

Lesson 4 - Variables and Coloring

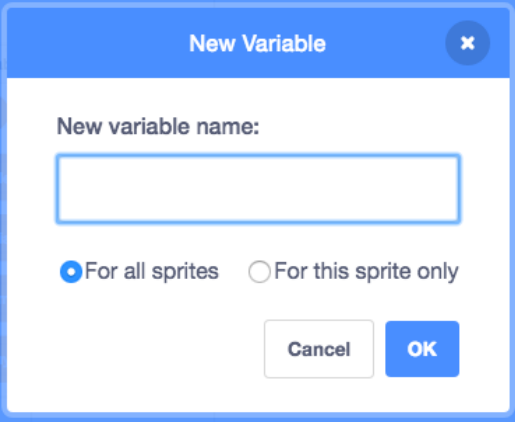
Part I :

In math, variables are used as placeholders for values that might change. Similarly, when coding, they can also represent a quantity that we can set and change.

To use a variable in your code, go to the **Data** blocks. You can make your own variables as part of an equation, input, etc.

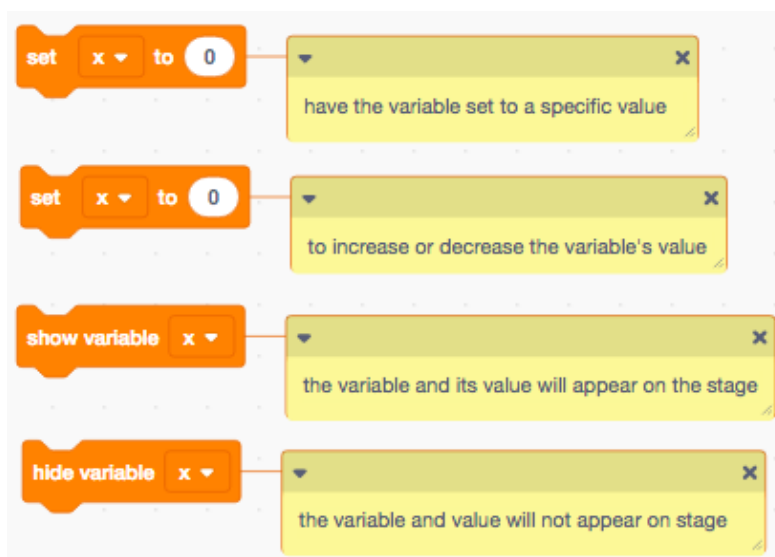
Just select: 

Name it and choose which sprites you want it applied to

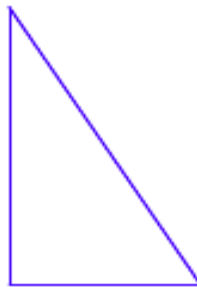
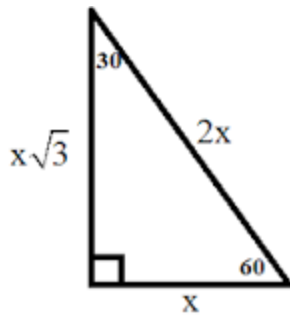


The image shows a 'New Variable' dialog box with a blue header and a close button (X) in the top right corner. Below the header, there is a text input field labeled 'New variable name:'. Underneath the input field, there are two radio buttons: 'For all sprites' (which is selected) and 'For this sprite only'. At the bottom of the dialog, there are two buttons: 'Cancel' and 'OK'.

Once you make a variable, these blocks will appear in the data section.



Variables, such as x , are helpful in equations.

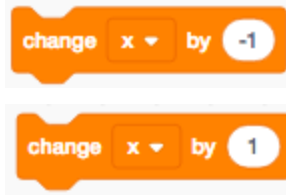


```
set x to 0
move x steps
turn 120 degrees
move 2 * x steps
turn 150 degrees
move x * sqrt of 3 steps
turn 90 degrees
```


Checkpoint 1: Use variables and code similar to the one above to create a 45-45-90 right triangle.

Part II :

Variables can also be changed to decrease or increase their value.



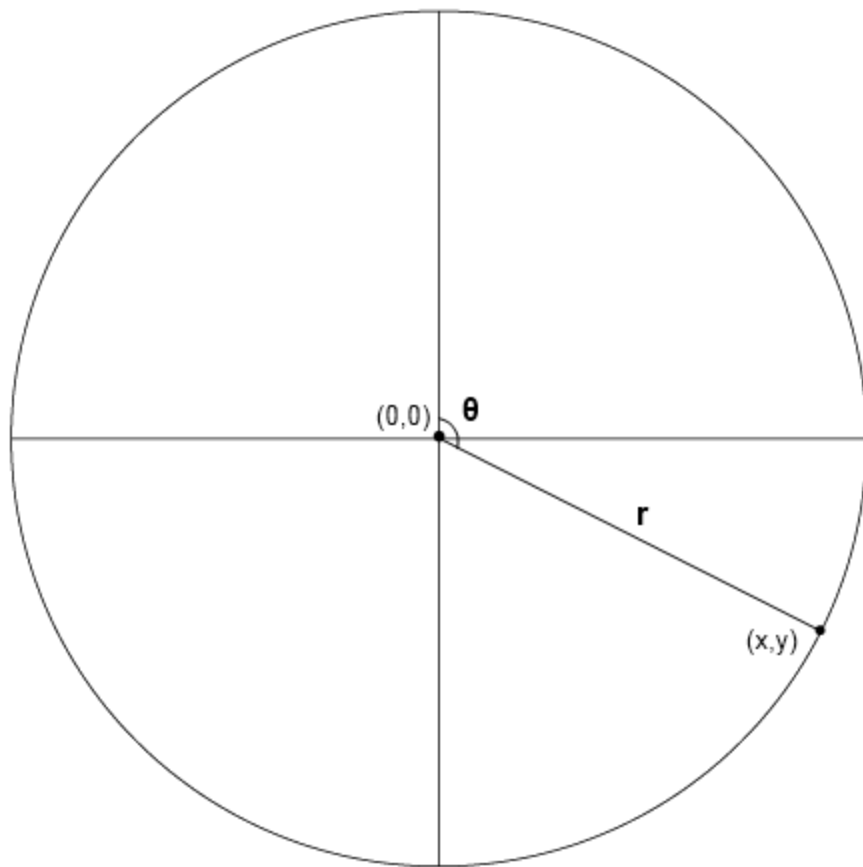
This block is useful in coloring in shapes. Since there is no way to fill in any shape, we have to draw smaller and smaller versions of the shape until it is entirely filled in.



Checkpoint 2

Checkpoint 3: Use this code to make an equilateral triangle that is filled in.

Part III :
Equations using Variables



To find the coordinates of any point on a given circle, you use:

$$x = r (\cos\theta) \quad \text{and} \quad y = r (\sin\theta)$$

Drawing a circle:

- The radius is 150
- Start facing to the right (use a variable for the starting angle)
- Change the angle by 1 degree 360 times so that it makes a full circle

Checkpoint 4 :

Checkpoint 5 : Using the previously drawn circle, fill it in.



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