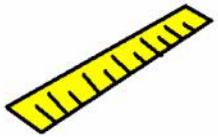
J&H Machine Tools



LUNCHEON LEARN

ZEISS

Checking distance

with regard to Rule #1

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The print…. A Simple Block. Measure the thickness.

10+/-1

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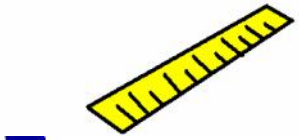

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How do YOU do it now?

- Align on the left, report the X of the right?
- Distance between left and right?

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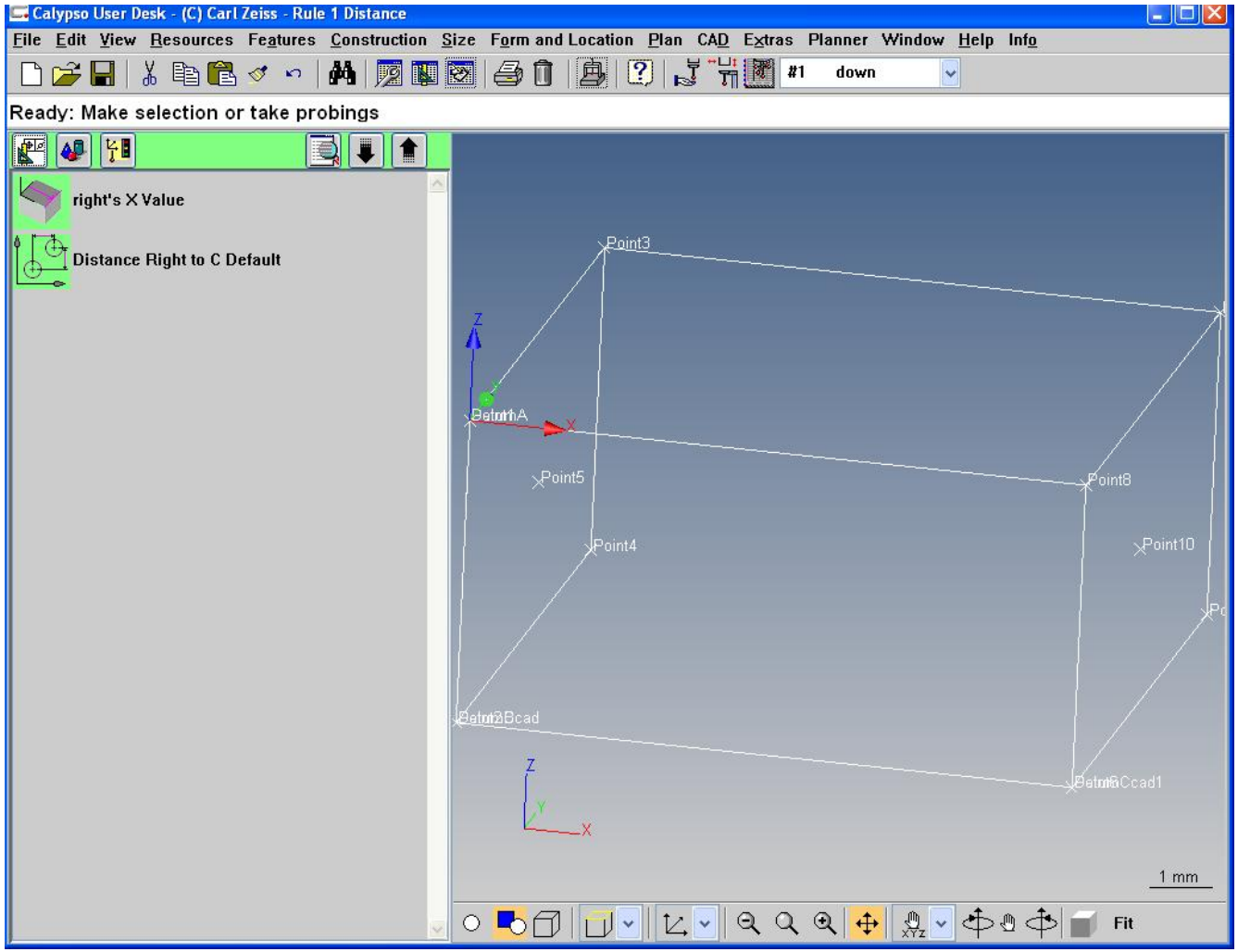

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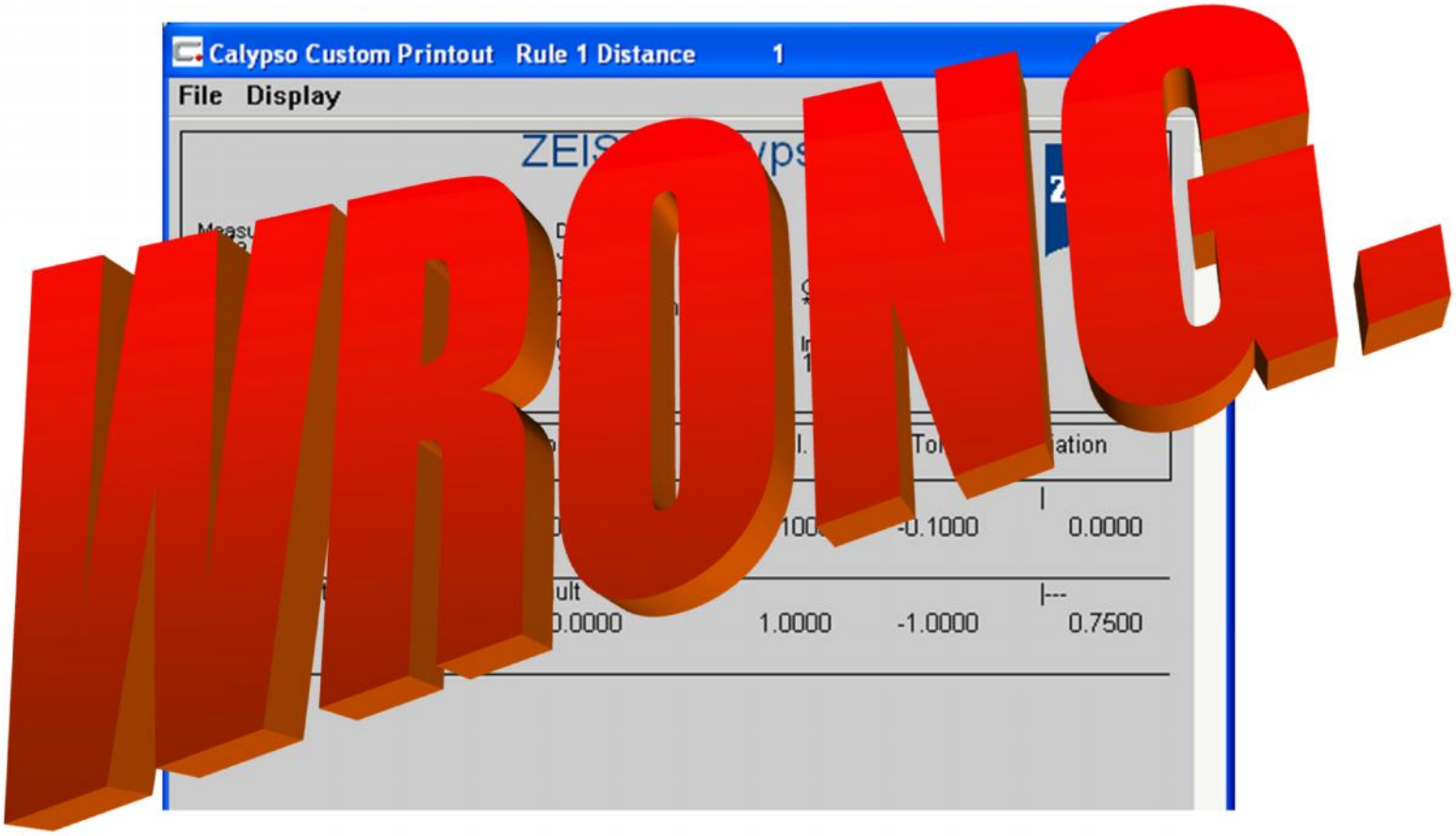

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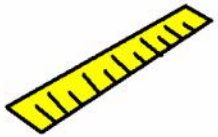

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To do this right, we need to understand

RULE #1

Sounds important, doesn't it????

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Definition Time!

"Where on ecified, the
limits of siz cribe the
extent to whi rm, as well
size, are allowec feature at each
cross section shall t m of an individual
feature is controlled b lowing three factors:
A) The surface or surface: f perfect form at MMC.
B) Where the actual local si f form is allowed equal to
the amount of such departu
C) There is no requirement fc AC limit of size is permitted to
vary from the true for to the ma

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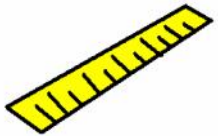

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HEY!!!

WAKE UP!

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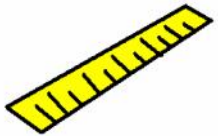

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What does it mean?

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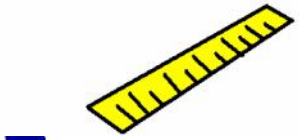

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For checking distance between two parallel opposing planes, two things must happen in order for the part to be good:

- The part must be able to pass between two parallel planes at the maximum allowable distance apart.
- The “actual local size” of any cross-section on the part must be larger than the minimum allowable distance apart.

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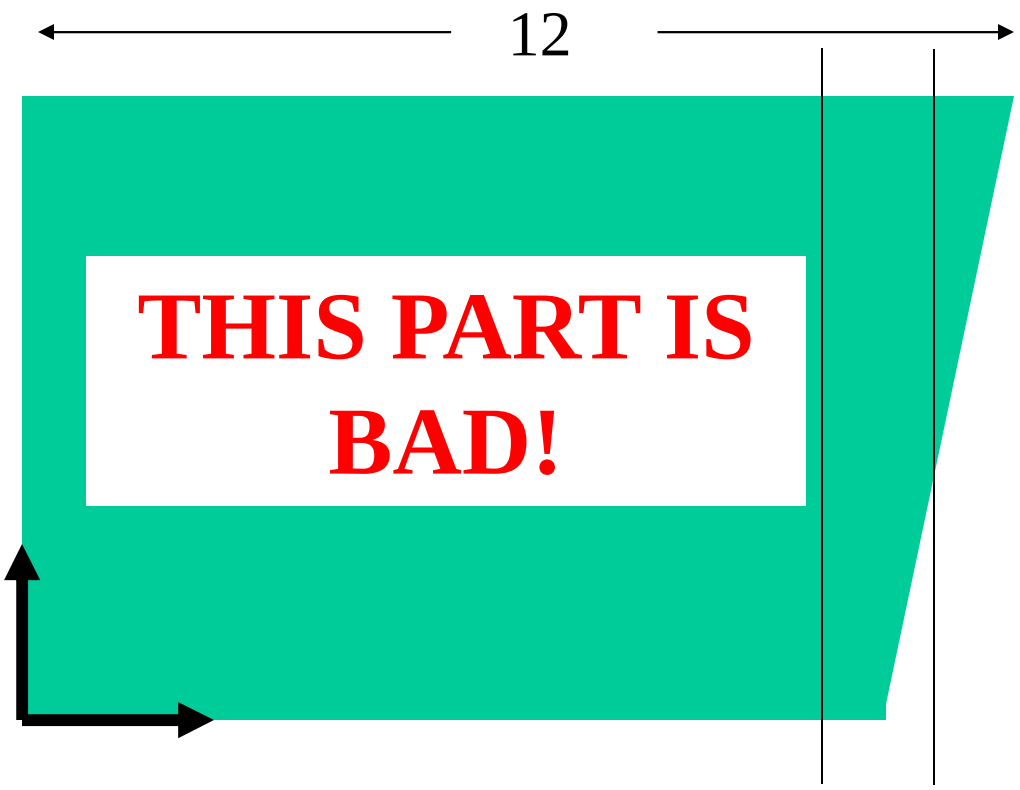

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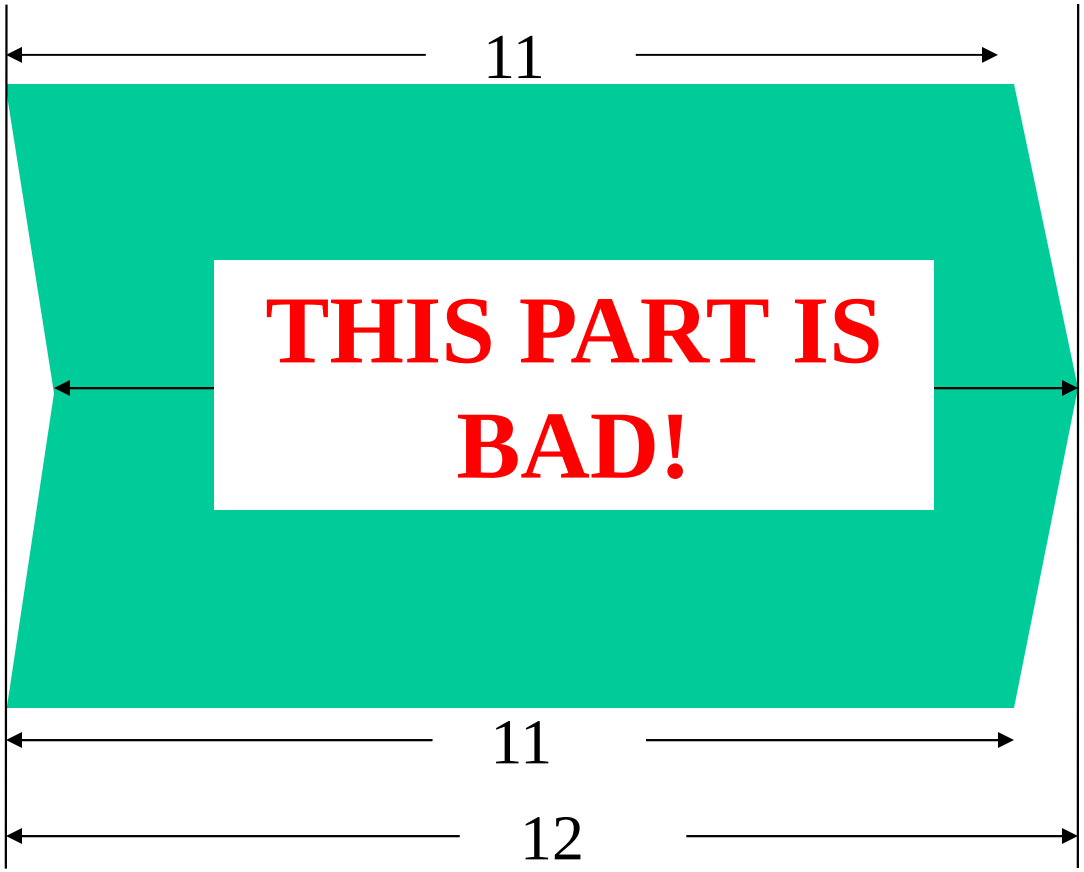

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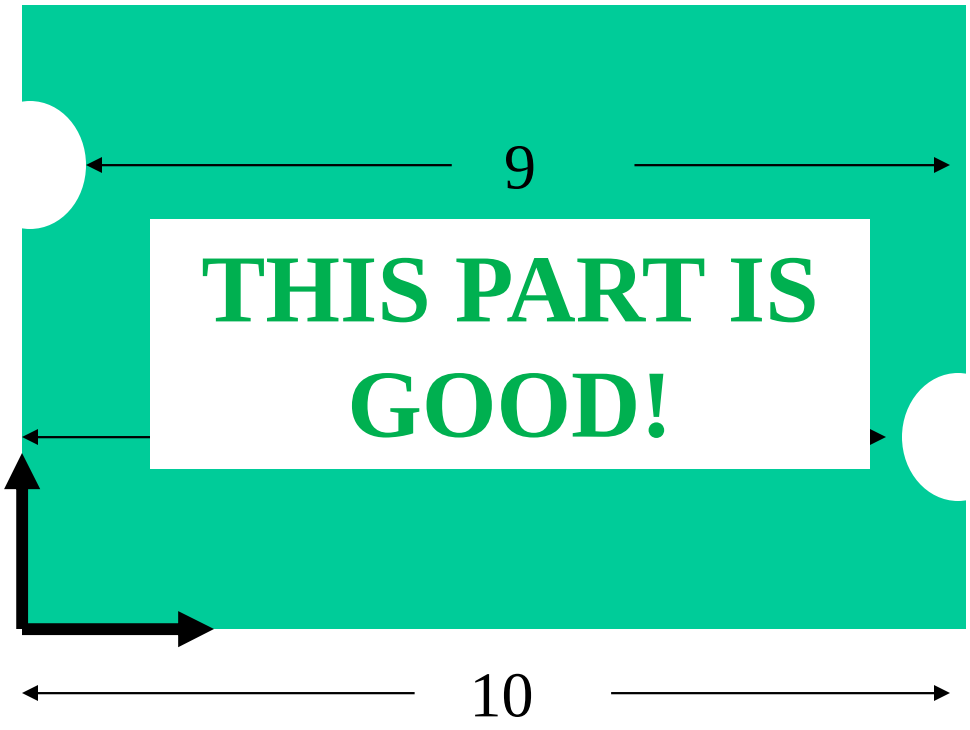

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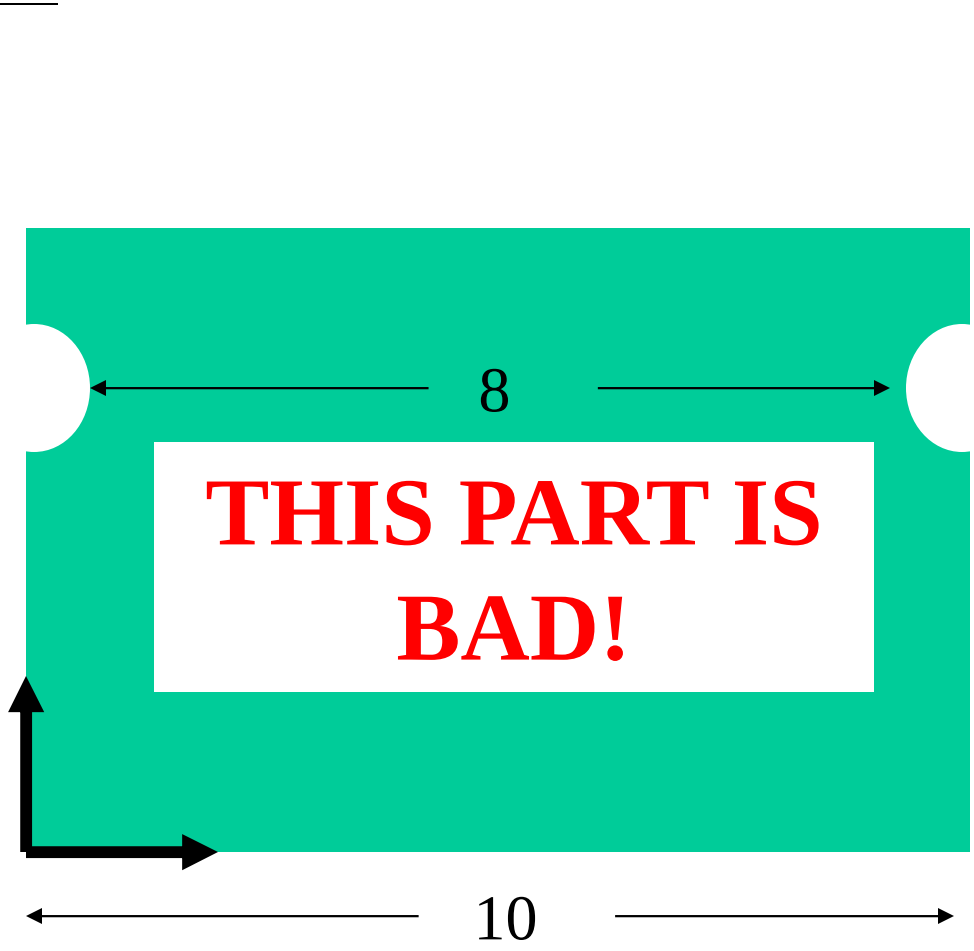

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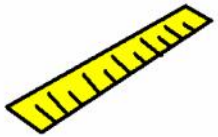

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Unfortunately, there is no "EASY BUTTON" way to report distance between planes correctly to "Rule #1".

"Rule #1" establishes a functional "go-no go" method of evaluating distance, not a solid numeric result, which CMMs are good at generating.

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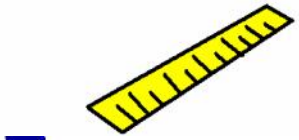

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Let's evaluate a few methods of checking distance and rate them on a scale of 1 to 5 for ease of use (practicality) and "correctness" considering "Rule #1".

5 is easiest and most "correct"

1 is hardest and least "correct"

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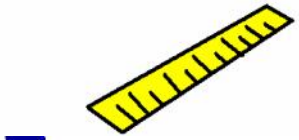

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Method 1:

Checking the “X” value.

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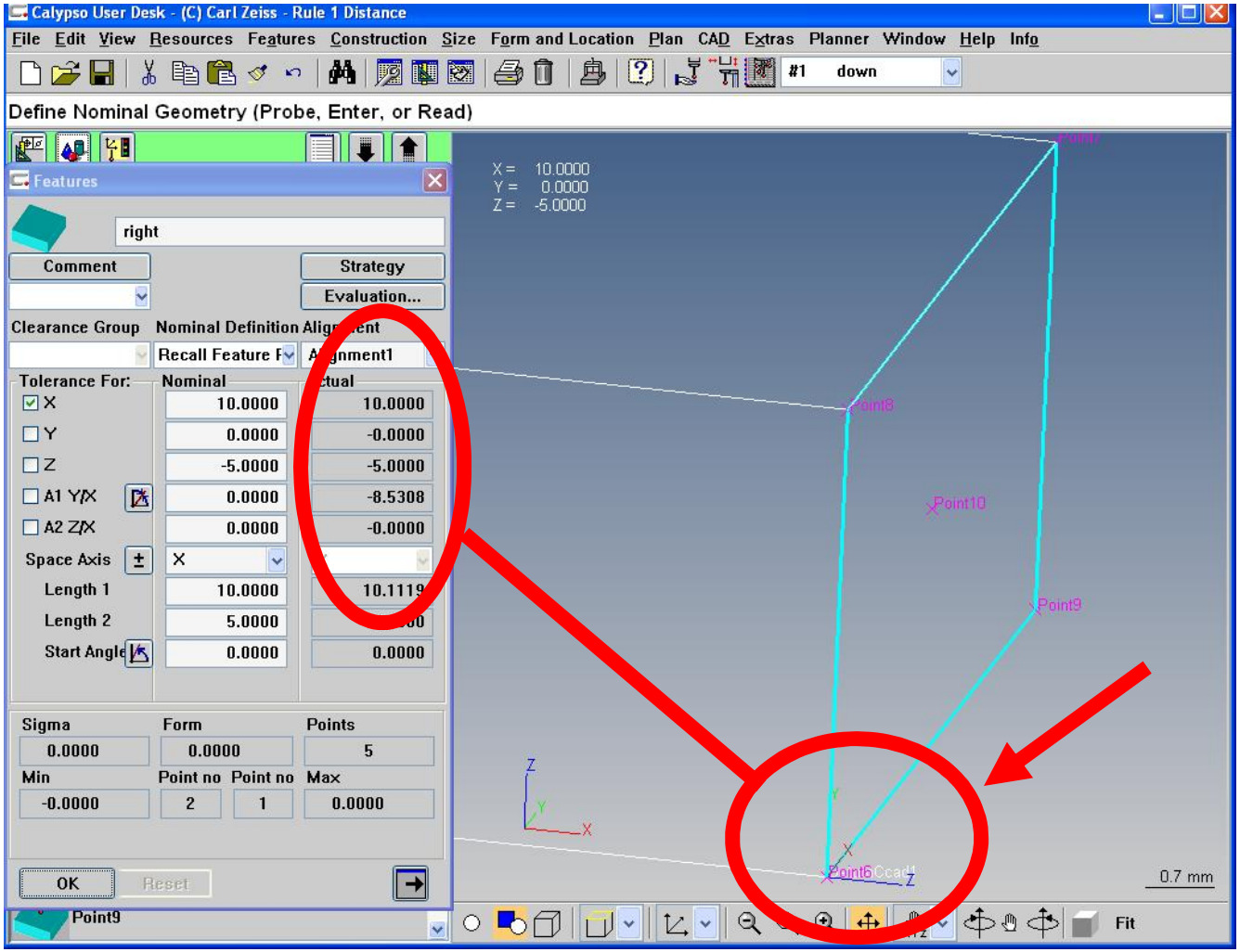

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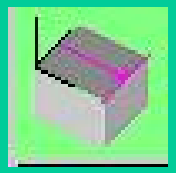

THIS PART IS GOOD!

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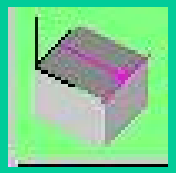

THIS PART IS BAD!

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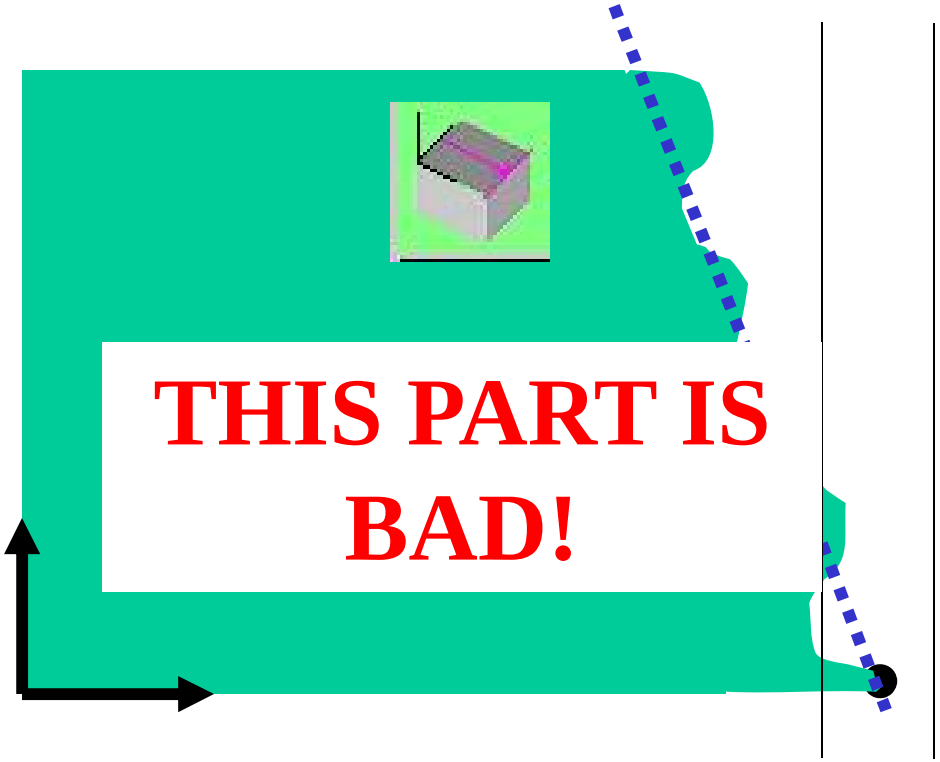

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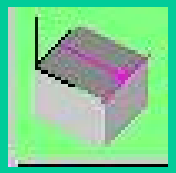

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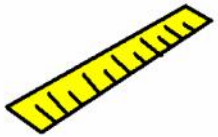

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Method 1:

Checking the “X” value.

Ease/Practicality: 5

“Correctness”: 1

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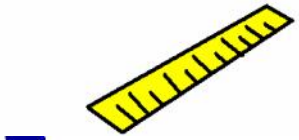

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Method 2:

Cartesian Distance

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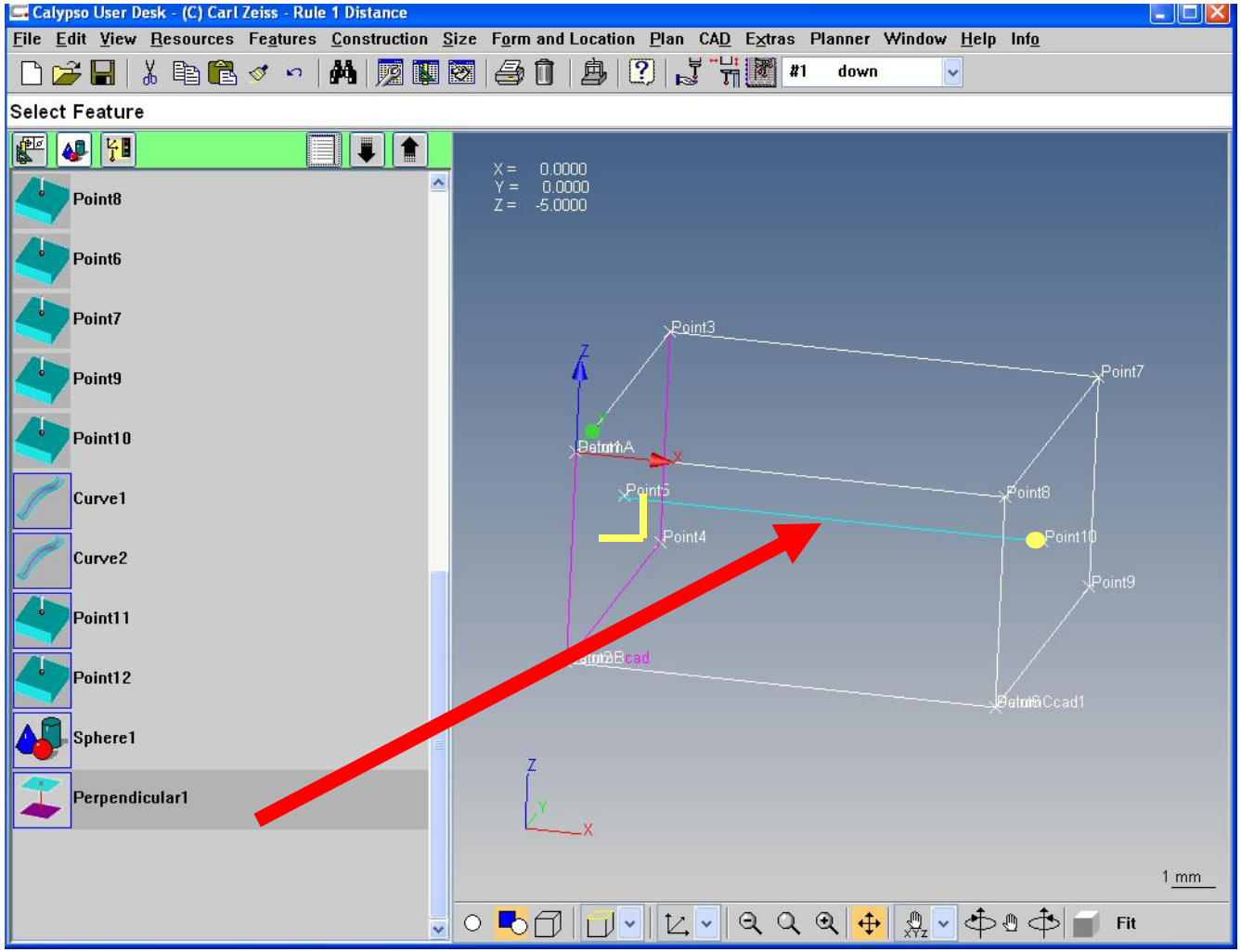

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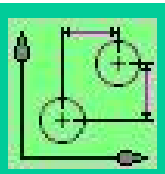

10

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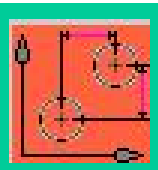

12

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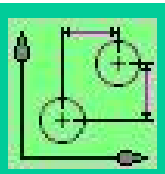

10

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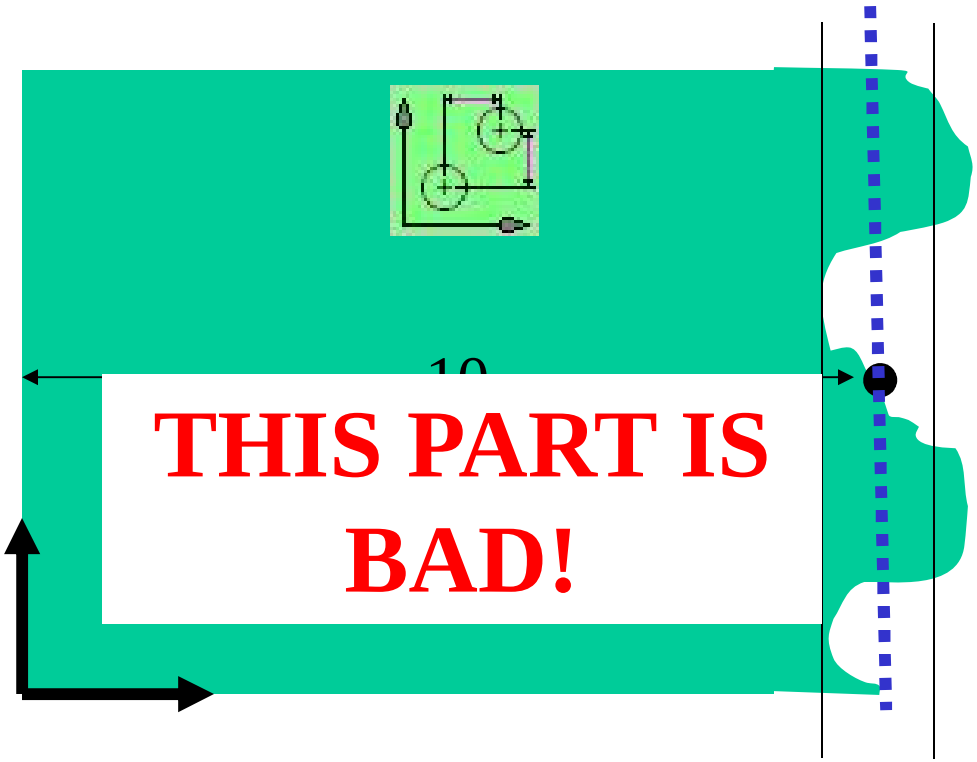

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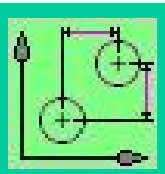

THIS PART IS BAD!

Method 2:

Cartesian Distance

Ease/Practicality: 4

“Correctness”: 2

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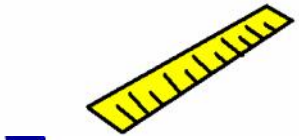

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Method 3:

Report Cartesian Distance and Parallelism

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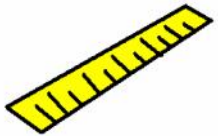

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Remember…

Parallelism = Distance between two planes, parallel to the datum, that contain all points of the evaluated plane.

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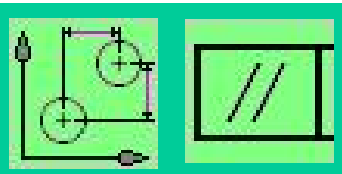

10.5

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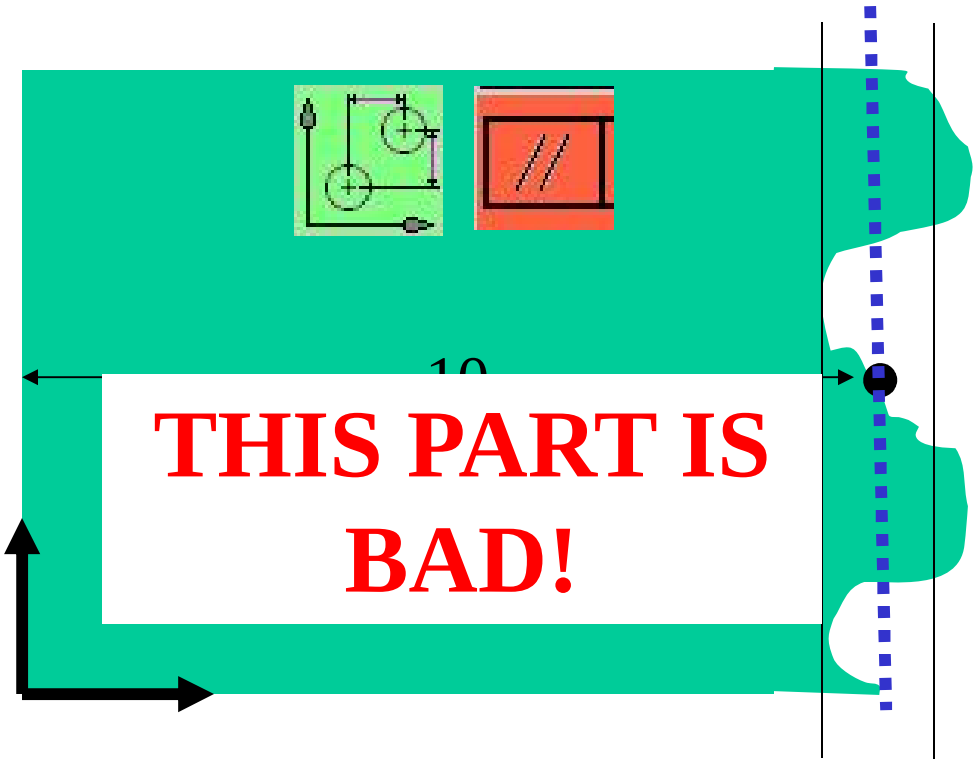

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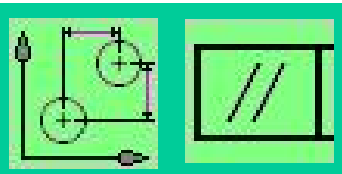

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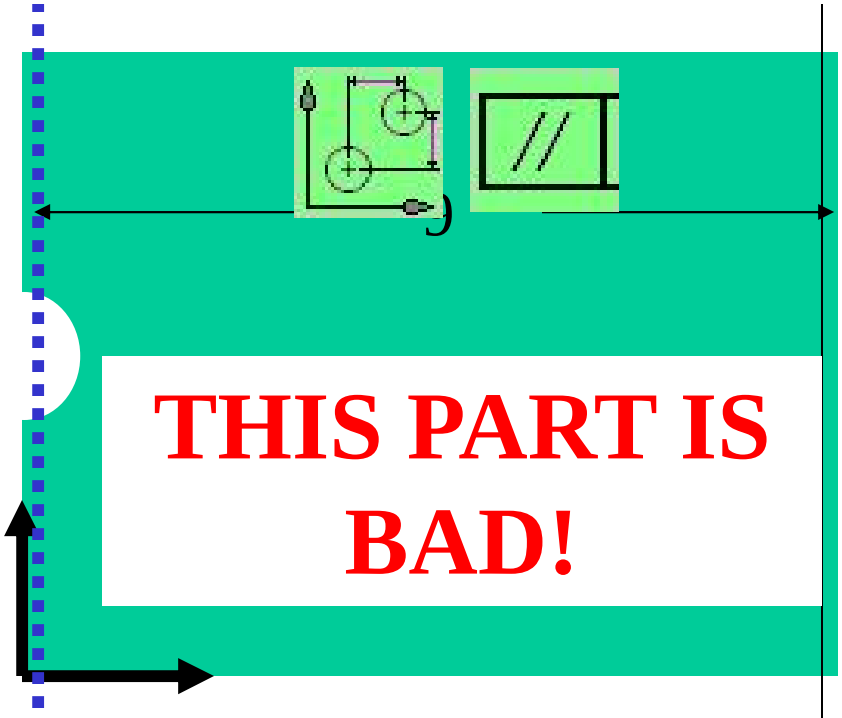

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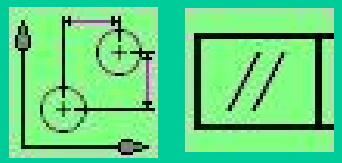

THIS PART IS BAD!

Method 3:

Report Cartesian Distance and Parallelism

Ease/Practicality: 3

"Correctness": 3

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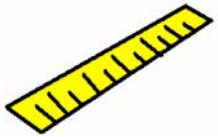

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Method 4:

Cartesian Distance and TWO Parallelisms

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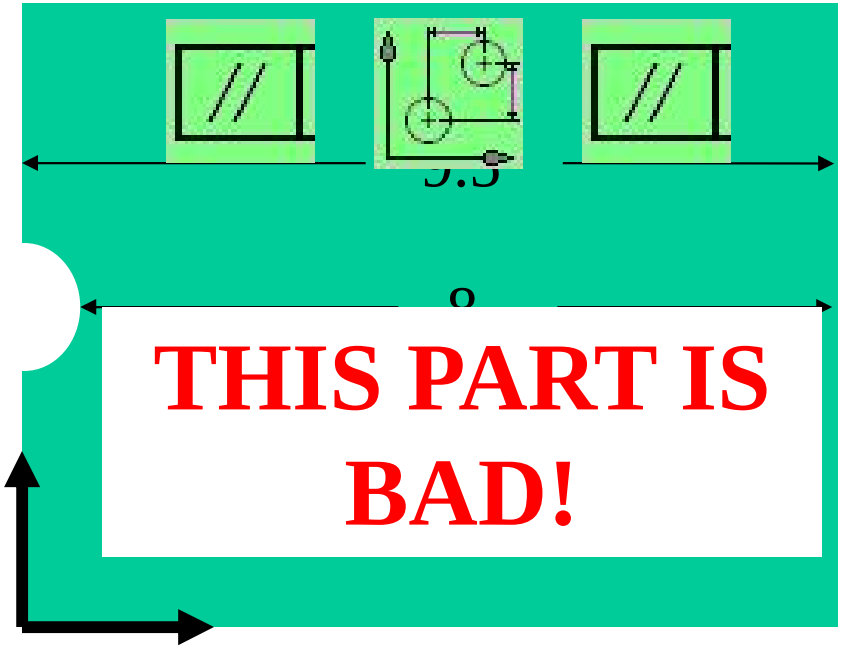

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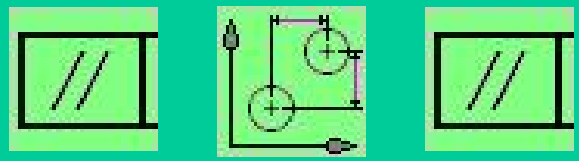

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THIS PART IS BAD!

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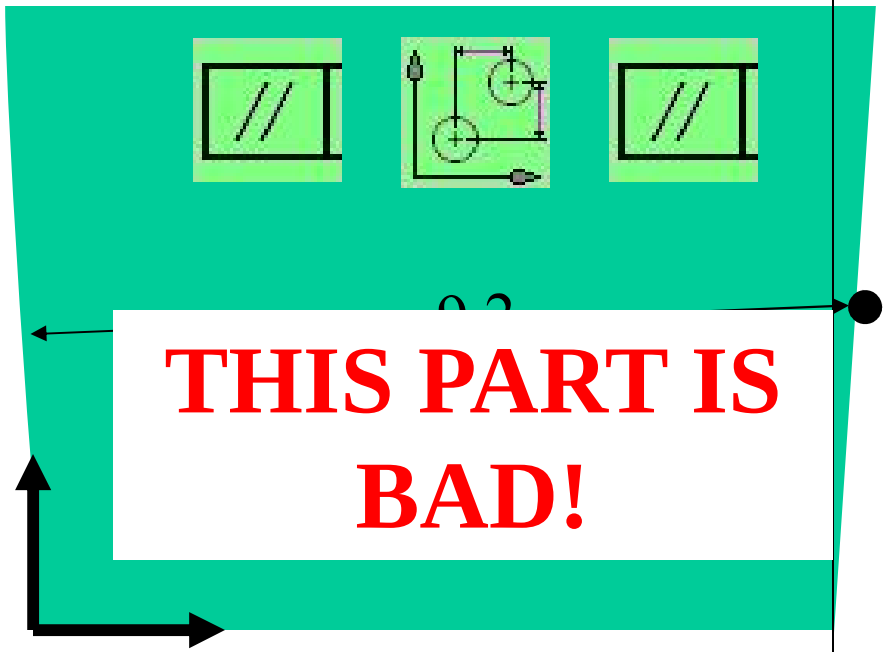

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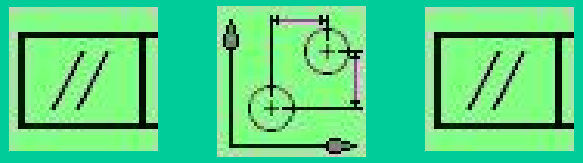

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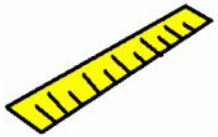

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Method 4:

Cartesian Distance and TWO Parallelisms

Ease/Practicality: 2

"Correctness": 4

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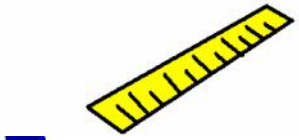

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Method 5:

Following the Standard

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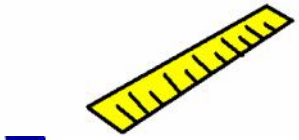

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Remember how to check distance, following Rule #1:

- The part must be able to pass between two parallel planes at the maximum allowable distance apart.
- The “actual local size” of any cross-section on the part must be larger than the minimum allowable distance apart.

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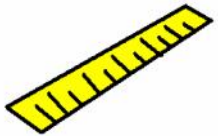

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First Part:

The part must be able to pass between two parallel planes at the maximum allowable distance apart.

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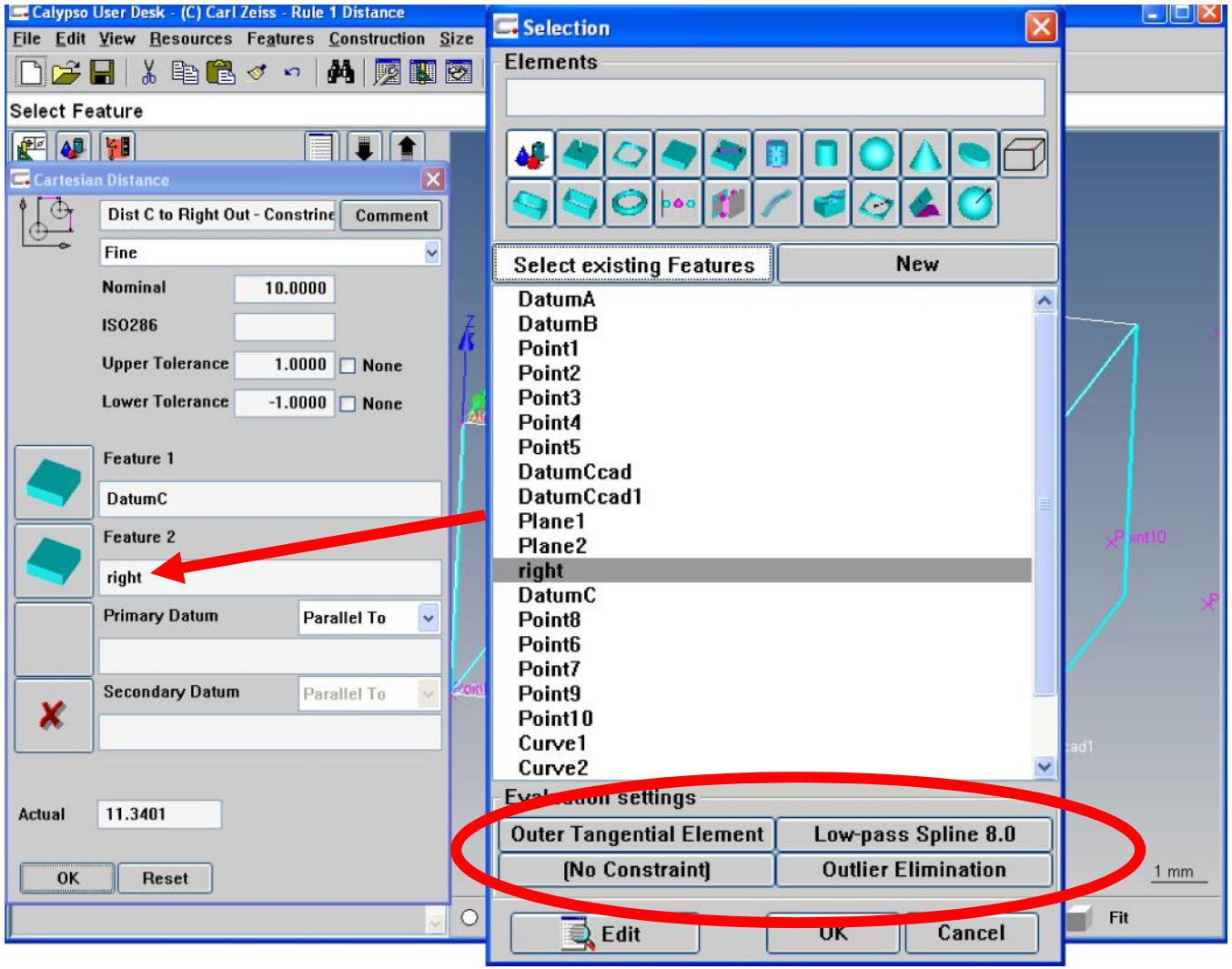

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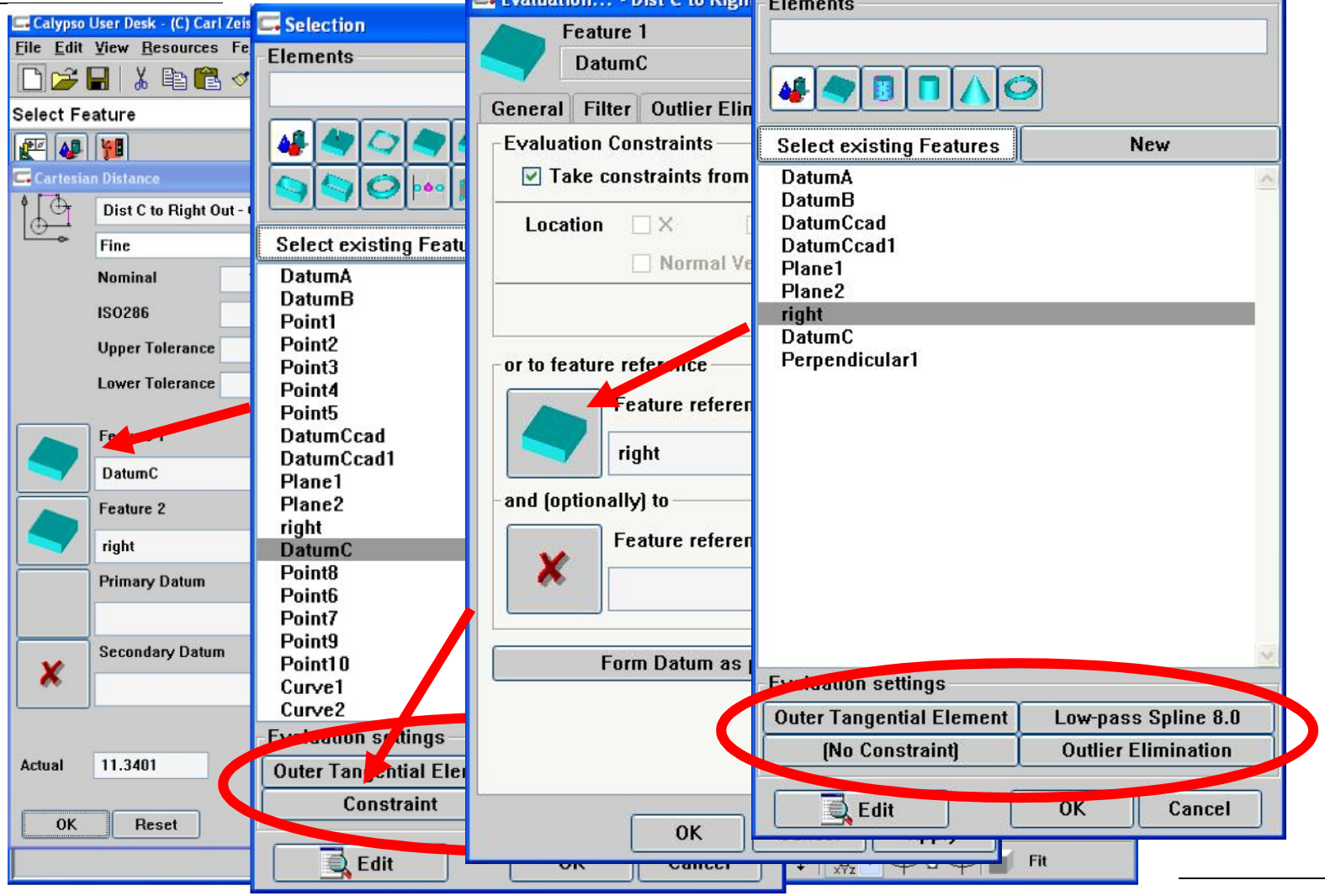

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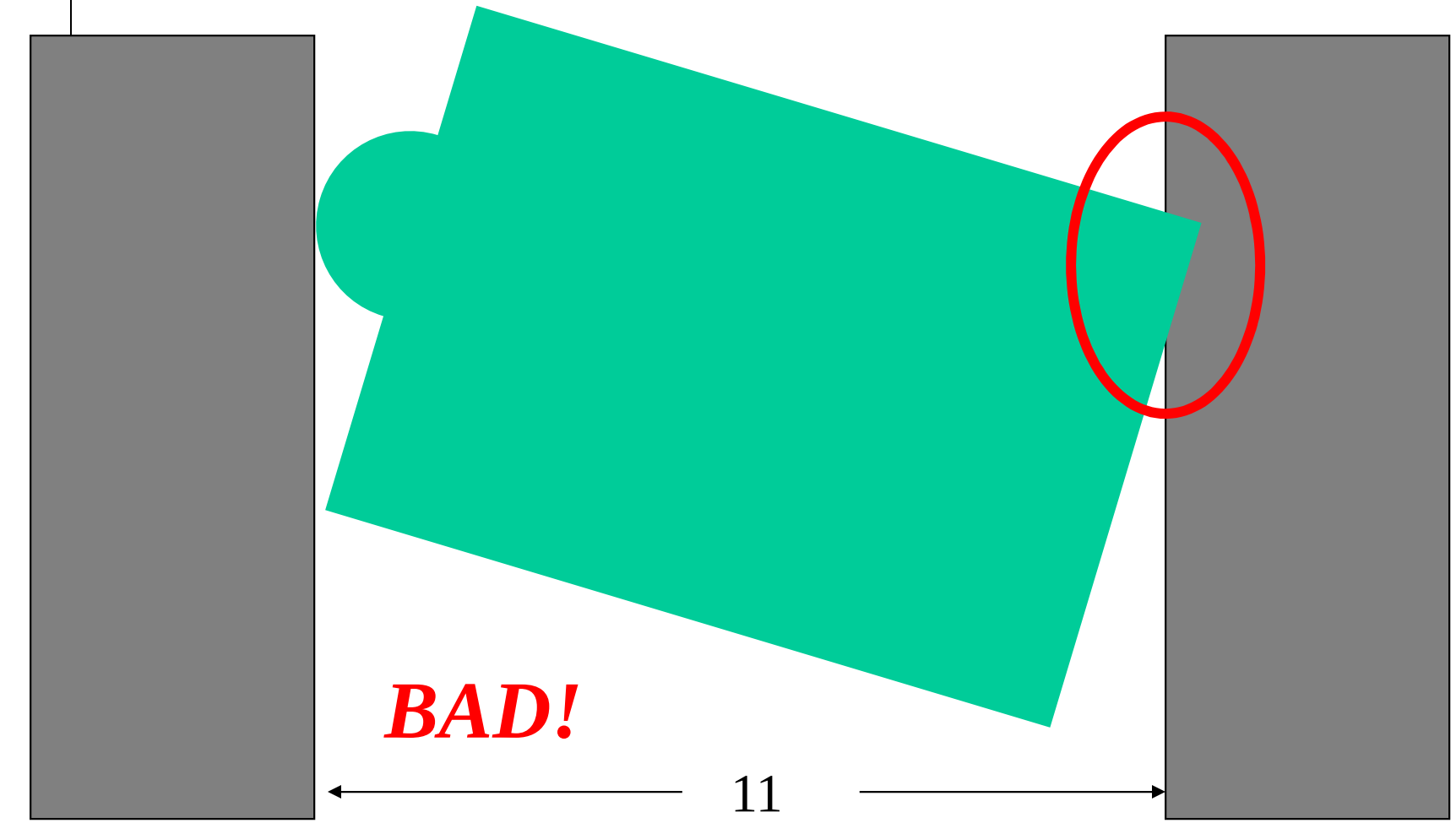

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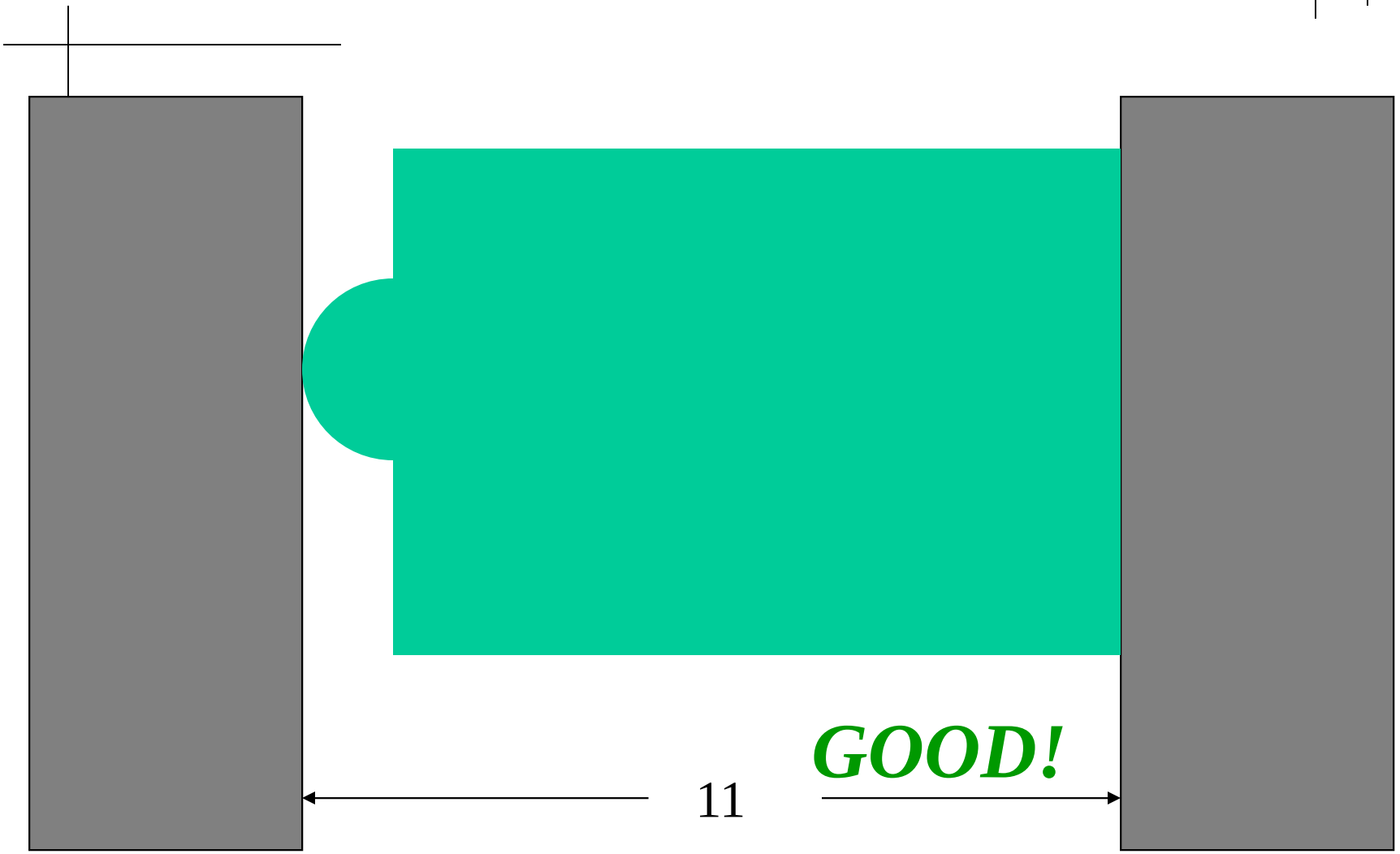

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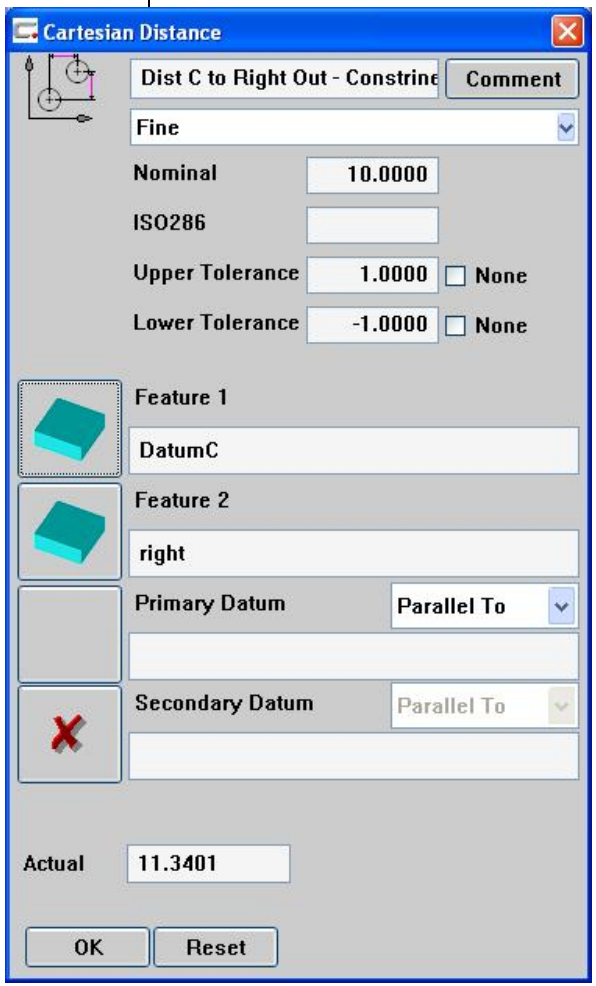
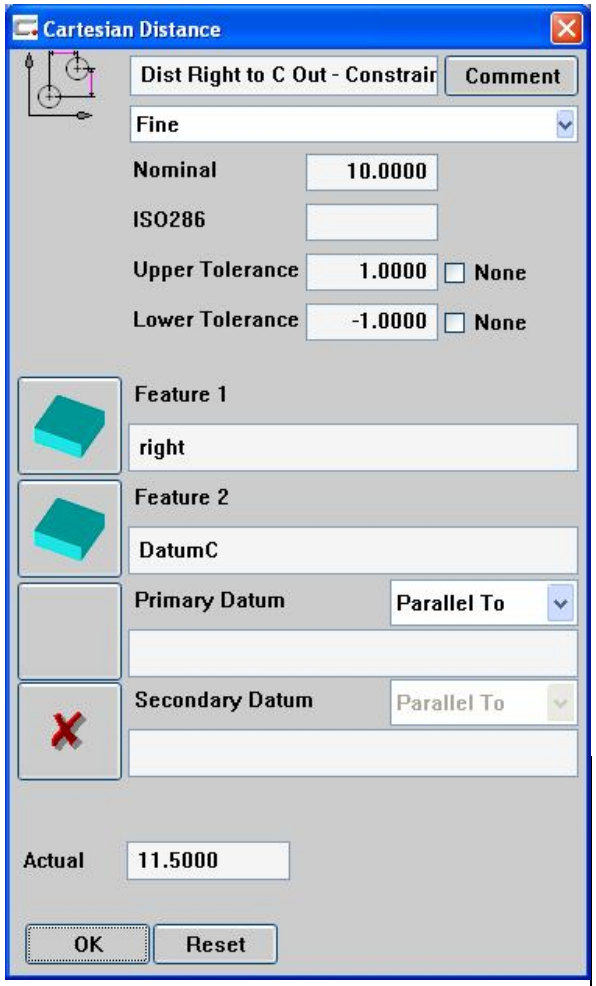


Since there's no Datum, Gotta check both!



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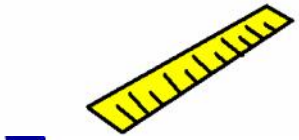

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Second Part:

The “actual local size” of any cross-section on the part must be larger than the minimum allowable distance apart.

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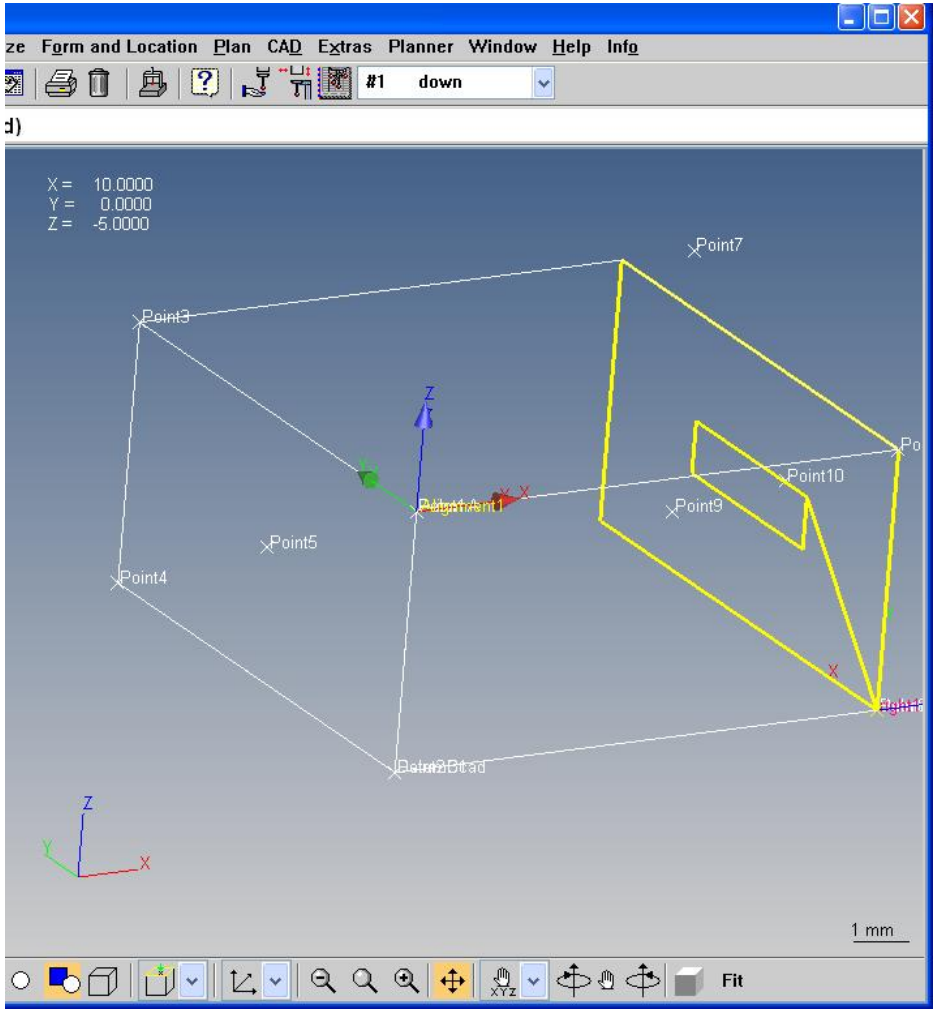
Measure the two planes with identical opposing measurement strategies.



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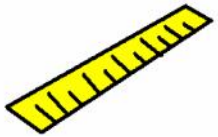

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Now, we need to

individually test the distance between all the points of a plane to the opposing point on the other plane. Report the smallest case.

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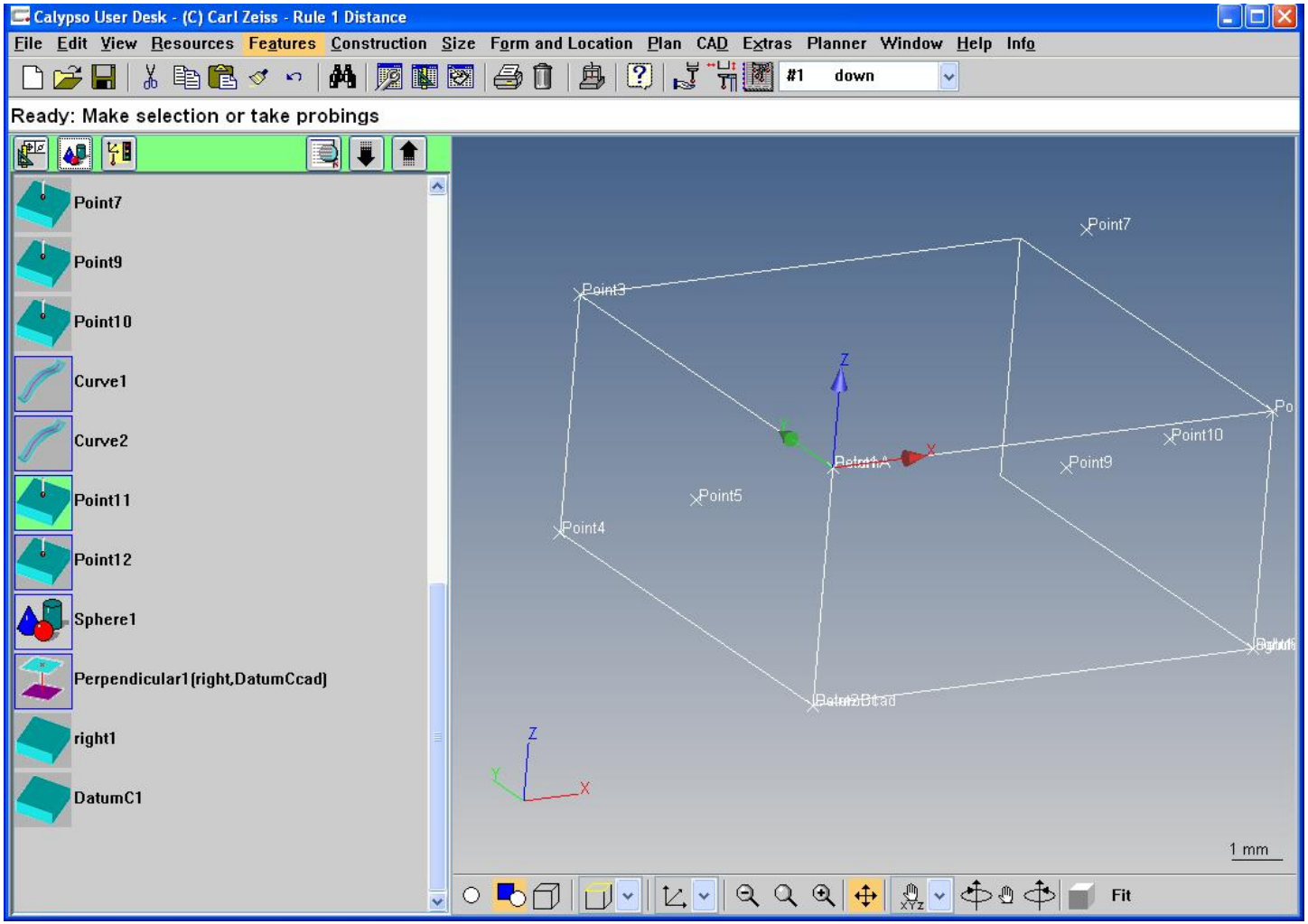

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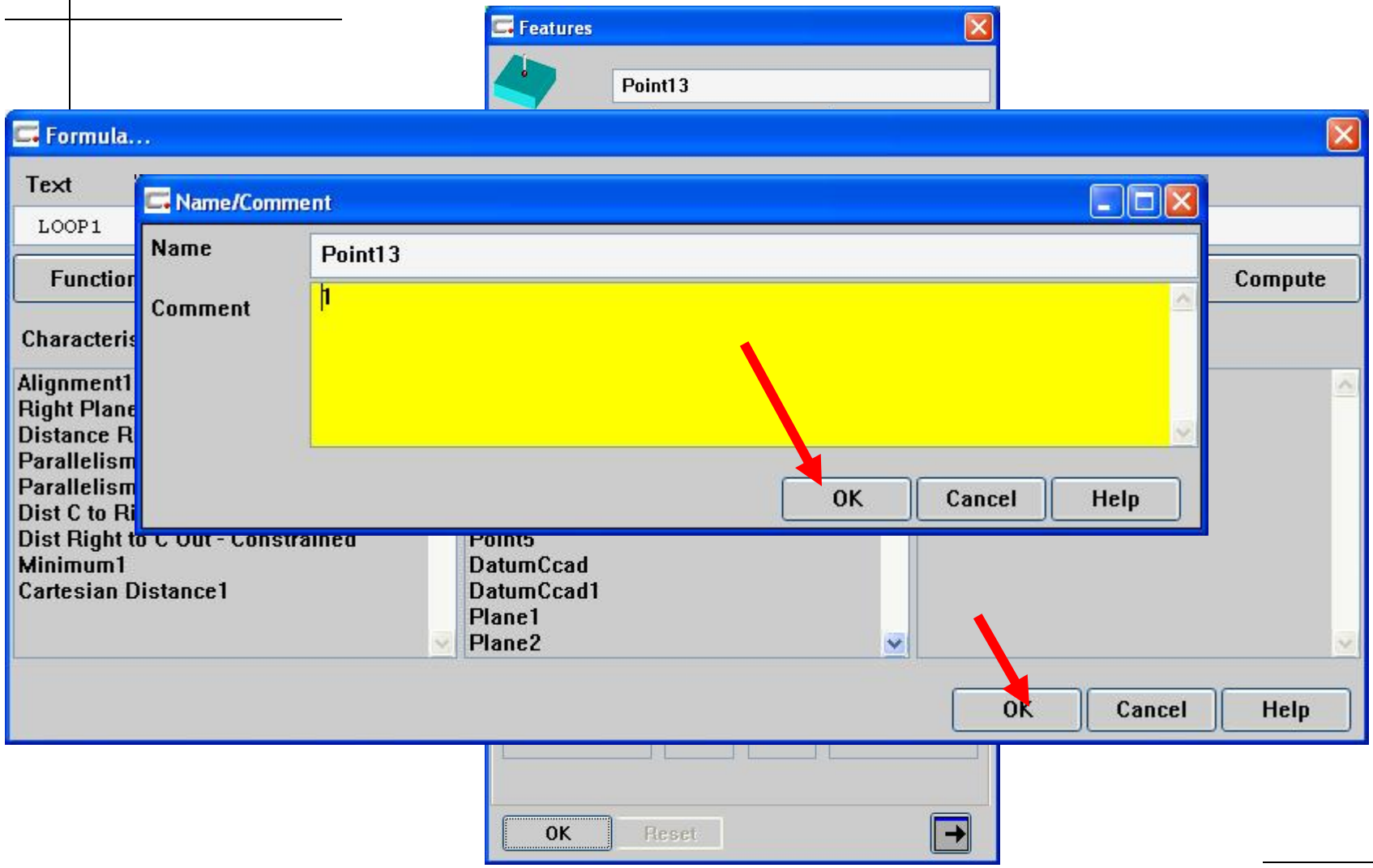

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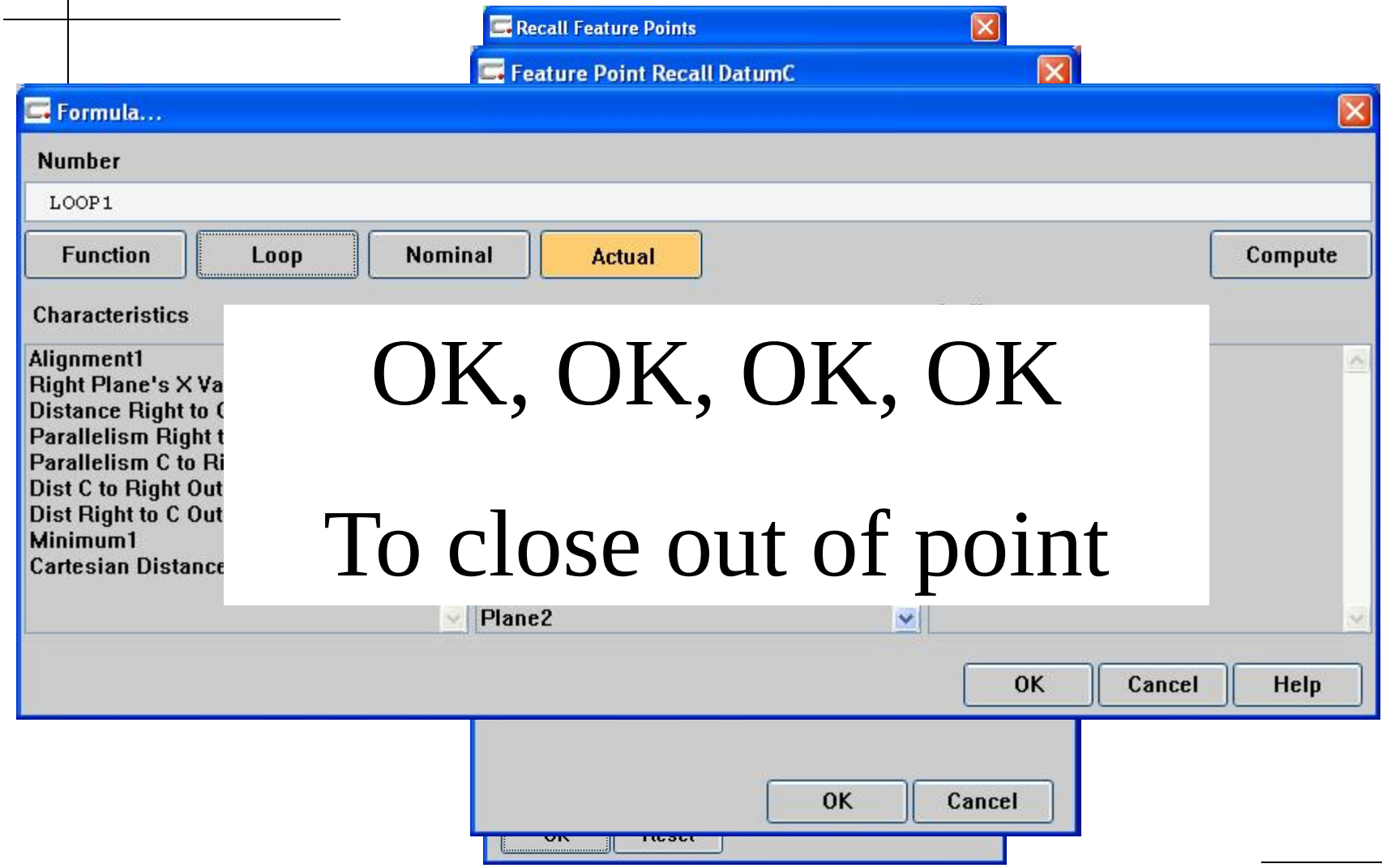

OK, OK, OK, OK

To close out of point

Repeat the same procedure to create a new point for the opposing plane.

- New point
- Comment - Formula - LOOP1
- Recall Feature Points - PLANE
- Add Limits - Formula - LOOP1

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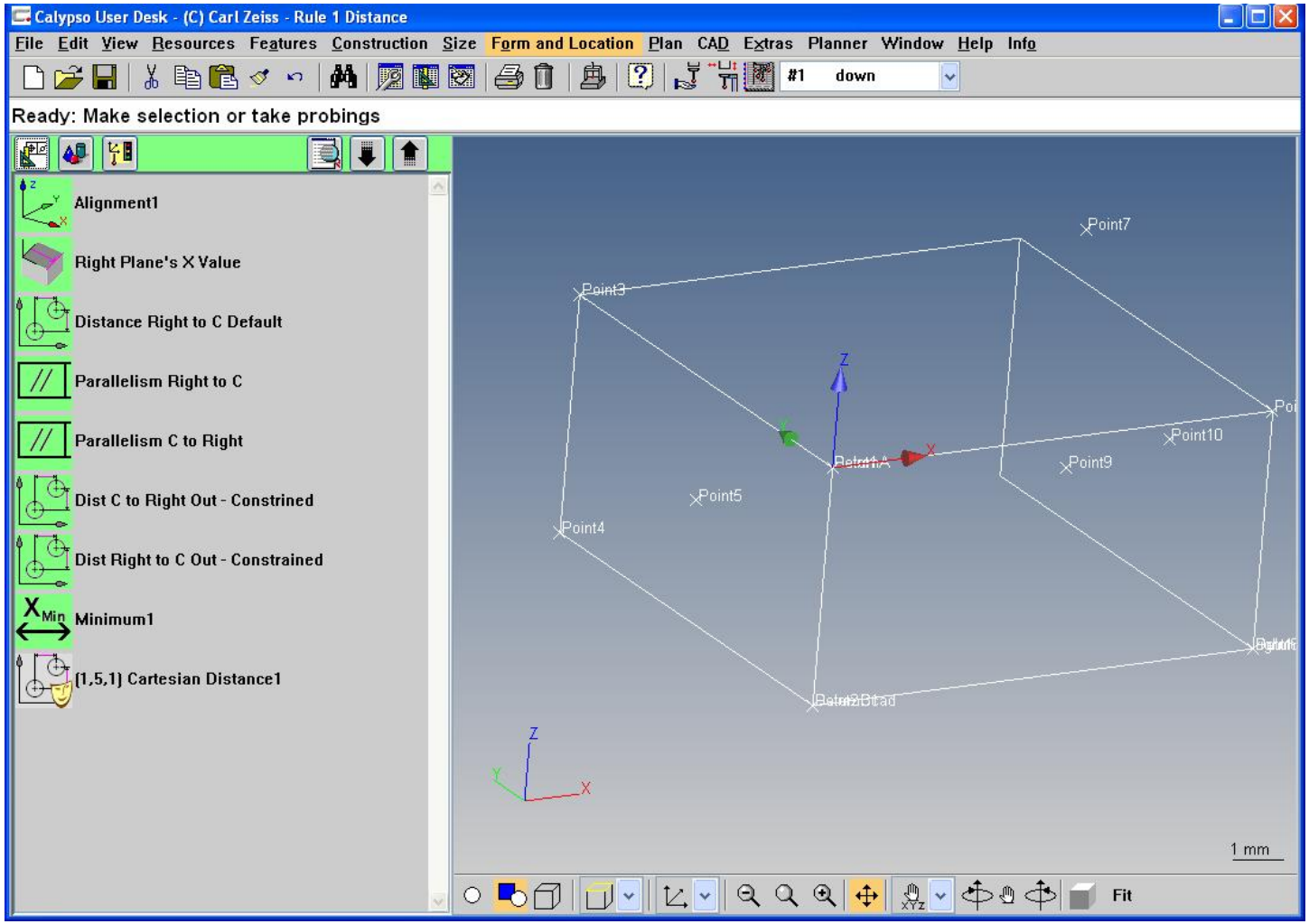

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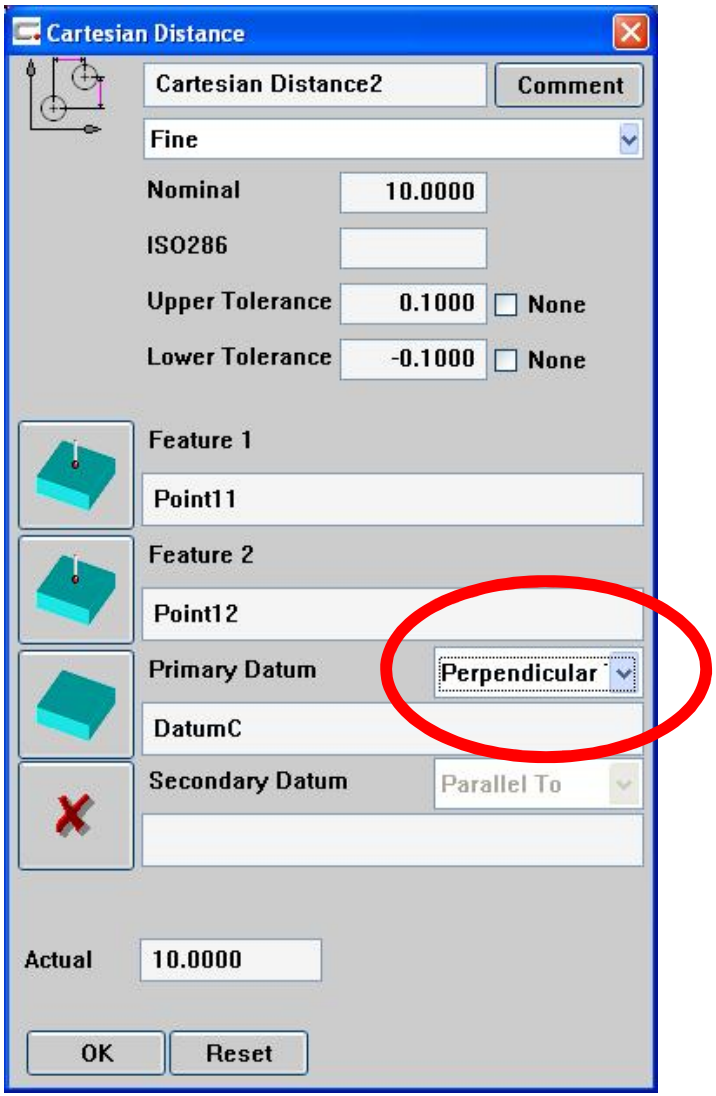

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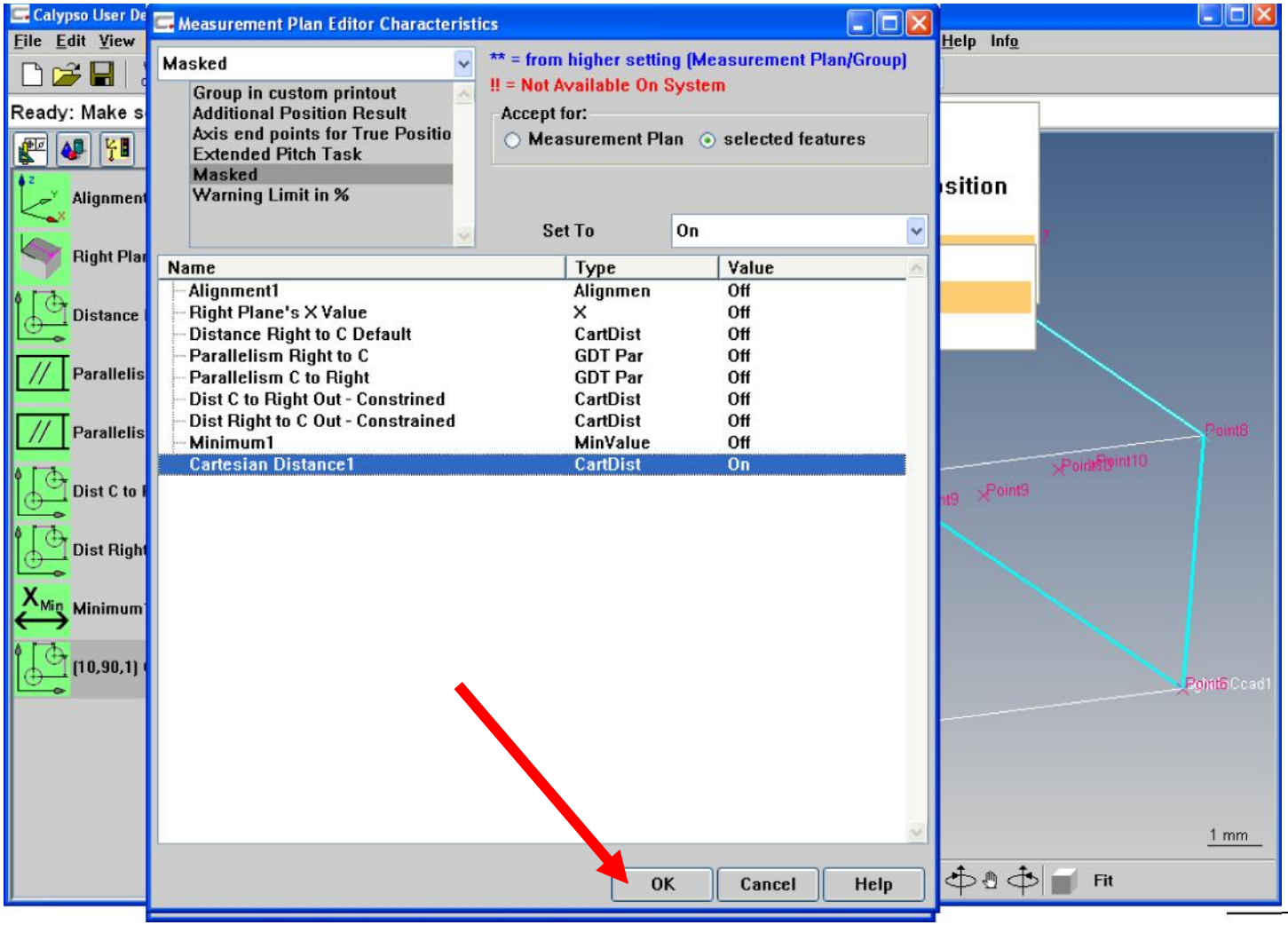

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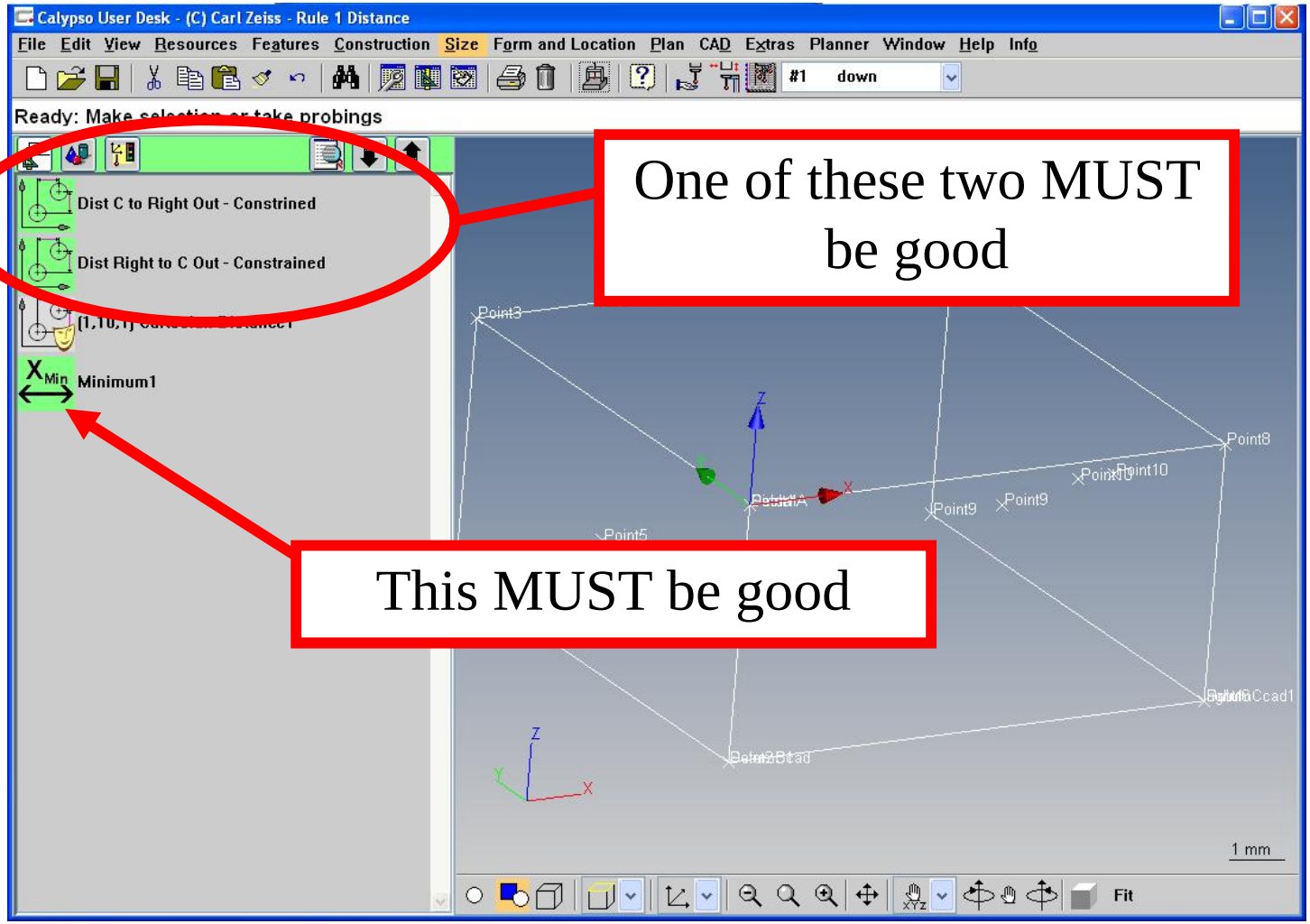

One of these two MUST be good

This MUST be good

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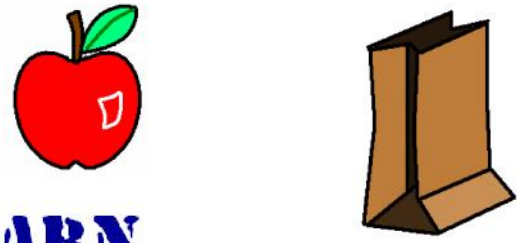

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That's it.

Easy, huh?

It's really not all that bad.

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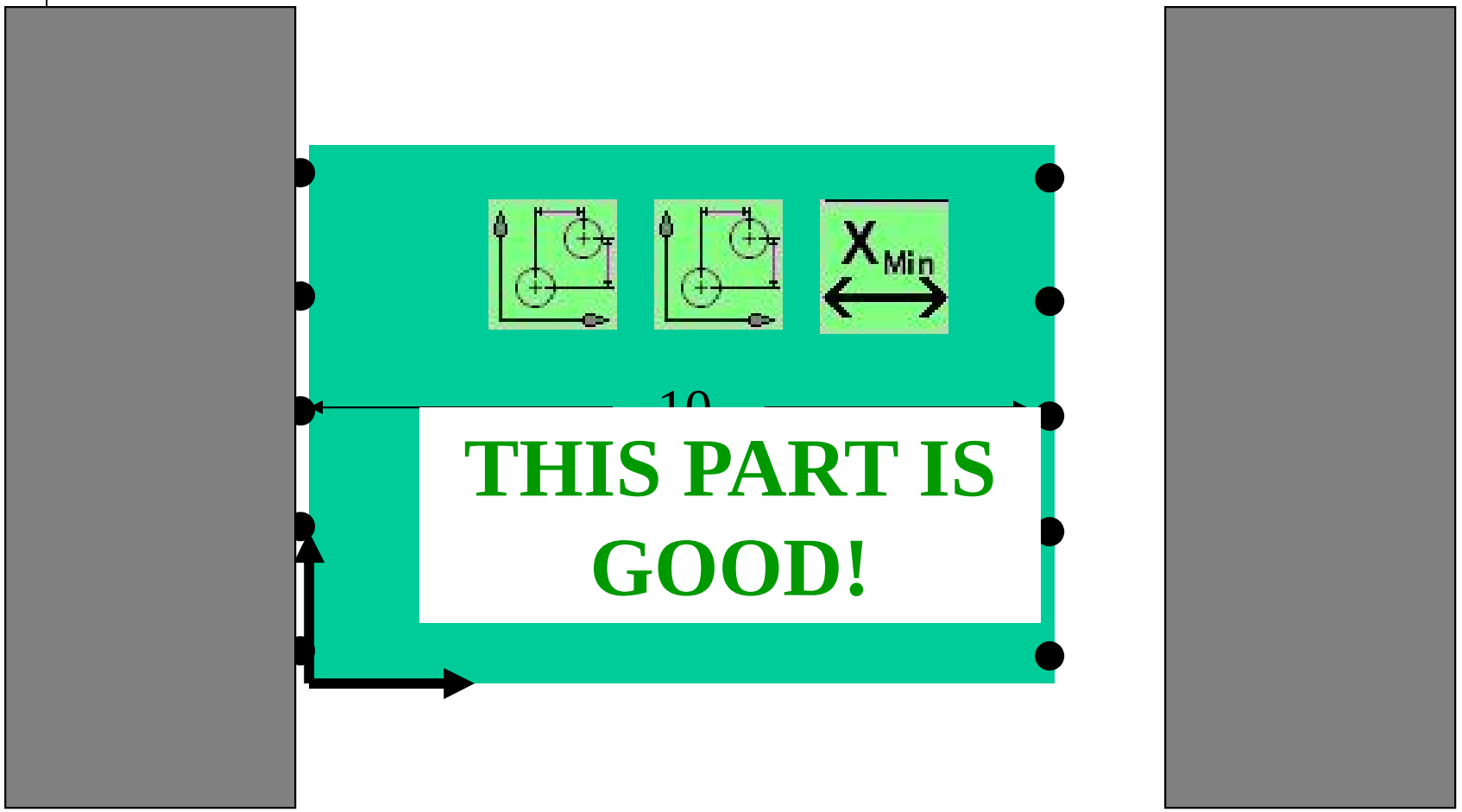

THIS PART IS GOOD!

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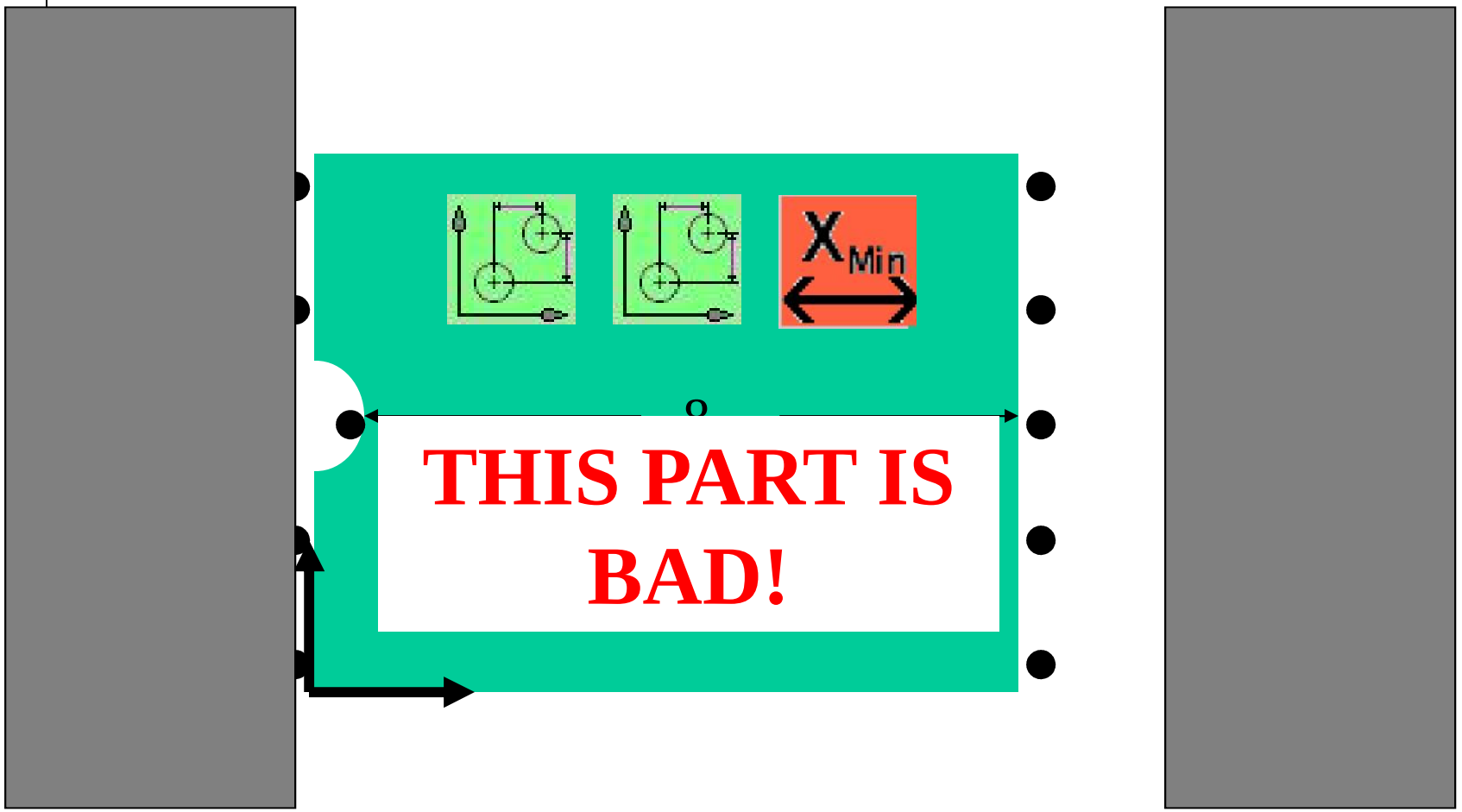

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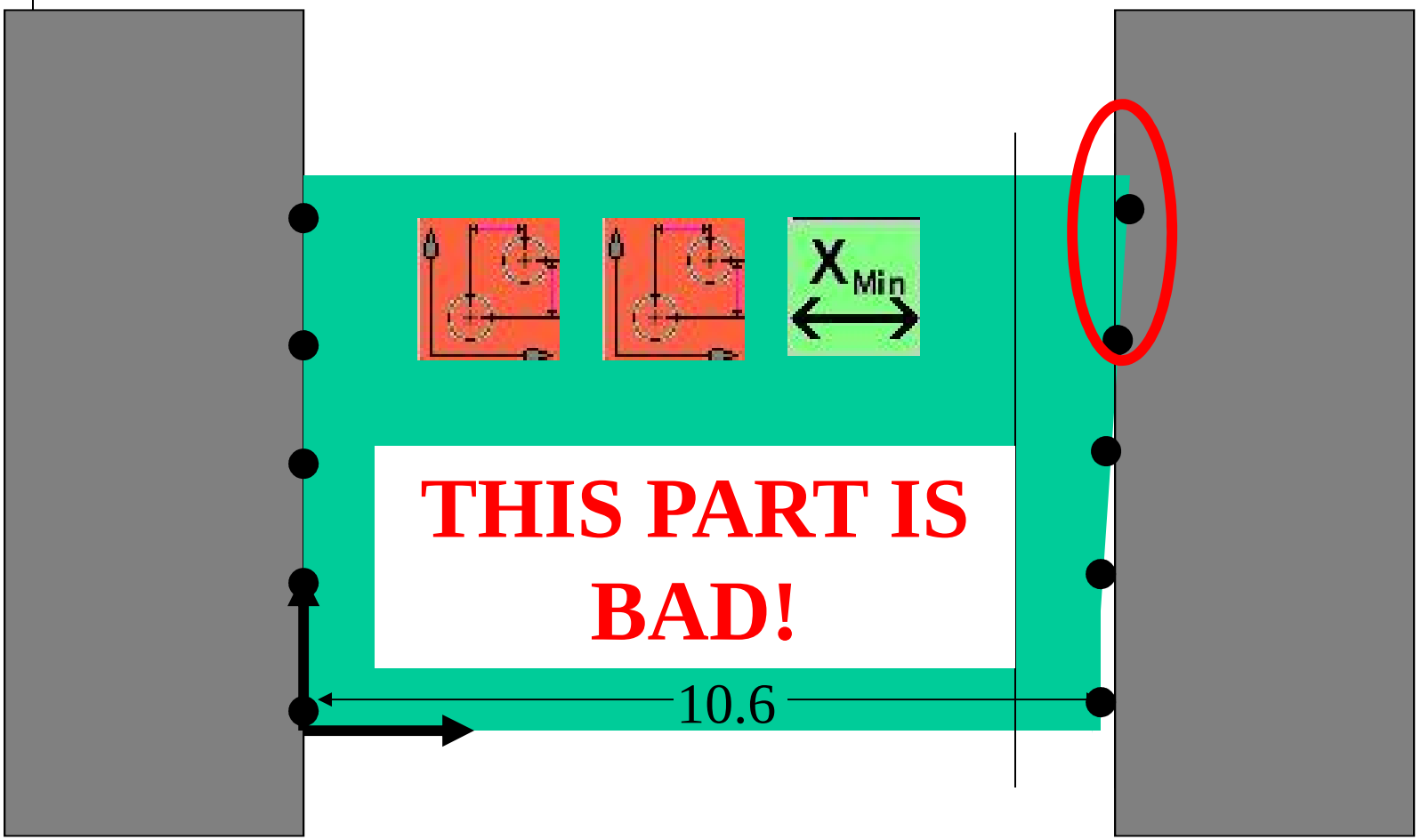

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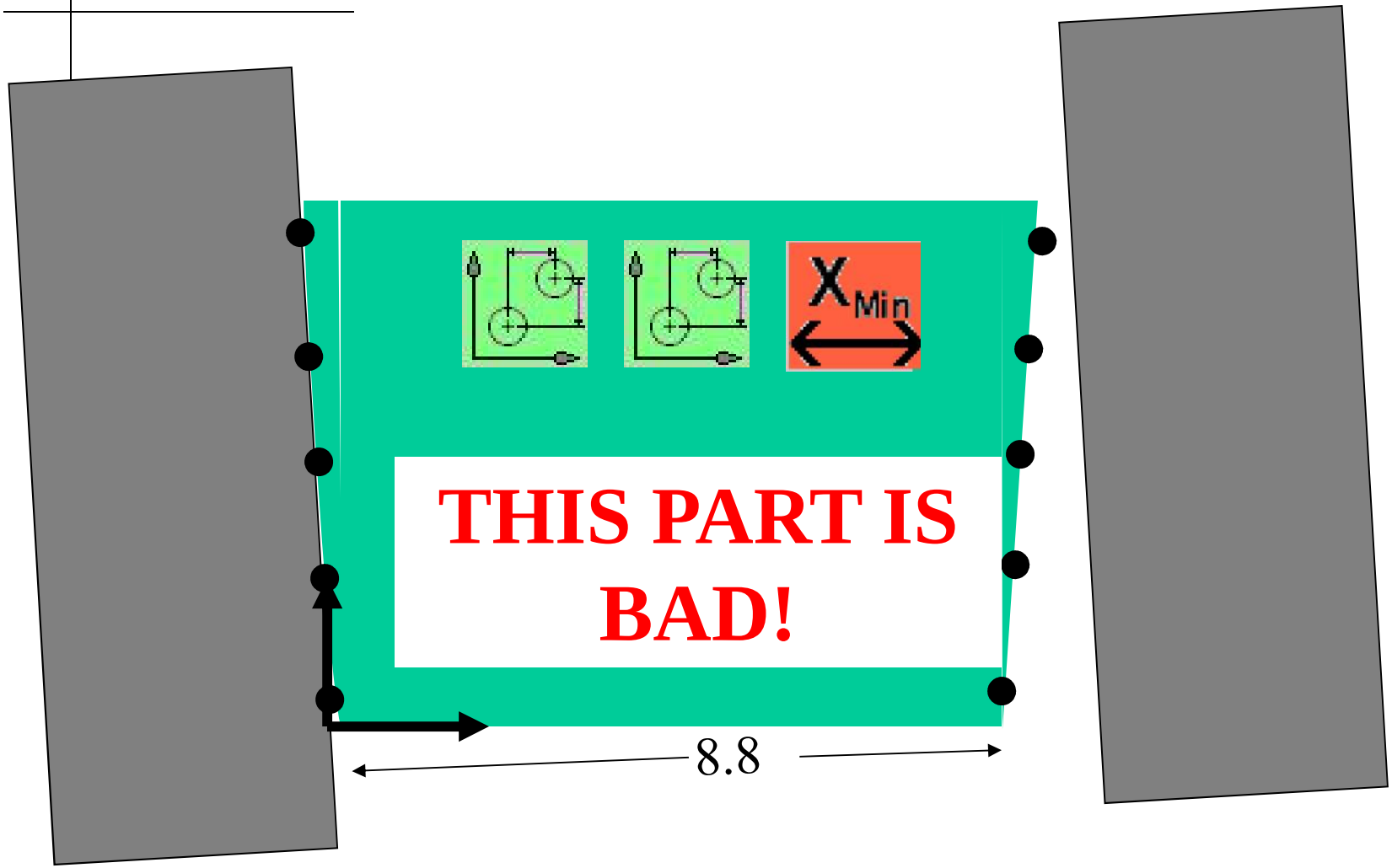

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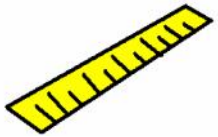

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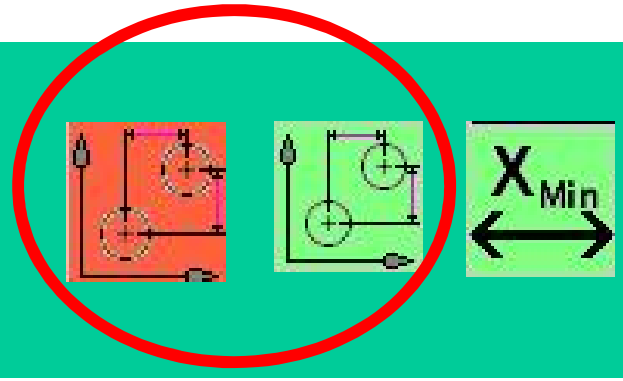

THIS PART IS GOOD!

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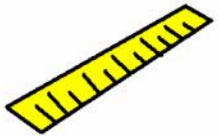

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Method 5:

Following the Standard

Ease/Practicality: 1

"Correctness": 4.9

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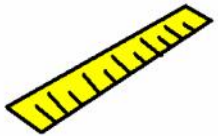

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Checking distance

with regard to Rule #1

Questions?