Measure Drill

PRINTABLE + FILLABLE PDF WORKBOOK

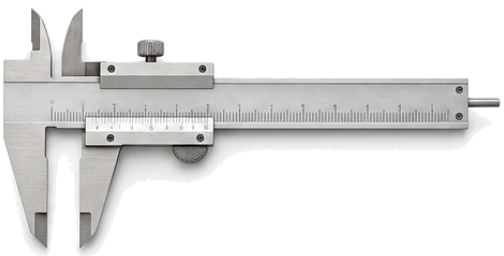
Shop Measurement Workbook

Tolerances, reading a drawing and the gauges machinists use, with checked practice and answer keys.

26 pages | US Letter + A4 | Answer keys

- Accuracy, the 10 to 1 rule, zero error and tool care
- Tolerances, in or out of spec, title blocks and fits
- Telescoping, depth, height, thread pitch and feeler gauges







Updated November 2026 · Plain English · Every answer checked

Free sample · The full workbook has every page

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What is inside

Work through it in order. Each lesson explains the idea with an example, then gives you practice. Every answer is at the back.

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How to use this workbook

Reading a tape, a micrometer or a caliper is the first step. In a shop you also need to know if the reading is good enough: whether the part is in tolerance, whether your tool can measure it, and how to read the sizes on a drawing. That is what this workbook teaches.

Who it is for

Machining, welding, fabrication, automotive and manufacturing students, apprentices, quality and inspection trainees, and anyone getting ready for a shop job or measuring test. If reading a micrometer or caliper is still new to you, start with the Micrometer and Caliper Workbook first.

How it works

1. **Read the lesson.** Each one explains the idea in plain words with a worked example.
2. **Do the practice.** Type your answers in the fillable PDF or print it.
3. **Check the back.** Every answer is in the answer key.
4. **Take the shop test** at the end and see where you stand.

Writing your answers

- Inch decimals to three places like a machinist: 0.250", not .25".
- Fractions in simplest form: 3/8", not 6/16".
- For in or out of spec, write In, or Out and how far: Out, 0.002" over.

> **Free practice:** measuredrill.com has free micrometer, caliper and dial indicator practice with a fresh drawing every time.

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LESSON 2

The 10 to 1 rule

You will: check whether a tool is fine enough for the job.

THE RULE

Your tool should read to one tenth of the total tolerance, or finer.

The total tolerance is the whole range the part is allowed to be. A part that is 1.250" plus or minus 0.005" can be anywhere from 1.245" to 1.255", so its total tolerance is 0.010". One tenth of that is 0.001", so a tool that reads to 0.001" is fine. A tape measure is not.

EXAMPLE

Total tolerance 0.010" ÷ 10 = the tool must read to 0.001" or finer

Practice

1. A tool reads to 0.010". With the 10 to 1 rule, the smallest total tolerance it should check is: _____

2. A part has a total tolerance of 0.002". With the 10 to 1 rule, the tool must read to at least: _____

3. A tool reads to 0.0001". With the 10 to 1 rule, the smallest total tolerance it should check is: _____

4. A part has a total tolerance of 0.050". With the 10 to 1 rule, the tool must read to at least: _____

5. A tool reads to 1/64". With the 10 to 1 rule, the smallest total tolerance it should check is: _____

6. A part has a total tolerance of 0.010". With the 10 to 1 rule, the tool must read to at least: _____

7. A tool reads to 1/16". With the 10 to 1 rule, the smallest total tolerance it should check is: _____

8. A part has a total tolerance of 0.020". With the 10 to 1 rule, the tool must read to at least: _____

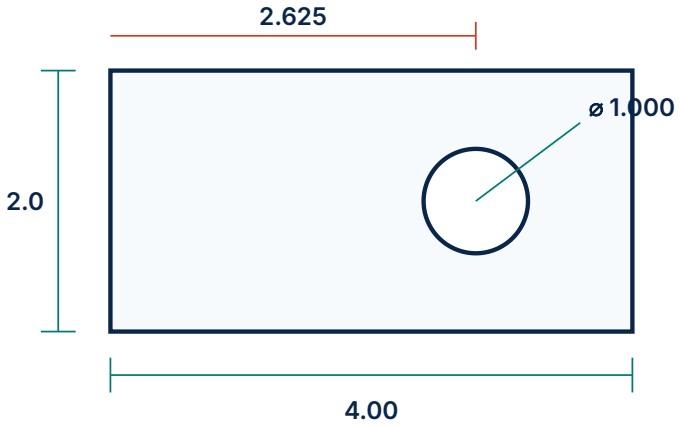
Many shops use 10 to 1 as the safe rule. Some use 4 to 1 for gauges they check carefully. When in doubt, use the finer tool.

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LESSON 9

Sizes and the title block

You will: find the tolerance of a size that has no tolerance written next to it.



TOLERANCES unless otherwise stated	
.X	± .1
.XX	± .01
.XXX	± .005
Fractions	± 1/64
Angles	± 1/2°

Most sizes on a drawing have no tolerance next to them. The tolerance comes from the **title block**, and it depends on how many decimal places the size is written with. More places means a tighter tolerance.

EXAMPLE

Using this block: 4.00 has two places, so ± .01, limits 3.99" to 4.01". The hole ⌀ 1.000 has three places, so ± .005, limits 0.995" to 1.005".

Every company writes its own title block. This one is a common example used for practice in this workbook. On the job, always use the block on your drawing.

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