New Commands in AutoCAD 2010: Part 4
Parametric Formulas
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Introduction

Dimensional constraints become powerful when you use formulas, as I've hinted in the previous tutorials. Indeed, you were dealing with formulas when you entered data like d1 and d1/2 into dimensional constraints.
Technically, formulas are called “parameters,” and controlled by the Parameters Manager palette. They apply to dimensional constraints only, never to geometric constraints. In this tutorial, we work with the following command:
Parameters -- displays the Parameters Manager palette.

Step-by-Step Tutorial: Editing Parameters

1. Start AutoCAD 2010 with the *DimConstraint3.dwg* drawing you saved at the end of the previous tutorial.
2. Open the Parameters Manager palette by one of these methods:
   - Enter the **Parameters** command.
   - In the ribbon's Parametric tab, click the **Parameters Manager** button in the Manage panel.

Notice the Parameters Manager palette.

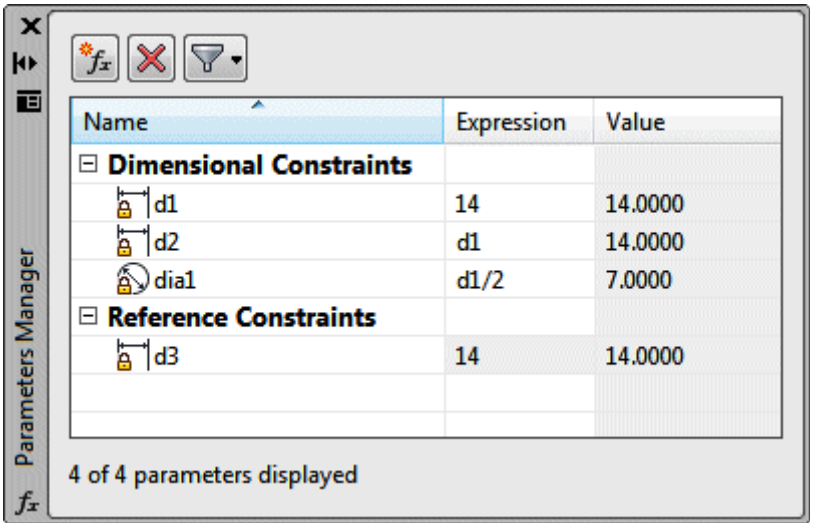

Figure 1: The Parameters Manager palette.

3. Because the drawing contains constraints, the palette is already filled with data. Let's take a look at what it holds:
   Name column -- lists the names of all dimensional constraints in the current drawing, such as d1 (linear) and dia1 (diameter).
   Expression column -- reports the formula attached to the name, such as 14 (a distance) and d1/2.
   Value column -- reports the value of the parameter.
4. The toolbar across the top of the palette provides these functions:

Figure 2: The Parameters Manager palette's toolbar.

New User Parameter -- adds a parameters to the palette.
Delete Selected Parameter -- erases the selected parameter(s). You can use the Undo command to return parameters that were removed by accident.
Filter Display -- toggles the display between showing all parameters and just those used by expressions.

5. The palette contains several "hidden" right-click menus:

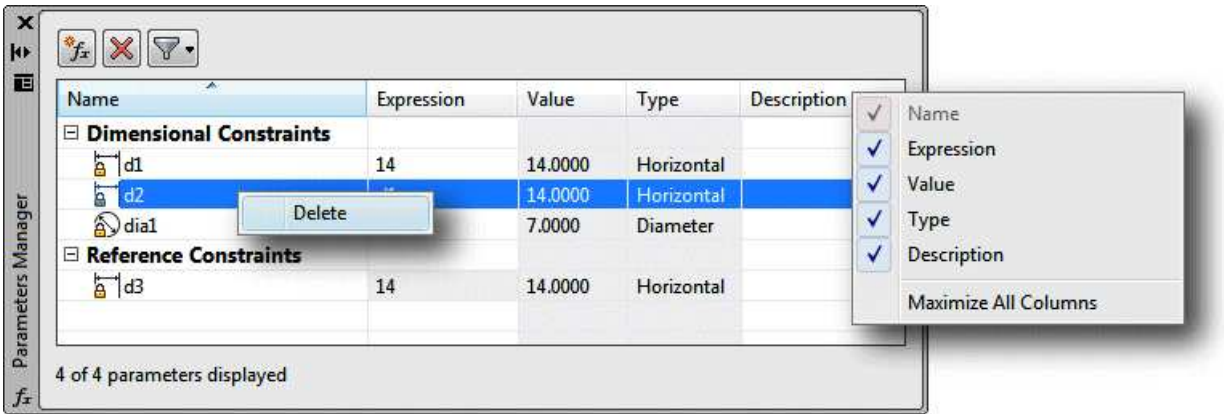

Figure 3: The Parameters Manager palette's shortcut menus.

a. Right-click the header (Name, Expression, etc). The shortcut menu toggles the display of header names. The figure shows that I've added the Type and Description columns.
b. Right-click any constraint name. The shortcut menu lets you delete the item.

TIP You can edit items in this palette. Click any text that doesn't have a gray background, and then change it. For example, you can change Names to make them more meaningful, expressions to change formulae, and descriptions. AutoCAD calculates the values for you.

6.The primary purpose of this palette is to control the expressions (formulas) maintained by dimensional constraints in this drawing. You can directly edit the text of dimensional constraints, of course, but this palette is handy by providing a single location that lists all.
Let's change the name of d1 and its expression:
a. Click **d1**. Notice that the entire row is highlighted.
b. Click **d1** a second time. Notice that only d1 is highlighted. This means you can now change the name.
c. Enter "TopLength" and then press **Enter**. Notice that other references to d1 change to TopLength in the palette.

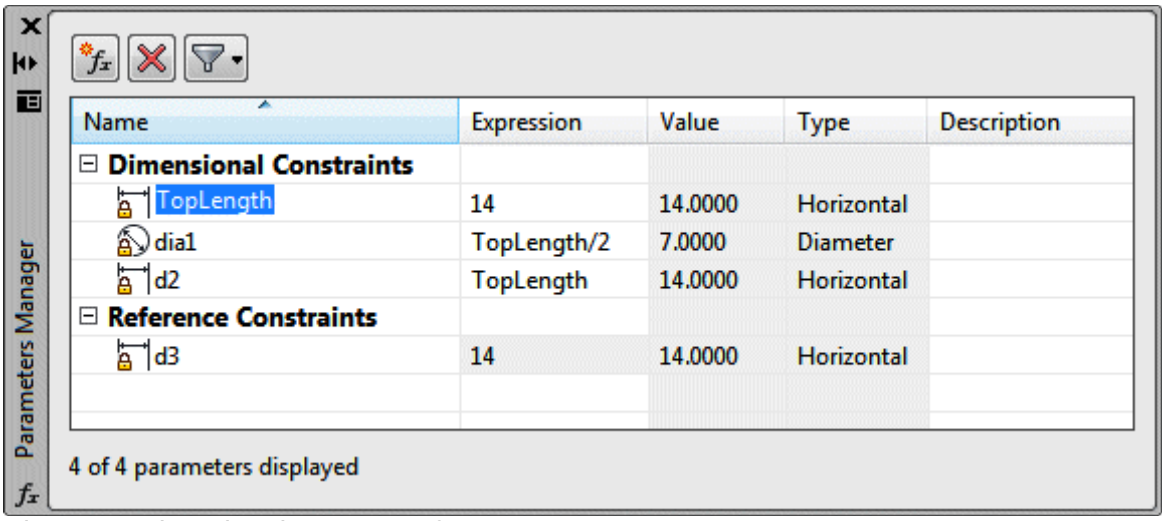

Figure 4: Changing the names of parameters.

d. Now let's change an expression. Click the row with **dia1**, and then click its Expression, TopLength-2.

e. Change the expression to read:

(TopLength-3)/2

...and then press **Enter**.

Notice that the drawing immediately updates: the circle changes it size. In addition, the text of the circle's dimensional constraint changes to match that found in the palette.

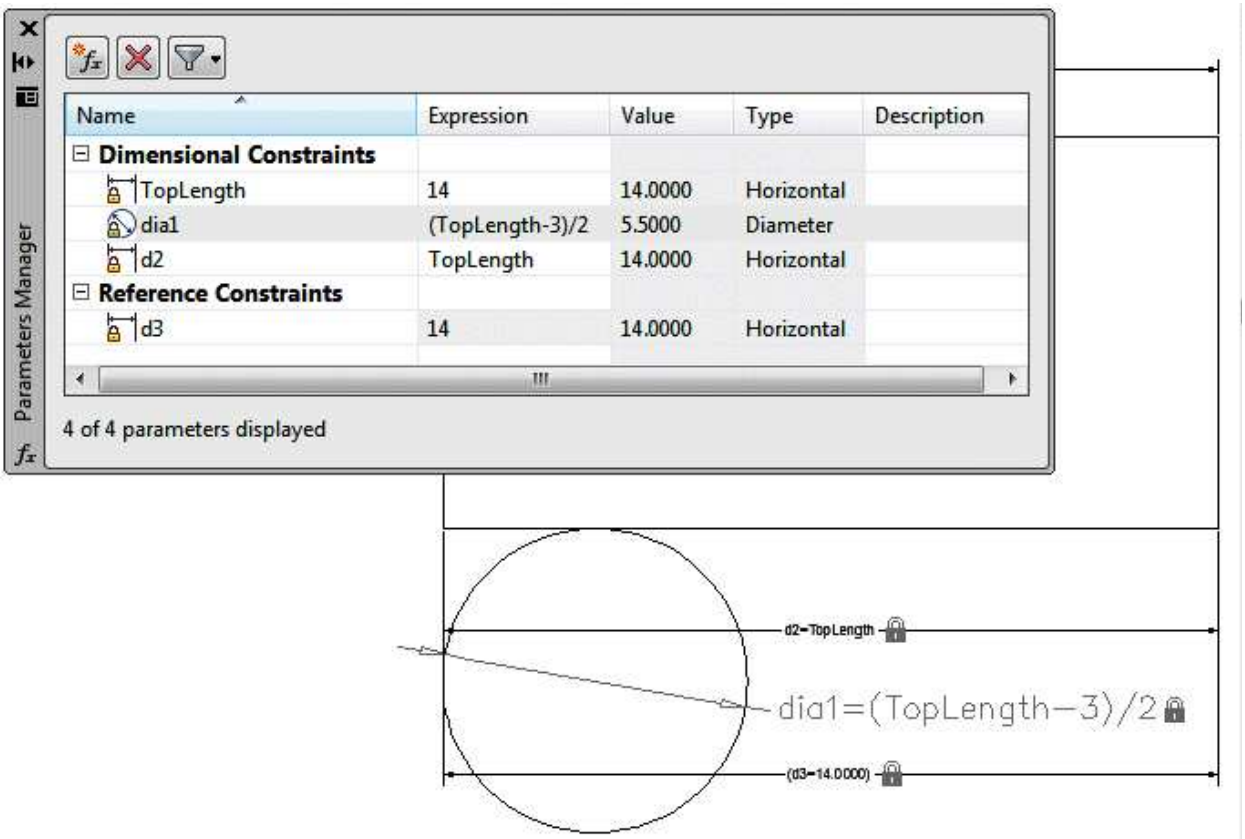

Figure 5: Changing the expressions of parameters.

TIP In addition to algebra (+, -, *, /), you can enter advanced functions into expressions, such as Cos() and Random(). For the full list, search AutoCAD's online help for the phrase "Constrain a Design with Formulas and Equations."

7. You have probably noticed that the text of dimensional constraints is made up of two parts -- a name and an expression. You can control what is seen in the drawing through the Constraint Settings dialog box. To access this dialog box:

- Enter **ConstraintSettings** command at the command prompt.
- Or enter the **csettings** alias.
- Or in the ribbon's Parametrics tab, click the diagonal arrow.

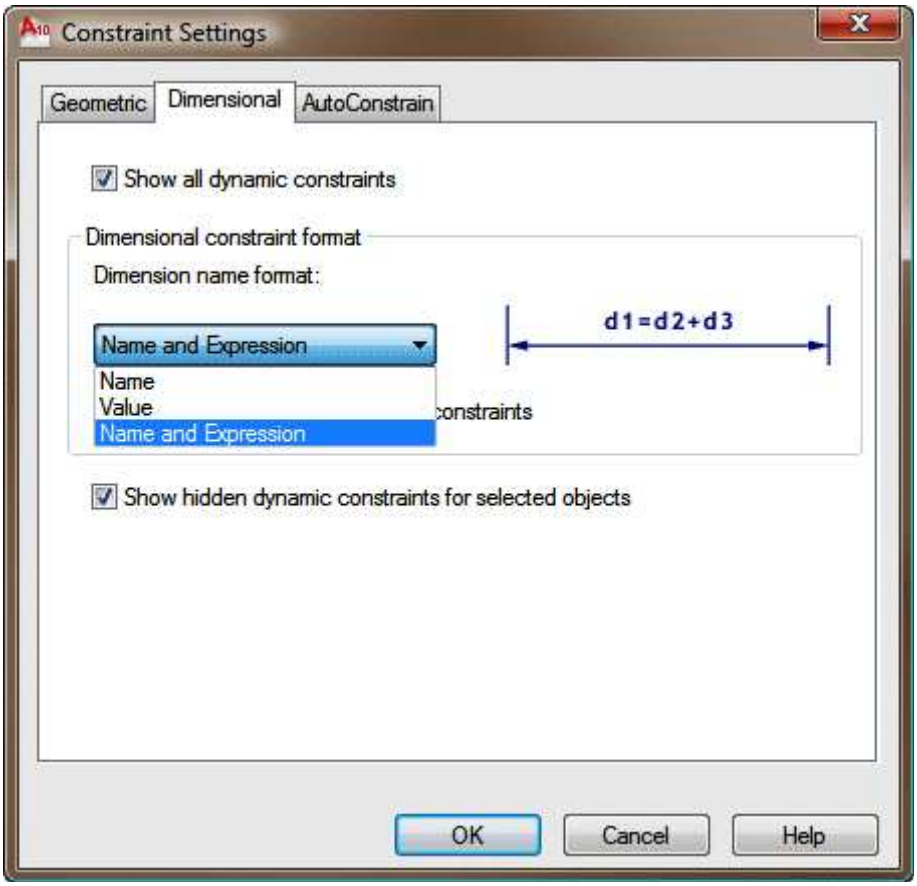

Figure 6: Constraint Settings dialog box.

(If necessary, choose the Dimensional tab.) In the Dimension Name Format droplist, choose one of the options:

Name -- identifies the constraint dimension, such as d1.
Value -- reports the value, such as 1.234.
Name and Expression -- displays both the name and the expression (d1=1.234).

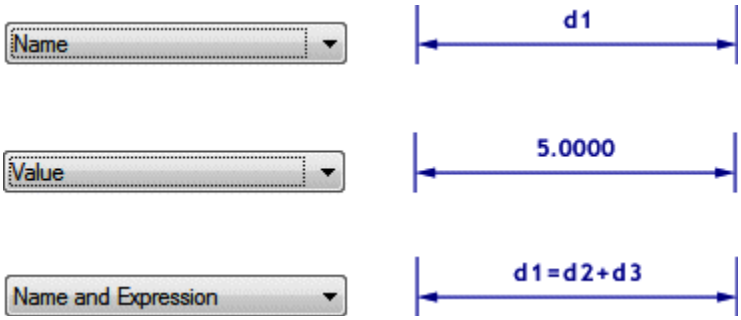

Figure 7: From left to right: Name, expression, and parameter text.

8. Click **OK**. Notice that all dimensional constraints change the look of their text.

9. This concludes the tutorial on using the Parameters Manager palette. Save the drawing, if you wish.

Test Yourself

1. What is the purpose of the Parameters Manager palette?
   a. It controls the settings of geometric constraints.
   b. It controls the names and values of dimensional constraints.
   c. It reports the values of extracted attributes.
   d. It reports the values of changed tables.

2. What is the meaning of the following expression: d1=dia1*4.
   a. The length of dia1 is four times the diameter of d1.
   b. To dial 4 is to dial once.
   c. The length of d1 is four times the diameter of dia1.
   d. The diameter of dia1 is four times the length of d1.

3. Changes made in the Parameters Settings palette are immediately reflected in the drawing.
   True / false.

4. You cannot change the way text is displayed by dimensional constraints.
   True / false.

5. What is another name for "expression"?
   a. Formula.
   b. Parameter.
   c. All of the above.
   d. None of the above.

[Answers]

1. b. It controls the names and values of dimensional constraints.
2. c. The length of d1 is four times the diameter of dia1.
3. True.

4. False.
5. c. All of the above.

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