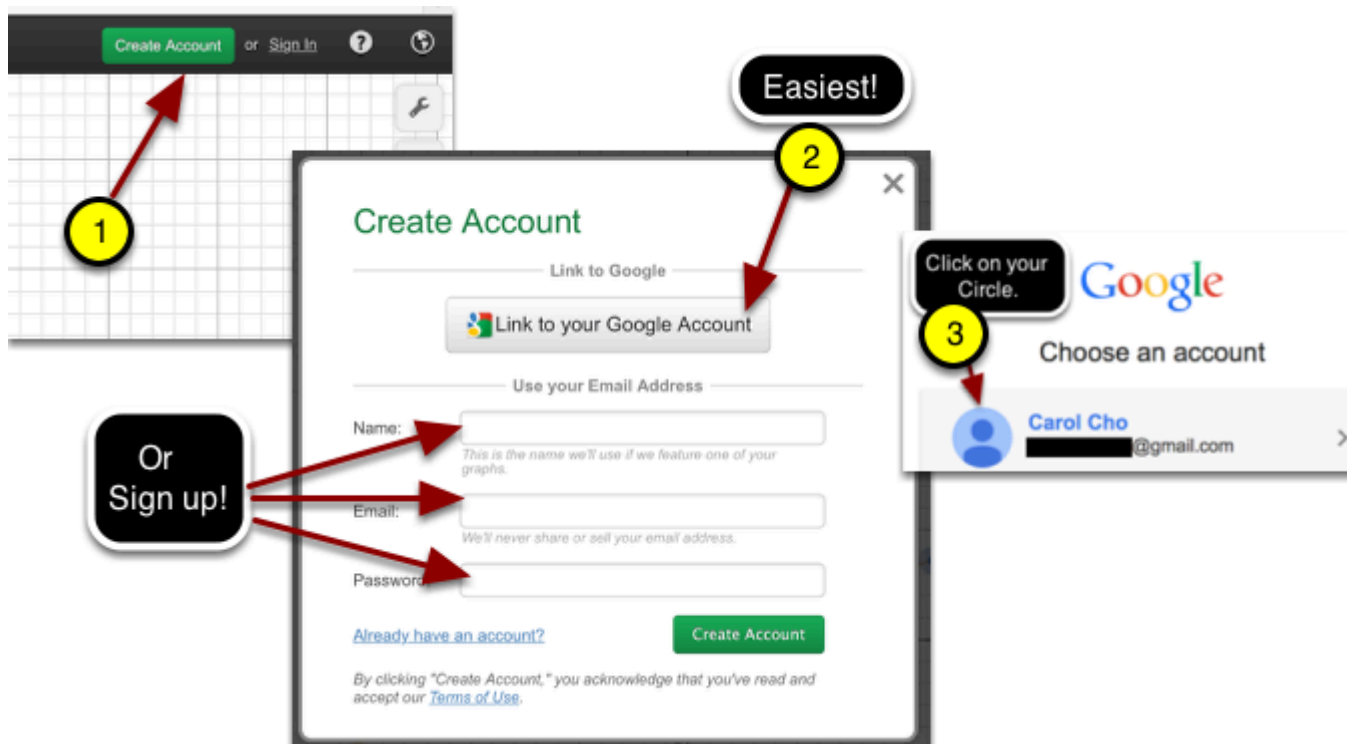
[Desmos Calculator](#)

- Look at the top BLACK bar.
- Click all words and icons on the top bar. What do each do?



TASK: Get a Desmos Account

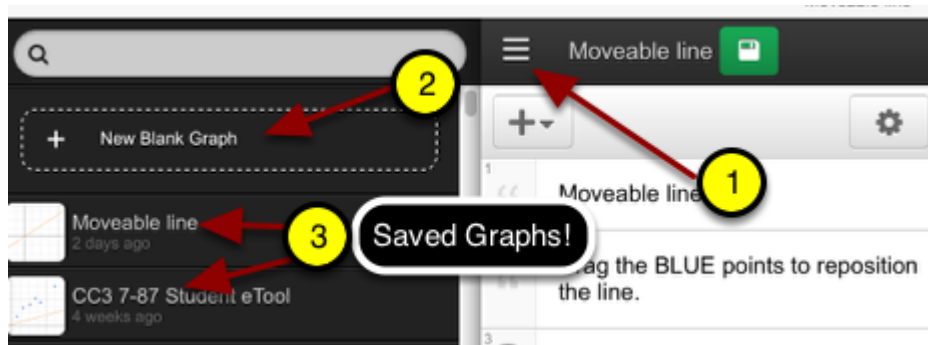
- Click on "Create Account".
- We recommend using your Google Account because it is easy and no new password to remember!
- Or, you can create a Desmos Account.



SAVE:

To access your Saved projects or create a New Blank Graph:

1. Click on the three parallel bars to open and close your saved graphs!
2. Click on any saved project. Then click on the "Open Graph".
3. Click on "New Blank Graph" to create a new graph.



Domain/Range & Axis Labels & Zoom: (Right side Icons)

You will create a graph changing the Domain/Range, adding labels, and zooming in and out.

EXPLORE:

The following is an example of the task you will be doing.

[Time/Distance Graph](#)

Create:

- Modify the file by domain restricting the function so that the graph is between -1 and 10 seconds.
- Scale the y-axis from -50 to 320 feet.
- Add the labels Time and Distance on the x- and y-axis.

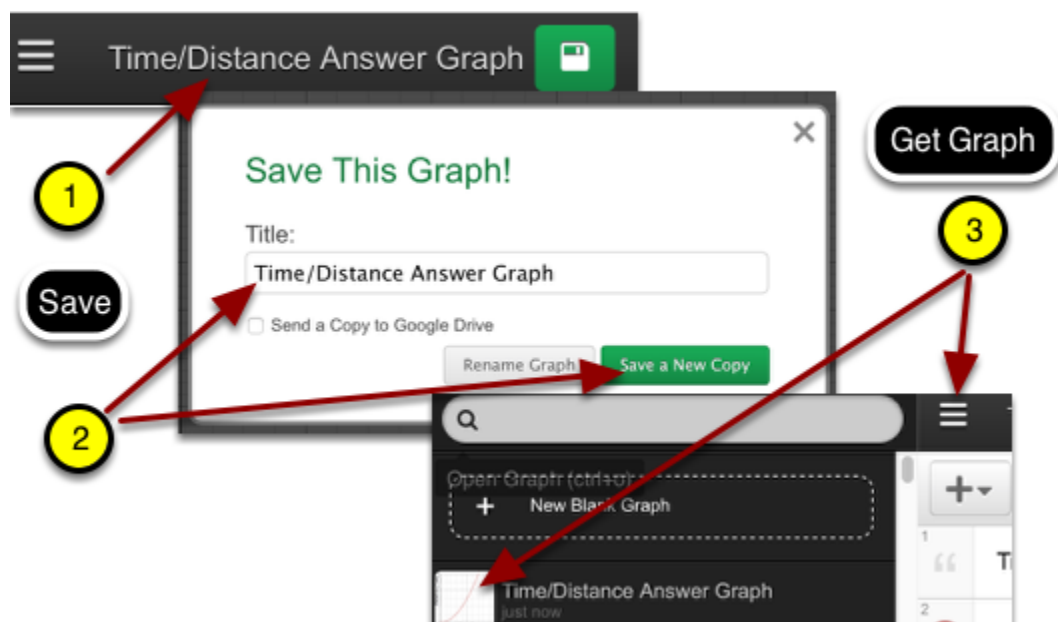
The image shows the Desmos Projector Mode interface. On the left, a control panel has three buttons: 'Graph Settings' (with a wrench icon), 'Zoom' (with '+' and '-' icons), and 'Default Settings' (with a home icon). Red arrows point from these buttons to the right-hand settings panel. The settings panel is titled 'Projector Mode' and contains the following options:

- Graph Paper:** Includes a 'Grid' toggle (checked) and a 'Square Grid' checkbox (unchecked).
- X-Axis:** The label 'Time (seconds)' is entered in the label field. The domain is set to $-1 \leq x \leq 10$ with a step of 1. The 'Show Numbers' checkbox is checked.
- Y-Axis:** The label 'Distance (feet)' is entered in the label field. The range is set to $-50 \leq y \leq 320$ with a step of 50. The 'Show Numbers' checkbox is checked.
- Angles:** 'Radians' is selected over 'Degrees'.

On the far right, a vertical toolbar contains zoom in (+), zoom out (-), and home (house) icons. A red box highlights the wrench icon at the top of this toolbar. A callout box with the text 'Click the down arrows for more options!' points to the green minus icons next to the X and Y axis labels.

SAVE:

- Rename the graph
- Save to your Desmos Account!



Adding Items in the List Tray: (Left Light Gray Bar)

EXPLORE: Click on the "Bar Graph" link below.

Then explore the items in the light gray bar at left!

- Click on the arrow next to the "+" sign. Try each option.
- Click on the arrow in front of "Bar Graph". Then click the Gear icon/"Done" to exit. What is its purpose?
- Click on the "<<" icon twice! What is its purpose?

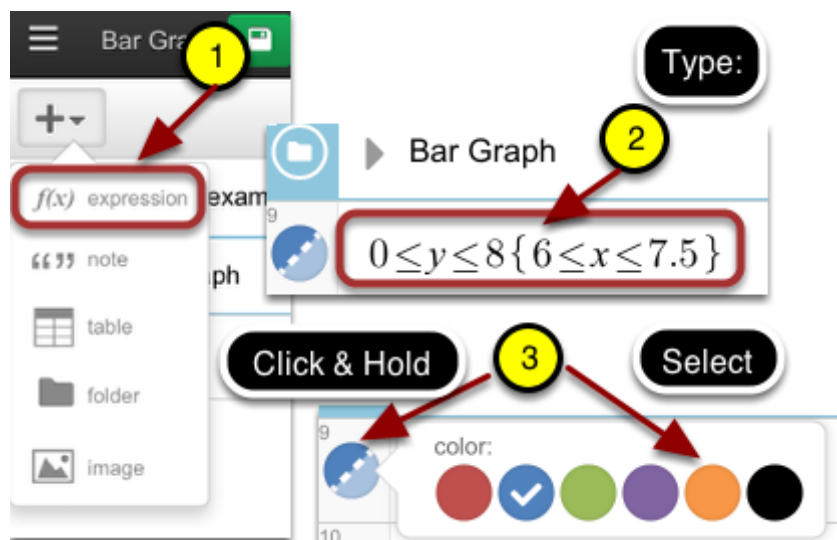
[Bar Graph](#)

CREATE:

- Add a 5th orange bar.
- Make the width 1.5 units and the height 8 units.
- Add an Orange image and position it above the orange bar.
- Add your steps inside the Bar Graph folder.

Step 1: Add the orange bar.

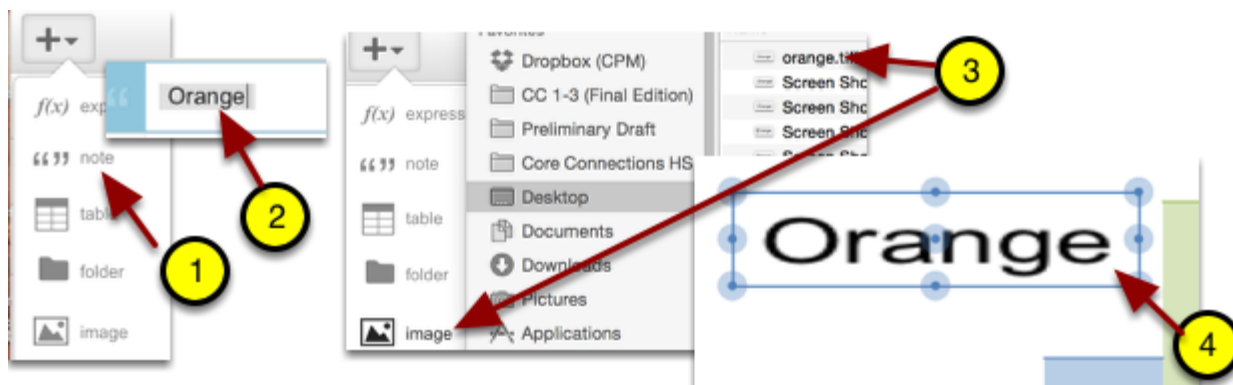
1. Click the "+arrow" button and select "f(x) expression".
2. Type in the function. You may need to access the bottom left key board icon to select from a keyboard.
3. Change color by clicking the BLUE circle. Hold 3 seconds for the color palette to show. Select the orange color.



Step 2: Make the image that says "Orange".

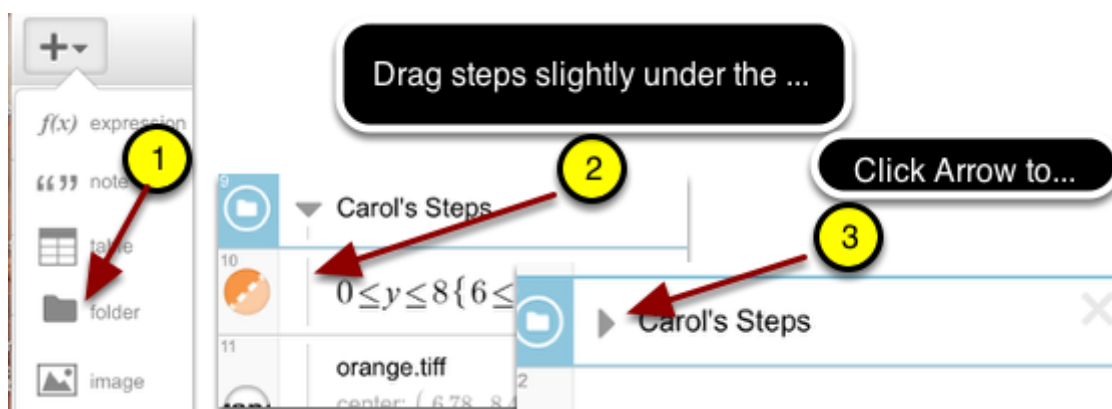
1. Select "Note" from the "+arrow" button.
2. In the new note, type: "Orange". Capture the word using your computer's image capture.
3. Select "Image" from the "+arrow" button. Browse to your image and upload.

- Shrink the image by dragging the bottom right handle diagonally up. Move the image by click/drag from the center.



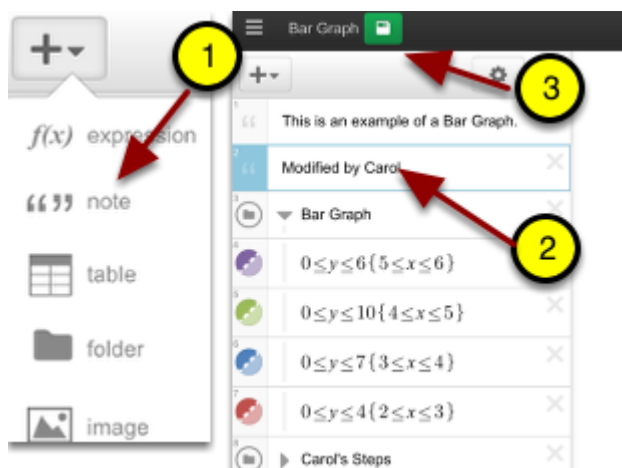
Step 3: Create an additional Folder and move your steps into it.

- Add folder. Name your folder. Drag the folder icon to any place in the list.
- Drag your steps just under each other to add to folder. Vertical lines will appear.
- Click the folder arrow to close.



Step 4: Add a note.

- Select a new Note.
- Type on your note: Modified by <your name>. Position the note by dragging the step up or down.
- Save your work!



SAVE:

1. Click the name of the graph.
2. Rename and Save.
3. Find the graph under the 3 parallel bars!



Create a Moveable Line Using a Moveable Point

EXPLORE:

In the example below:

- Drag the BLUE points.
- Drag along the line.
- Drag the grid.
- Click the arrow in front of "Line" in step 3 to view how this is created!

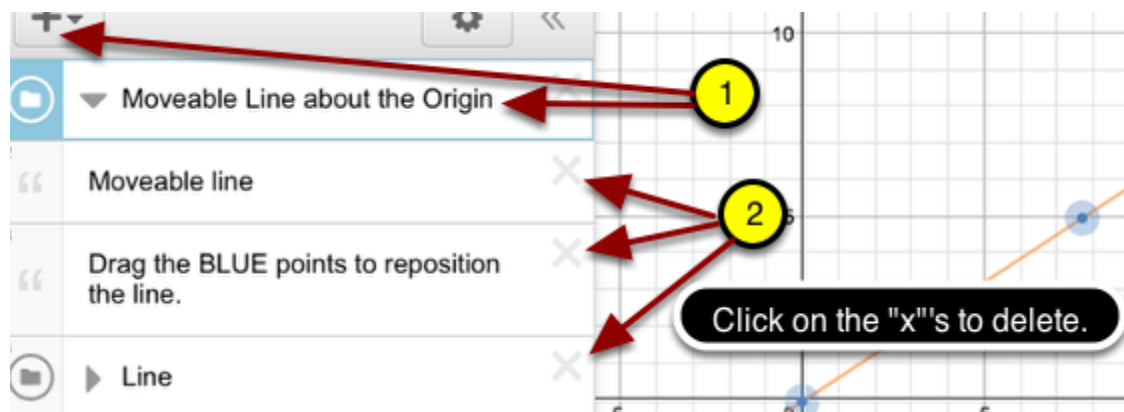
[Moveable Line](#)

Create:

Create a line with a stationary point at (0,0) and a moveable point which allows the user to pivot the line about the origin thereby changing the Slope.

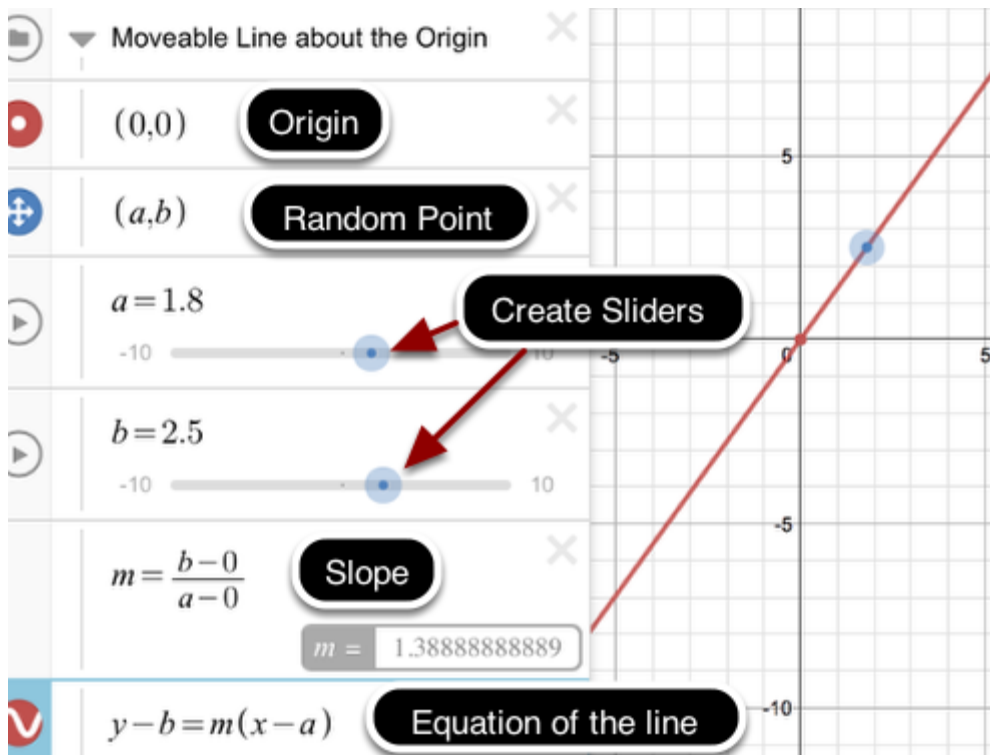
Step 1:

1. Add a new folder from the "+" menu and name it such as "Moveable Line about the Origin"
2. Delete the current lines so that you do not repeat variable names.



Step 2:

- Type the following steps without the comments in the ovals.
- The sliders are automatically created when clicking "add sliders" ALL!



SAVE:

- Click on the "Moveable line" to resave!
- Rename the graph.
- Click on "Save a New Copy".



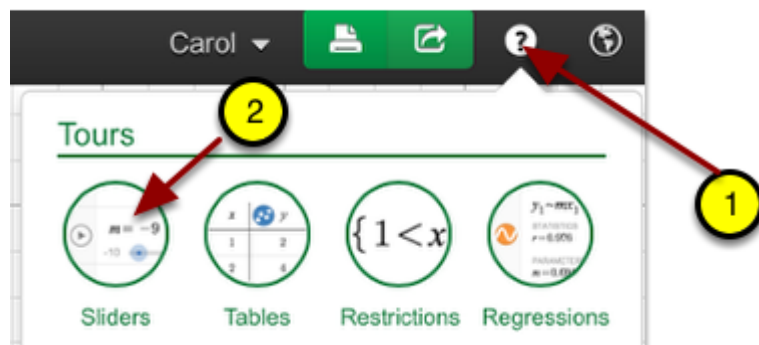
Creating Sliders

EXPLORE:

[Create Sliders](#)

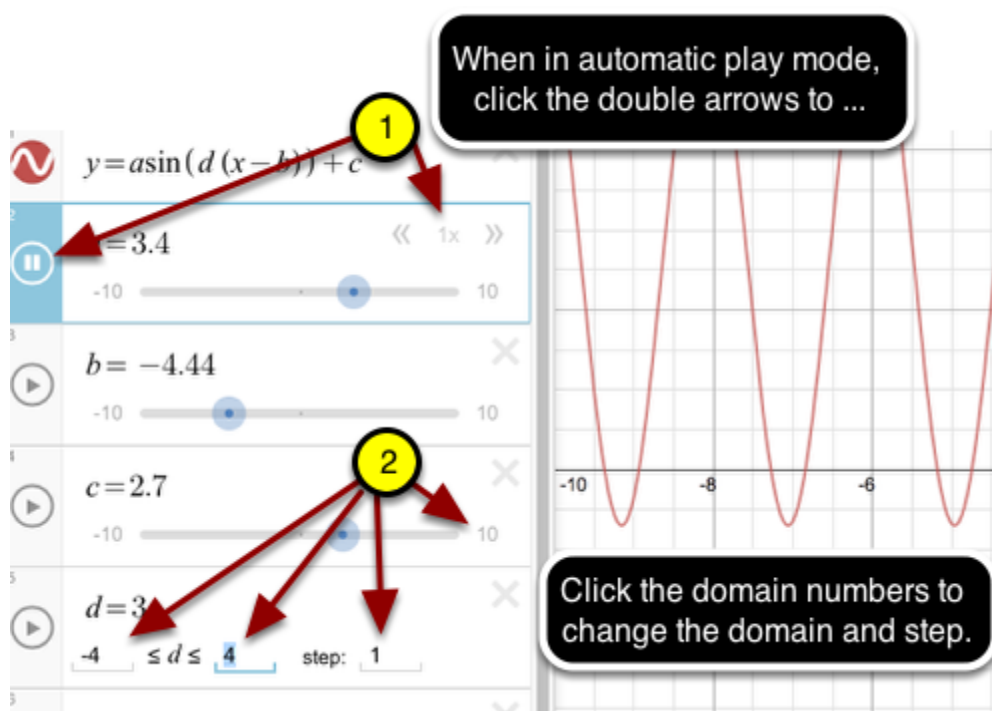
Desmos has a built in tutorial for sliders:

- Click the "?".
- Click Sliders.
- Follow all of the steps in the tutorial!



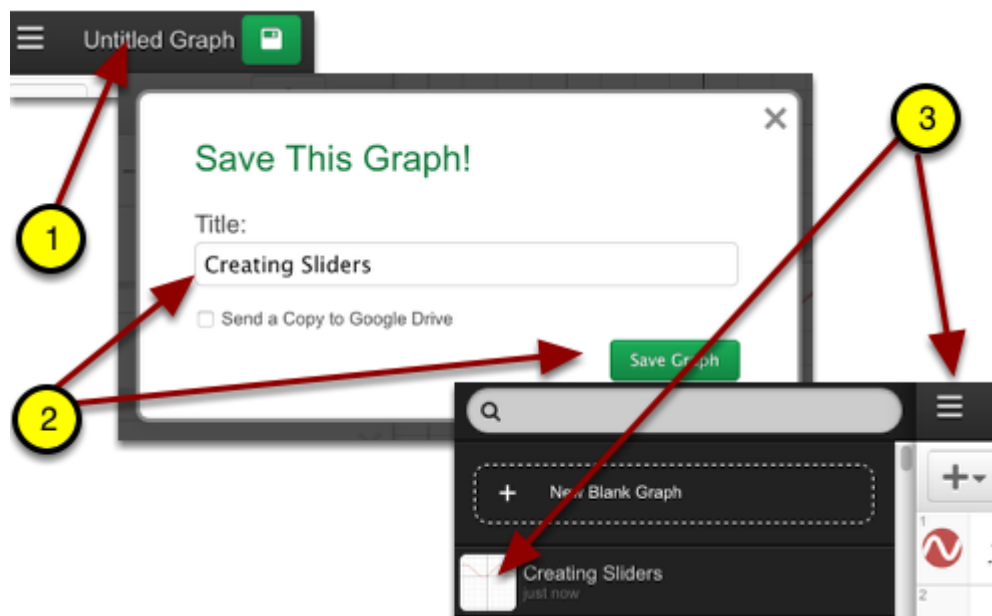
Create:

- Type the equation: $y = a \sin(b(x-c)) + d$
- Add ALL sliders.
- Manually or automatically move the sliders!
- Change the speed when on automatic!
- Change the domain/step of the sliders.



Save:

1. Click "Untitled Graph"
2. Name and "Save Graph".
3. Click the 3 parallel bars to access the file.



Creating Tables

EXPLORE:

Use the following "New Blank Desmos Graph" to complete the work below.

[New Blank Desmos Graph](#)

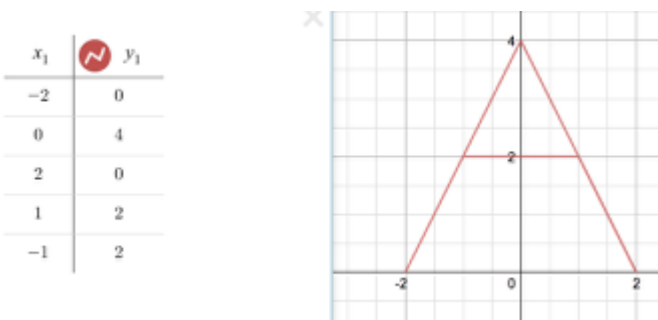
1. At the upper right corner, click the "?".
2. Click "Tables". Follow the directions.
3. Note: When clicking the circle next to "y", try the other submenus.)

The screenshot shows the Desmos interface with the 'Tables' menu open. A red arrow points to the '?' icon in the top right corner, labeled with a yellow circle '1'. Another red arrow points to the 'Tables' icon in the 'Tours' section, labeled with a yellow circle '2'. A third red arrow points to the 'y' icon in the 'Tables' menu, labeled with a yellow circle '3'. A tooltip titled 'Last trick!' says 'Click and hold on this icon until the options menu opens up.' Another tooltip says 'Click here to connect the dots.'

x_1	y_1
1	4
2	4
3	5
4	6
5	7

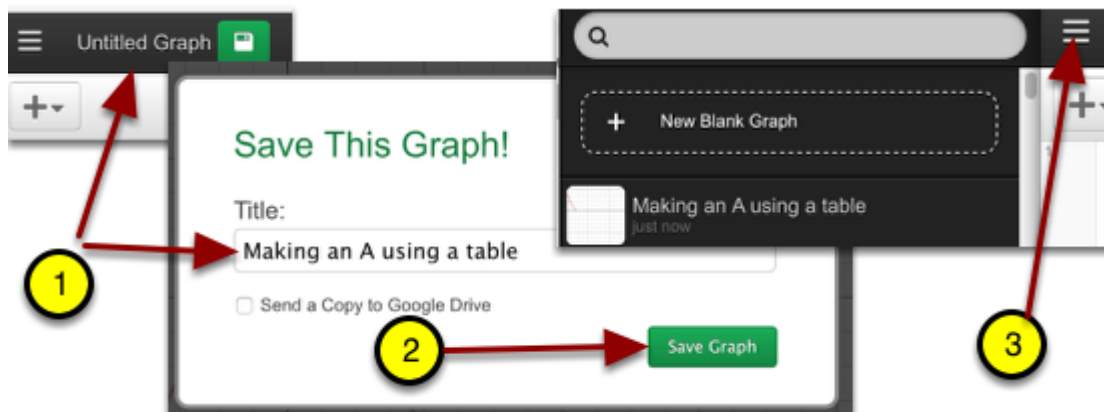
CREATE:

- Create one of the letters in your initials!
- Be sure to connect your points!
- An example for "A" is below!



SAVE:

- Click on the Untitled Graph on the upper left corner. Add a title.
- Click "Save Graph".
- Check your saved list for the file.



Creating Tables: Scatter Plots

EXPLORE:

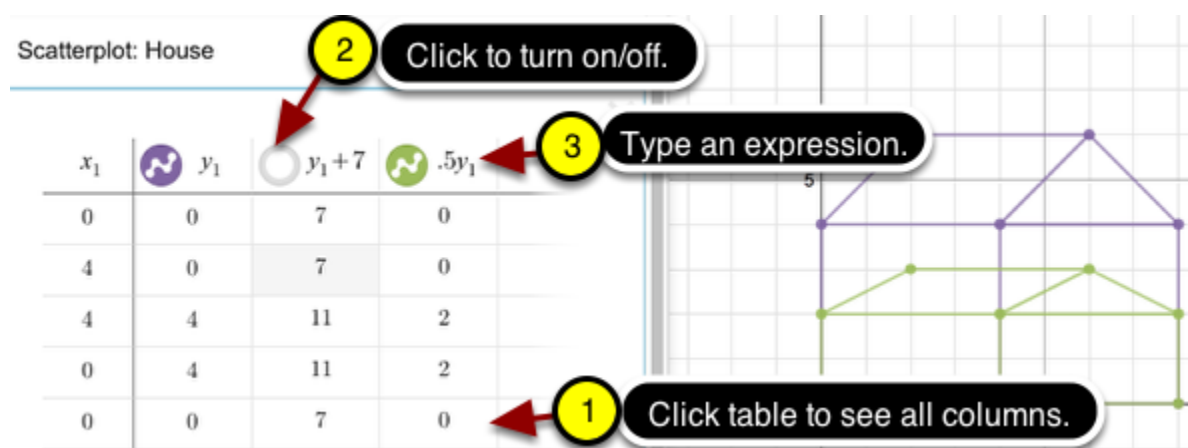
- Click on the link below.
- Scroll down watching the animation showing how to create scatter plots.

[Scatter Plots](#)

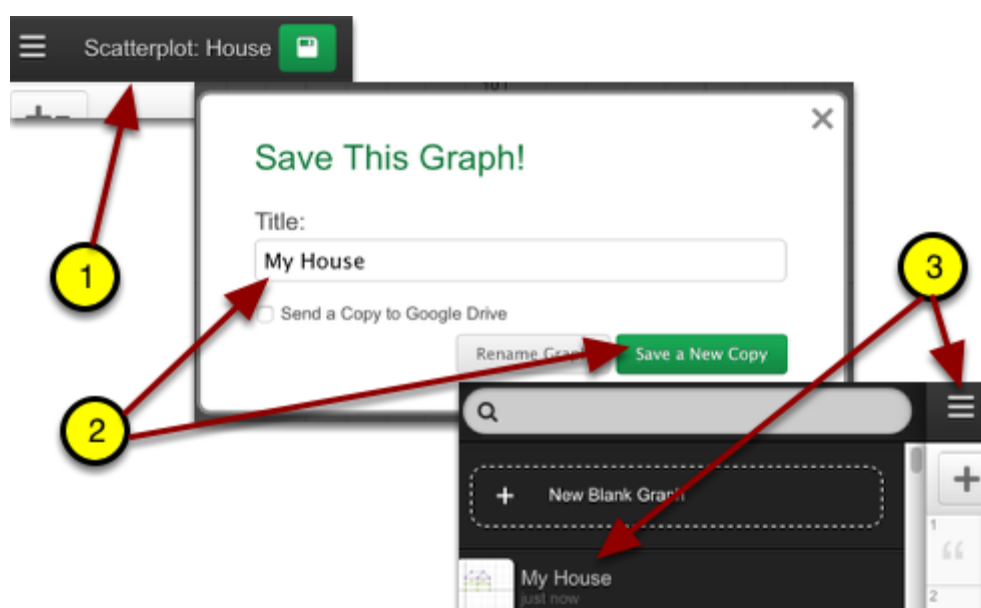
CREATE:

[Scatter Plots: House](#)

1. Click the table so that all columns show.
2. Click the white circle in the 2nd column. An orange house will appear above the purple house.
3. Click just after the green circle in the 3rd column to select the column. Type: $.5y_1$



SAVE:



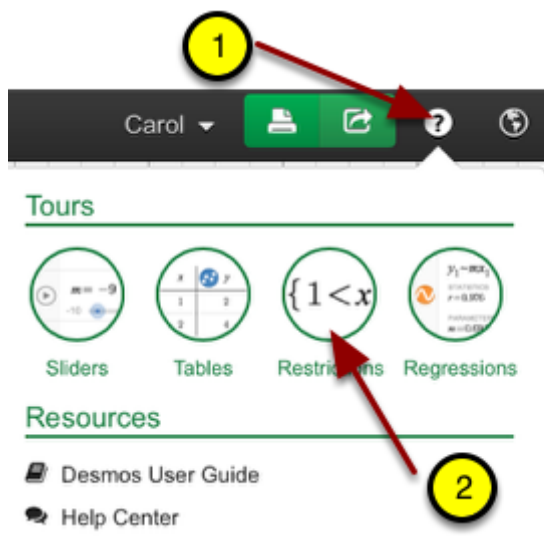
Restricting Domain and Range

EXPLORE:

Click on the list below.

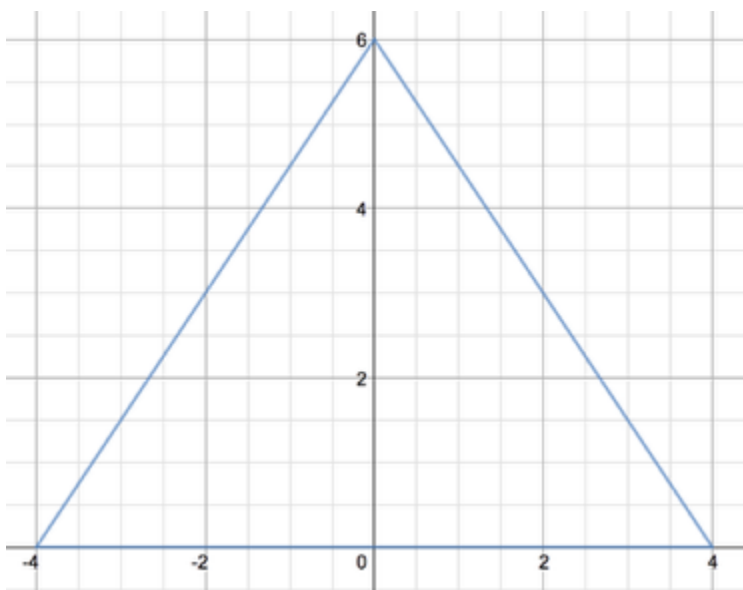
[Restricting Domain and Range](#)

- Click on the "?" at the upper right of Desmos.
- Click on "Restrictions". Follow the tutorial.



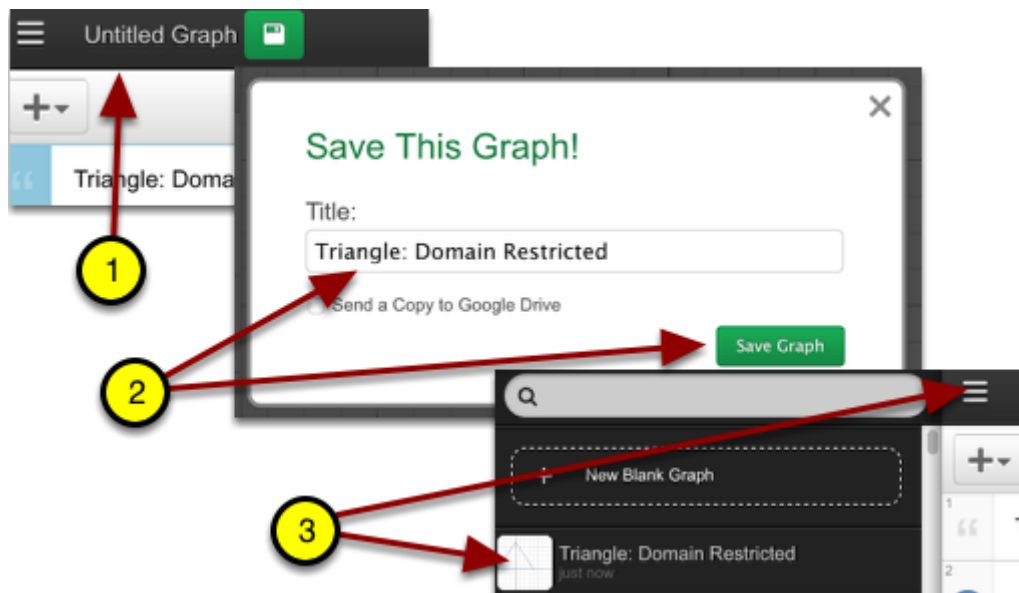
CREATE:

- Add 3 domain restricted equations to draw the triangle below.
- Do NOT use a table.



SAVE:

1. Click Untitled Graph.
2. Rename and "Save Graph".
3. Click the 3 parallel bars to access saved graph.





Geometry

Create a Rigid Moveable Shape

EXPLORE:

- Click on the link below.
- Move the shapes about.
- Look at the expressions under the arrow for several shapes.

[Moveable Shapes](#)

CREATE:

- Create a moveable "L" or other letter of your choice!
- Follow the two steps below.

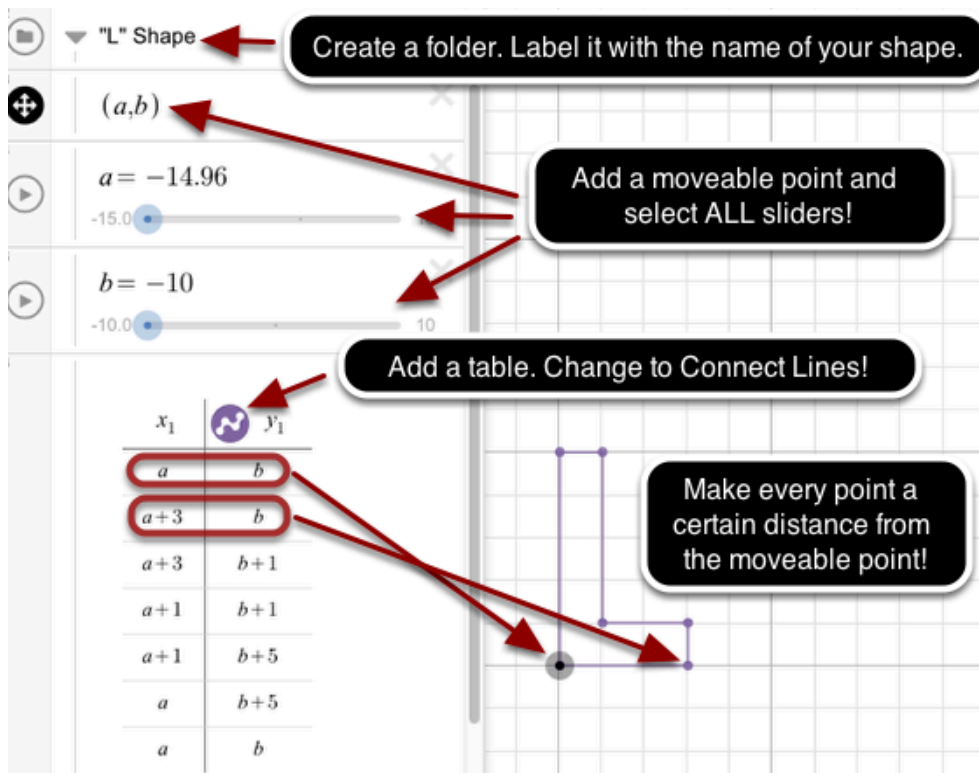
Step 1:

- Delete all of the shapes before starting your own.
- Add your own title or notes.



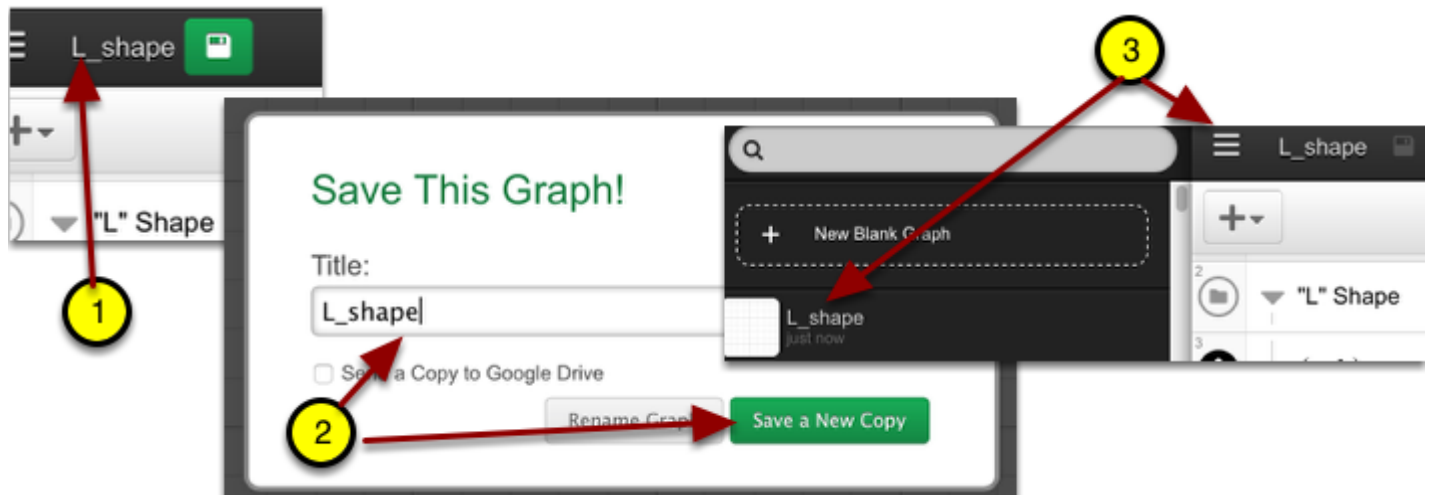
Step 2:

- Follow the steps below to create an "L". Or be creative and make your own shape!
- Add a table. Be sure to click the circle in front of the output and change it to connect lines!



SAVE:

1. Click the name next to the GREEN SAVE BUTTON.
2. Rename & Save.
3. Click the 3 parallel bars to access the saved file in the future.



Create Polygons

EXPLORE:

- Click on the link below.
- Move each vertex. How many different quadrilaterals can you form?
- Click the arrow on the folder and investigate the table and the moveable point.

[Create Quadrilaterals](#)

CREATE:

- Resave the file and call it "Create Polygons".
- Add two more folders. Name the first: 3-Sides (Triangles). Name the second: 5-Sides (Pentagons)
- Below are the expressions and table to add to the 3-Sides (Triangles) folder.
- Add similar expressions and table to add to the folder for pentagons.

The screenshot shows a Desmos workspace with the following elements:

- Table:** A table with columns P_{3x} and P_{3y} . The rows contain the values x_3 , 4, 6, and y_3 .
- Point:** A point labeled (x_3, y_3) is shown on the grid.
- Menu:** A menu is open, showing options for style, drag, and color. The style options include a green circle with a wavy line. The drag options include a green circle with a plus sign. The color options include a green circle with a checkmark.
- Annotations:**
 - A black box with white text says "Hold the green circle until the menu shows." with an arrow pointing to the green circle in the table.
 - A black box with white text says "Connects points" with an arrow pointing to the green circle with a wavy line in the menu.
 - A black box with white text says "Points move vertically and horizontally." with an arrow pointing to the green circle with a plus sign in the menu.

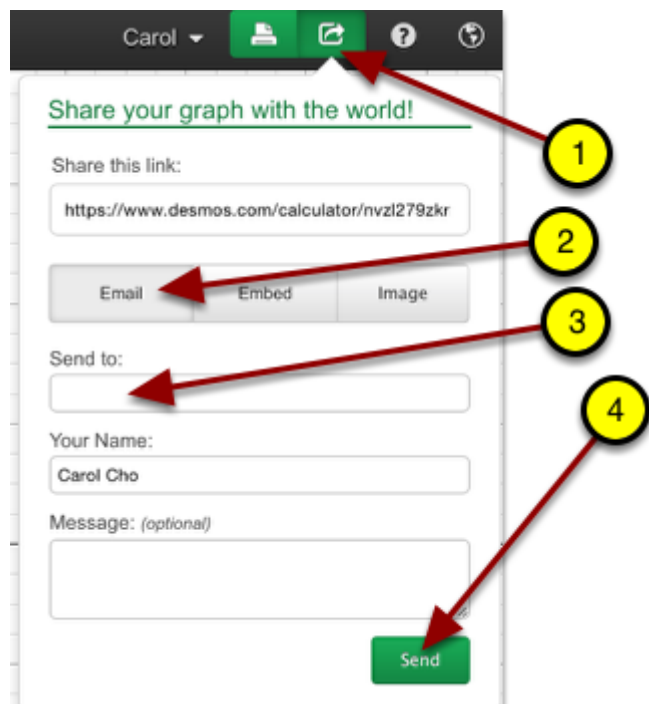
Additional Notes:

- A moveable point must start and end the table to connect the sides of the figure.
- Hold the circle until the menu shows. Select the icon to connect the points and to move them in all directions.
- The variables MUST be unique. Choose a system that makes sense to you. In this case the columns are named P_{3x} and P_{3y} representing the x-column for a polygon of 3 sides and the y-column for a polygon of 3 sides.
- The variable point was named: (x_3, y_3) for a variable point for the 3-sided figure.

- Check how the variables are named for the 4-sided polygon. Follow a similar pattern for the 5-sided polygon.

SAVE:

- Save your work in your Desmos Account.
- Save the link to your google spreadsheet for your partner to access or email the link to your partner.



Side Lengths & Perimeter

EXPLORE:

- Click on the link below.
- Drag the vertices of the rectangle. Notice the changes of the side lengths and the perimeter.

[Side Lengths & Perimeter](#)

CREATE: 5-sided pentagon

Modify the file:

- Add a 5th point and sliders in the Points folder.
- Add an additional side in the table.
- Link the image "E" (found in the Images folder) to the 5th vertex.

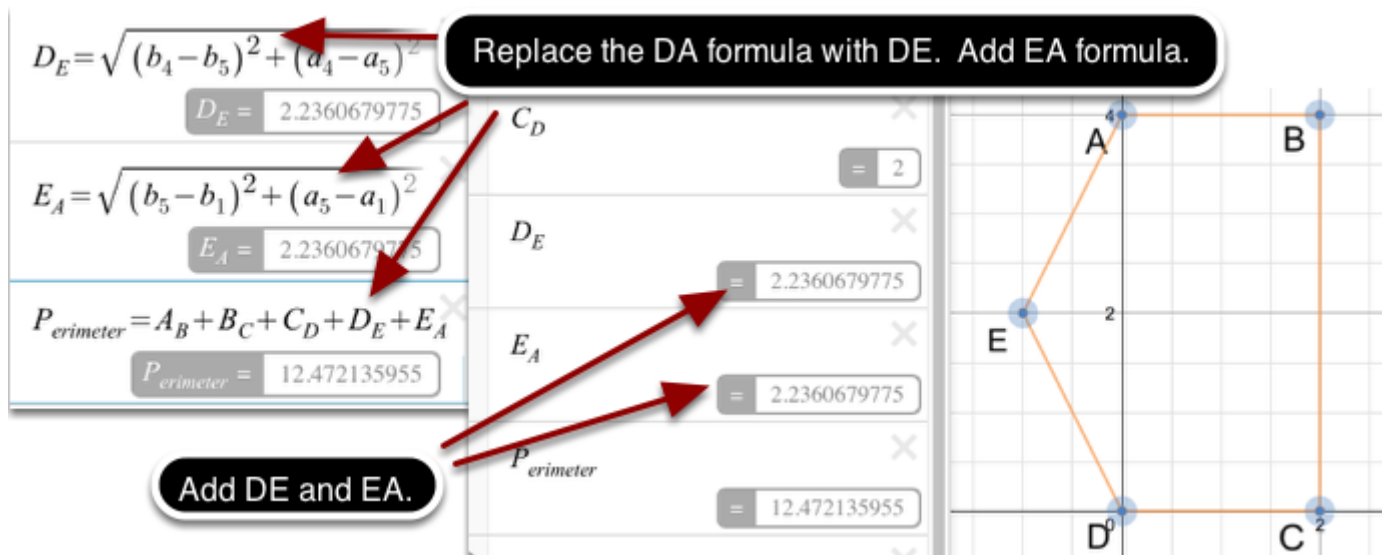
The screenshot shows the Desmos Geometry workspace with several modifications highlighted by red circles and arrows:

- Circle 1:** Points to the sliders for a_5 and b_5 . The sliders are set to $a_5 = -1$ and $b_5 = 2.01$.
- Circle 2:** Points to the new row in the "Calculations & Table" folder, which has columns x_5 and y_5 and contains the values a_5 and b_5 .
- Circle 3:** Points to the "E.png" image in the "Images" folder. The image's center is set to $(a_5 - .25, b_5 - .25)$ and its size is 0.39×0.34 .

A text box with a black background and white text says: "Modify the center. Click on the empty circle to view the 'E'." This box is positioned near the "E.png" image.

Modify the expressions and formulas found in the Calculations & Table folder.

- Modify the "DA" formula to "DE" formula.
- Add a "EA" formula.
- Change the formula for the perimeter to reflect all 5 sides.
- At the top, add the DE and EA formulas.
- Verify your work!



SAVE:

Rename the file: Pentagons: Side Lengths and Perimeter

Save to your Desmos Account & save to your Google spreadsheet.

The image shows the "Save This Graph!" dialog box in Desmos. It has a title field, a checkbox for "Send a Copy to Google Drive", and two buttons: "Rename Graph" and "Save a New Copy".

Annotations:

- A yellow circle with the number 1 has an arrow pointing to the title field.
- A yellow circle with the number 2 has an arrow pointing to the "Save a New Copy" button.

Regressions

Creating a Regression Line

EXPLORE:

- Watch the video below.
- Click on the "Blank Desmos Graph" to get started!

[How To: Create Regressions](#)
[Blank Desmos Graph](#)

CREATE:

Use the built-in tutorial for creating regressions using Desmos.

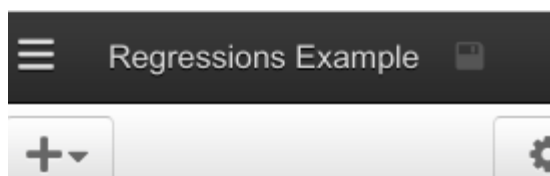
1. Click the "?". Then Click the Regressions icon.
2. Follow the given steps.

The screenshot shows the Desmos interface with the 'Regressions' tutorial panel open. A red arrow points from the '?' icon in the top bar (labeled 1) to the 'Regressions' icon in the 'Tours' sidebar (labeled 2). The 'Regressions' panel displays a linear regression model $y_1 \sim mx_1 + b$ with statistics $r^2 = 0.953$ and $r = 0.976$, and parameters $m = 0.69425$ and $b = 10.288$. A table of data points is shown below the statistics. To the right, a 'Finished Example' graph shows a scatter plot with a linear regression line and a parabolic curve.

x_1	y_1	e_1
1.7	10.4	-1.0682303
3	12.1	-0.2707497
4.7	13.7	0.14903258
6	15	0.54651317
7.5	16.3	0.80514462
9	17.3	0.76377607
10.5	18	0.42240752
11.9	18.6	0.050463536
13.3	19	-0.52148045
14.1	19.2	-0.87687701

SAVE:

- Give your finished file a name such as "Regressions Example".
- Save to your Desmos Account. You will be able to go back to it later to modify over it or use it as a guide for a new project.



Creating a Line of Best Fit

Create a moveable line to "fit" over a set of data.

EXPLORE:

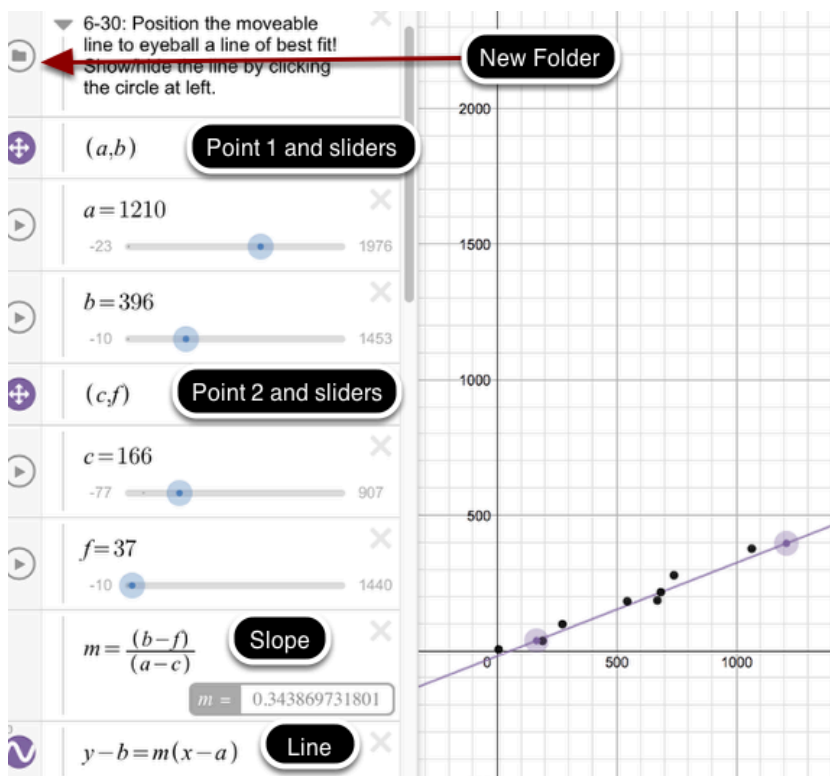
Fit a line to this set of data.

[Creating a Line of Best Fit](#)

CREATE: A Moveable Line

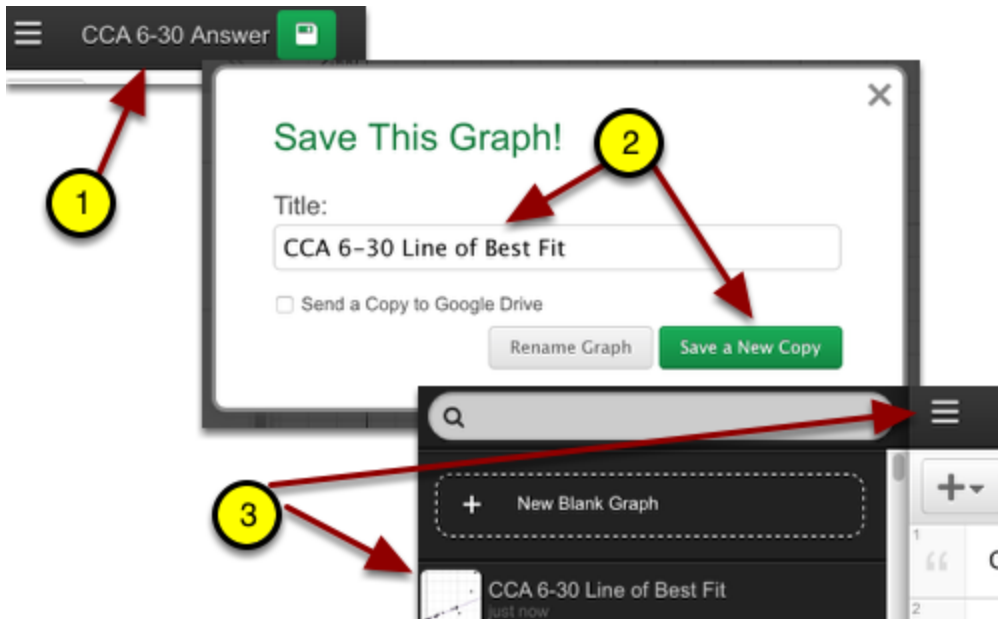
Add a new folder, name it, and add the following expressions below.

- Create 2 moveable points.
- Calculate the slope between them.
- Use the point/slope form of a line.



SAVE:

Save your work to your account.



Algebra

Inequalities & Shading

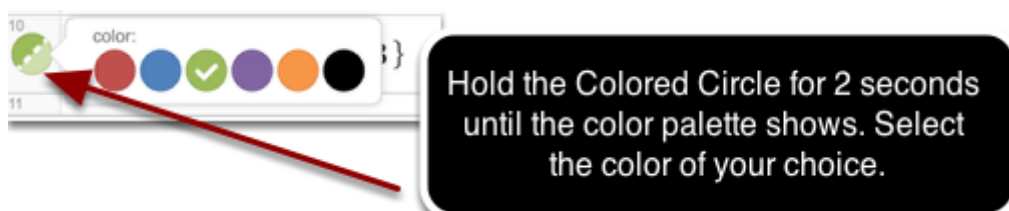
EXPLORE:

- The inequality for each shape is on the left with the same color.
- You can add variables/sliders to the inequalities to allow the shape to change.

[Inequalities & Shading](#)

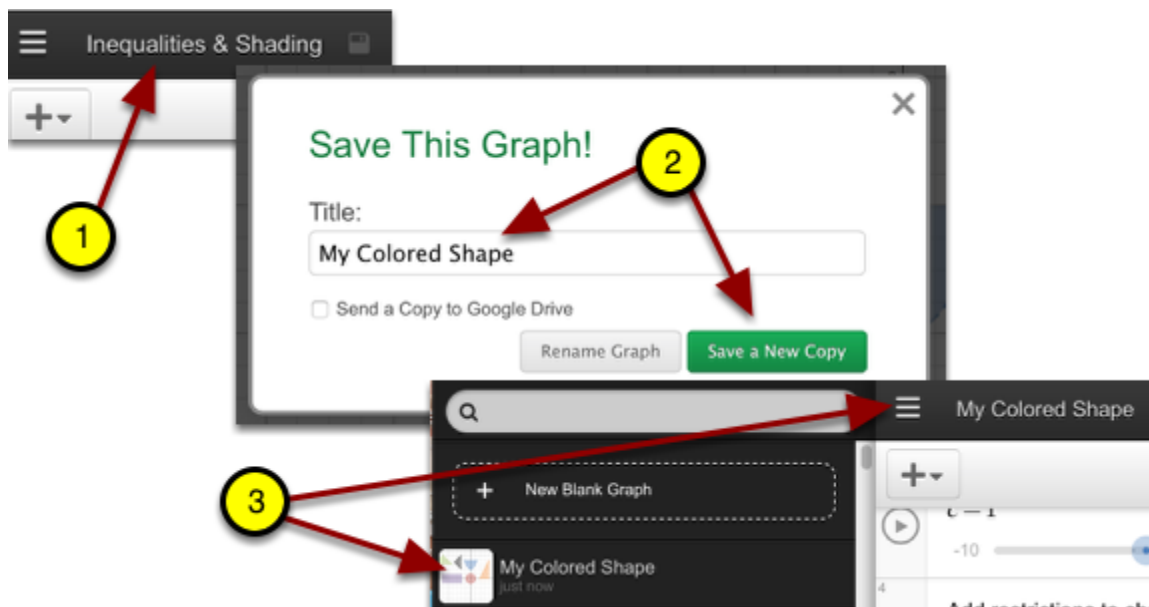
CREATE:

- Delete the shapes on the examples above.
- Create a simple shape writing the inequality which is somewhat different from the examples.
- Shade the interior with a color.



SAVE:

- Click on the "Inequalities & Shading".
- Rename and save.
- View your file.



Piecewise Functions

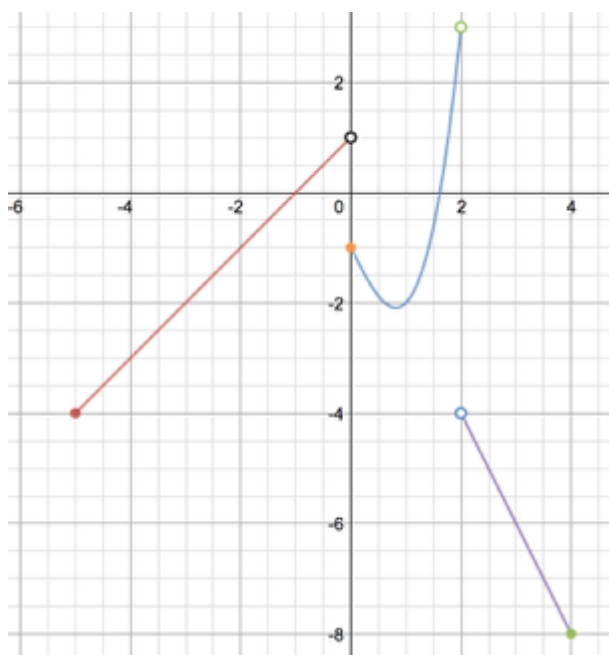
EXPLORE:

- Click on the link below.
- How is each segment of the graph drawn?
- Drag along all segments from beginning to the end. How are the endpoints depicted?

[Piecewise Functions](#)

CREATE:

Change the above file so that functions are restricted reflecting the graph below.



EMAIL:

1. Click on the green arrow at the far top right.
2. Click "Email"
3. Add your email address and send it.

The screenshot shows the Desmos sharing interface. At the top, a dark header bar contains the user name 'Carol', a printer icon, a share icon, and a help icon. Below this, a green banner reads 'Share your graph with the world!'. A section titled 'Share this link:' displays a URL: 'https://www.desmos.com/calculator/lj3ev...'. Below the URL are three buttons: 'Email', 'Embed', and 'Image'. Further down, there is a 'Send to:' label followed by an empty text input field. Below that is a 'Your Name:' label followed by a text input field containing 'Carol Cho'. Underneath is a 'Message: (optional)' label followed by a larger empty text area. At the bottom right is a green 'Send' button. Three red arrows with yellow circular numbers indicate a sequence: Arrow 1 points from the share icon in the header to the URL; Arrow 2 points from the URL to the 'Email' button; Arrow 3 points from the 'Your Name' field to the 'Send' button.

Carol

Share your graph with the world!

Share this link:

<https://www.desmos.com/calculator/lj3ev...>

Email Embed Image

Send to:

Your Name:

Carol Cho

Message: (optional)

Send