INFORMATION SHEET

ON

MICROMETER

SUBJECT: Read The Micrometer

INTRODUCTORY INFORMATION:

In many trades the micrometer is an instrument used to make very precise measurements. To read the micrometer the operator must note three separate items. Two of these items or readings are taken from the barrel of the micrometer and the third is taken from the thimble. Accuracy in the reading of the micrometer is as important as taking the actual measurement.

GENERAL INFORMATION:

Spindle Threads

There are 40 single threads per inch on a micrometer spindle. One turn of the thimble on this screw moves it 1/40 of an inch. To change 1/40 to a decimal, we write it thusly: 1/40 = .025".

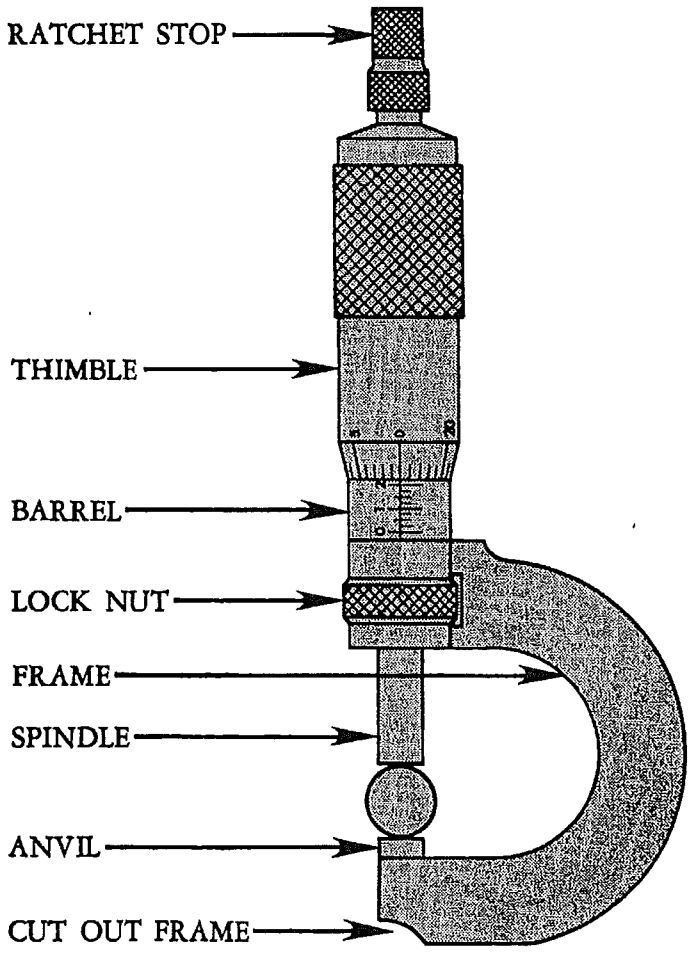
Barrel

The barrel is marked in such a manner that a line is scribed for each 1/40 or .025". To aid in keeping track of these lines, every time four lines are passed a number appears. For example, when the micrometer is opened from 0 through four complete turns of the thimble, the figure 1 appears on the barrel. This figure is read as .1" or one-tenth of an inch. To assist further in reading the "mike," the thimble is graduated into 25 equal parts. Each line on the thimble is 1/25 or 1/40 or 1/1000. The fraction 1/1000 is written as a decimal thusly: .001".

Read The "Mike"

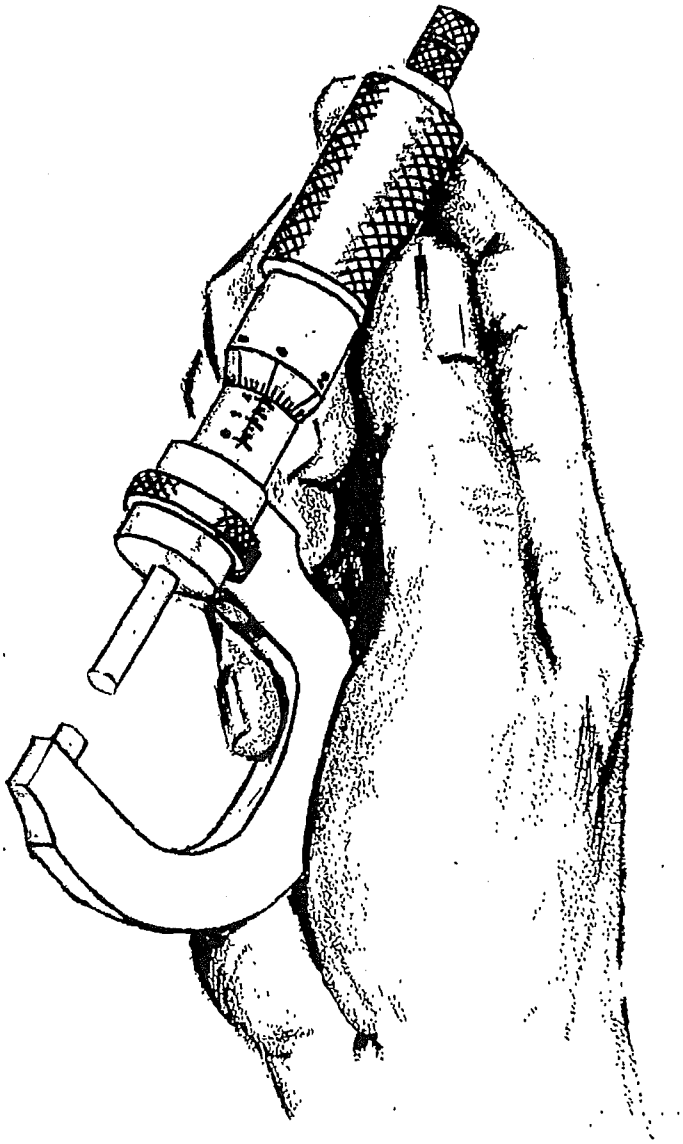
To read the mike, first observe the number of divisions on the barrel, the line on the barrel, and the number of thousandths on the thimble. Take a reading from the mike by counting the number of divisions visible on the barrel and add to this amount the number of thousandths on the thimble coinciding with the line on the barrel. The reading on the mike parts illustration sheet is .225".

PARTS OF THE MICROMETER CALIPER



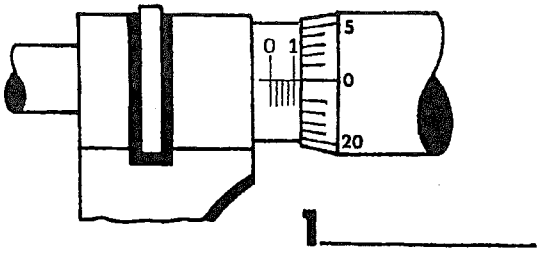
READING ON MIKE .225

HOLD THE MICROMETER CALIPER



Pictorial Recall Test Sheet
on
Reading The One Inch Micrometer

What are the correct readings in thousandths of an inch for the following settings on the one inch micrometer? Write in the correct answer in the blank space provided by each illustration.



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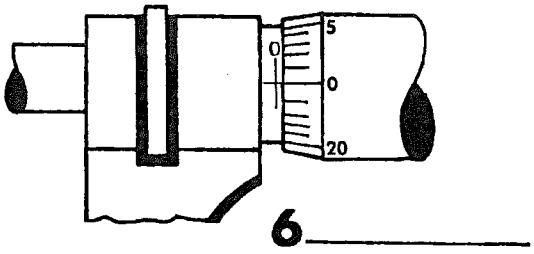

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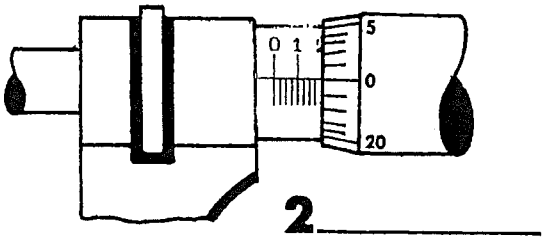

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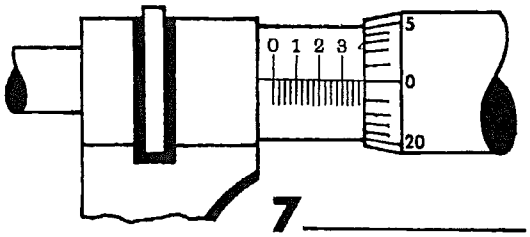

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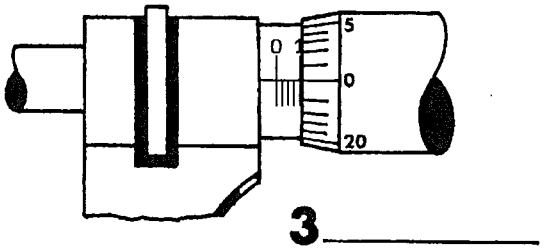

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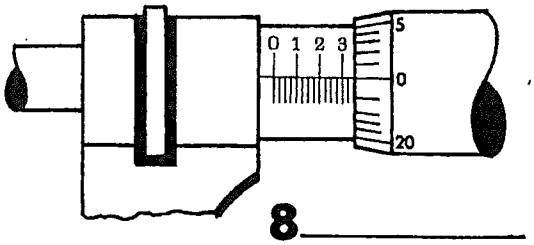

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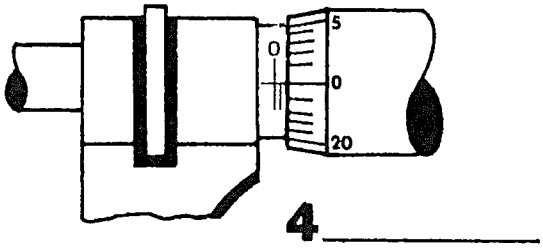

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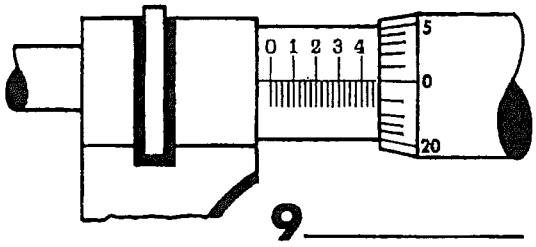

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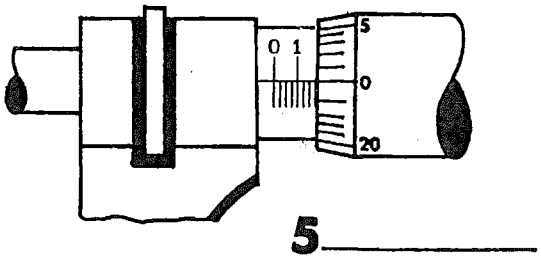

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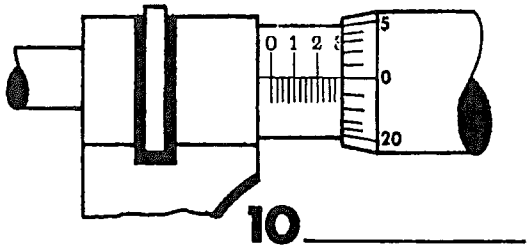

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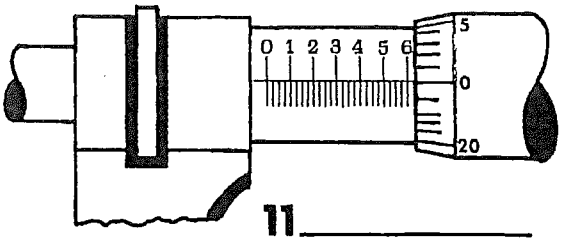

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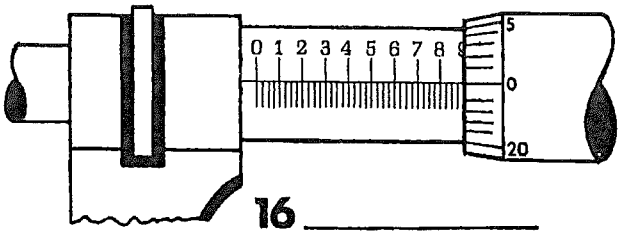

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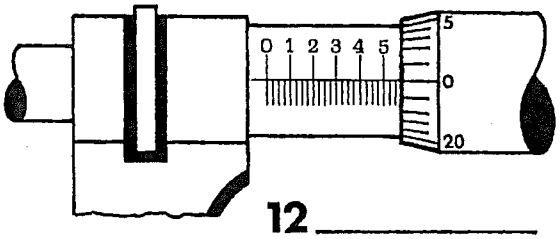

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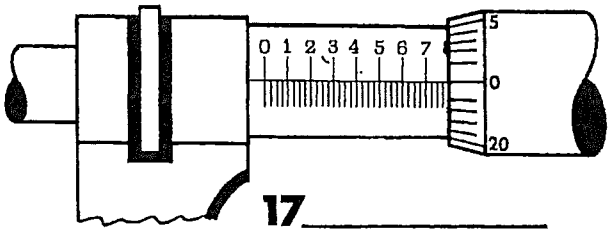

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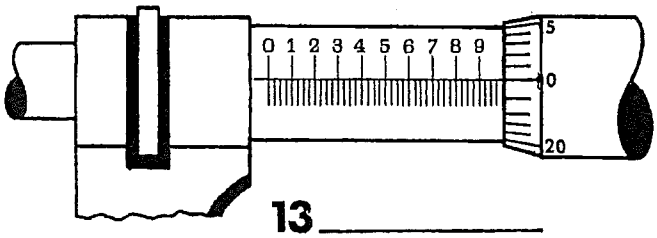

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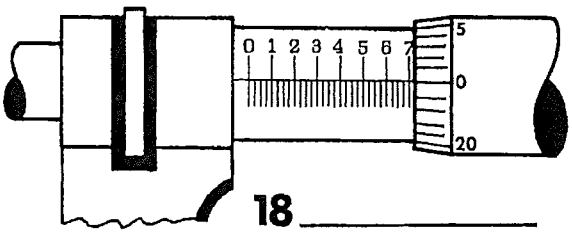

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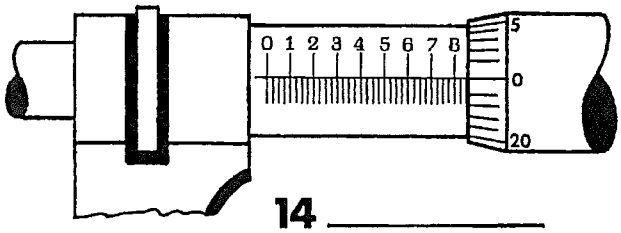

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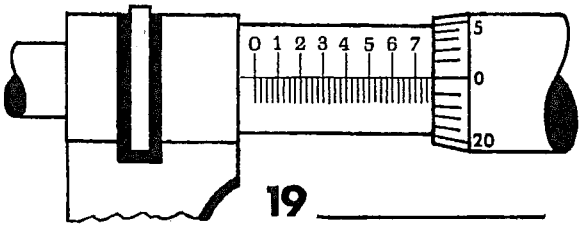

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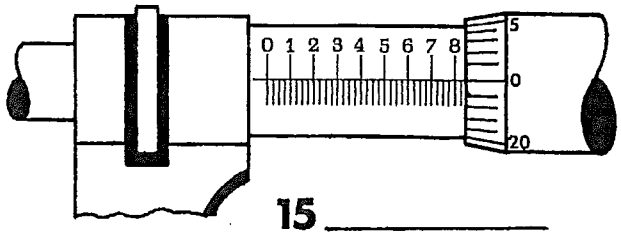

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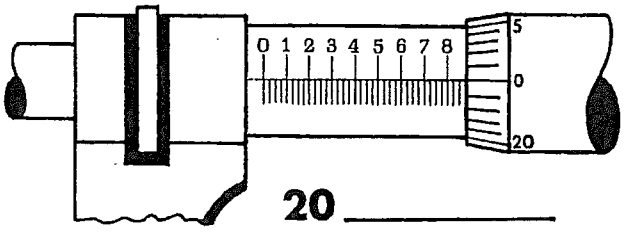
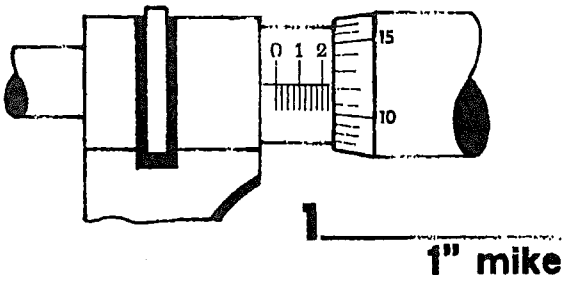


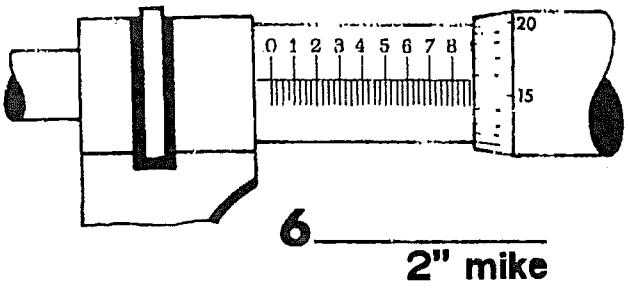
20 _____

Pictorial Recall Test Sheet
on
Reading Various Size Micrometers

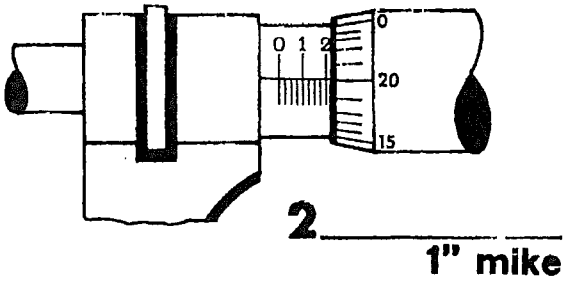
What are the correct readings in thousandths of the following settings on various size micrometers? Place the correct answer in the blank space provided by each illustration.



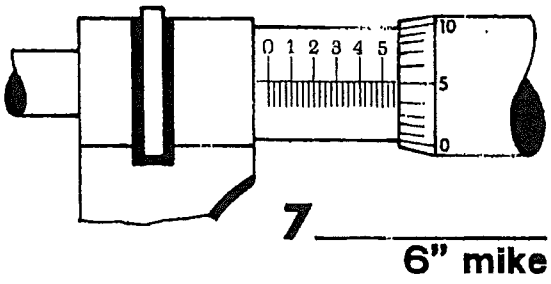
1_____ 1" mike



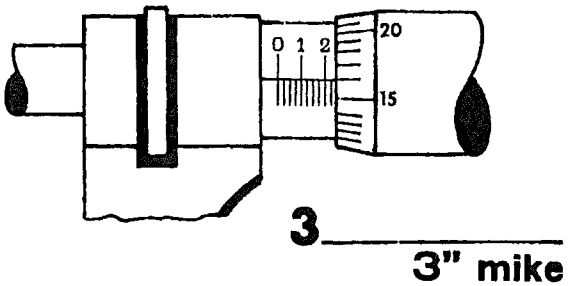
6_____ 2" mike



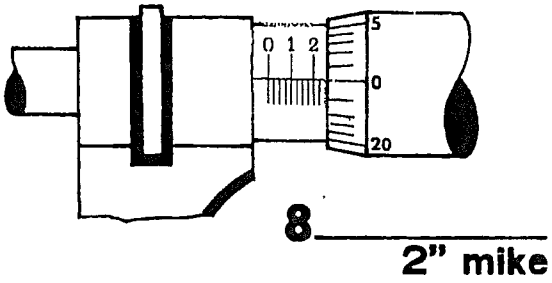
2_____ 1" mike



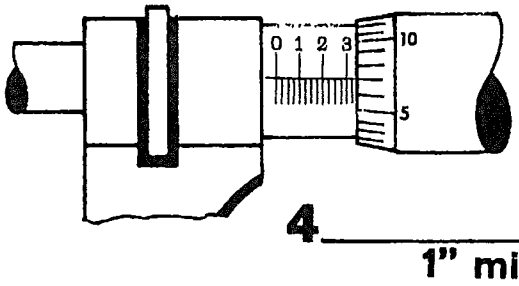
7_____ 6" mike



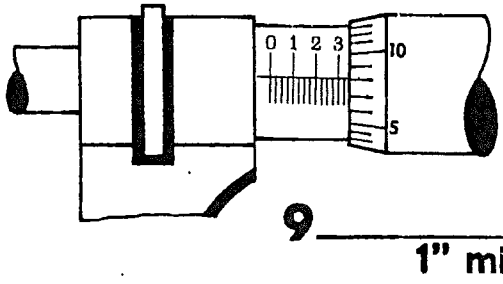
3_____ 3" mike



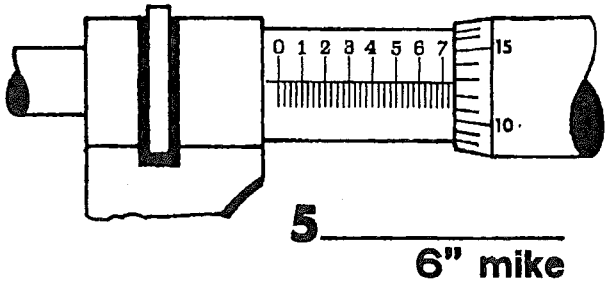
8_____ 2" mike



4_____ 1" mike



9_____ 1" mike



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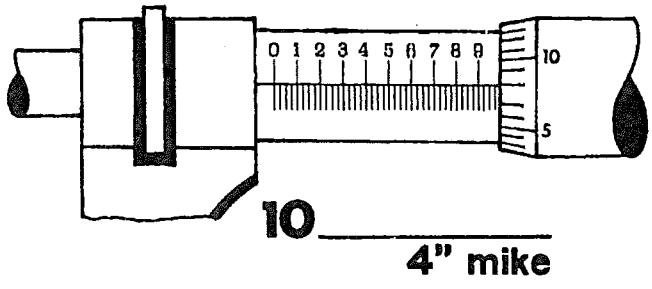
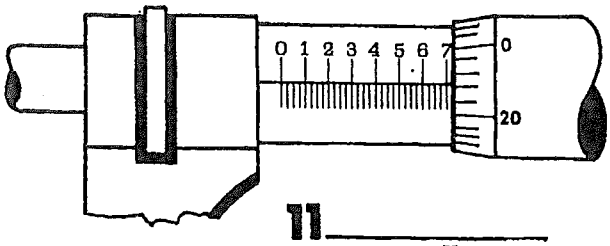
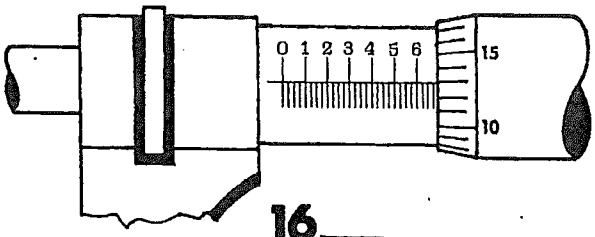


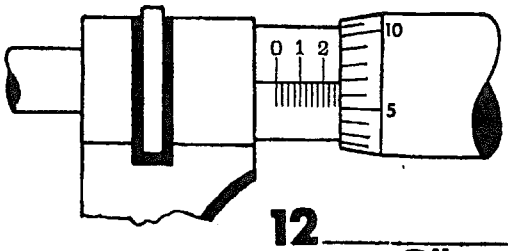
10_____ 4" mike



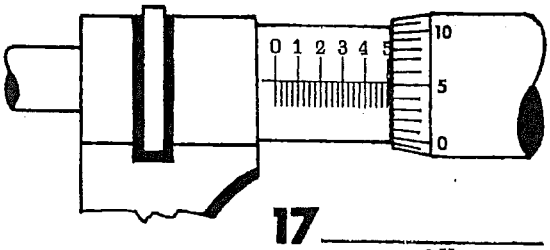
11 5" mike



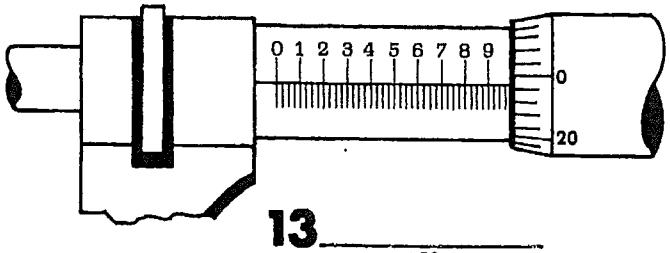
16 2" mike



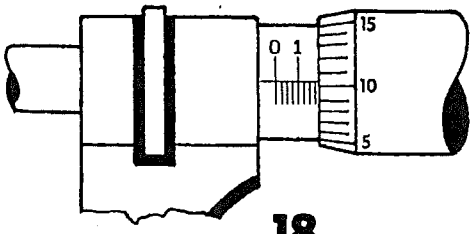
12 3" mike



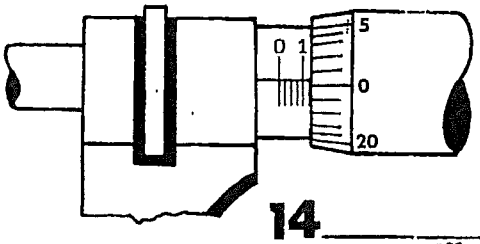
17 4" mike



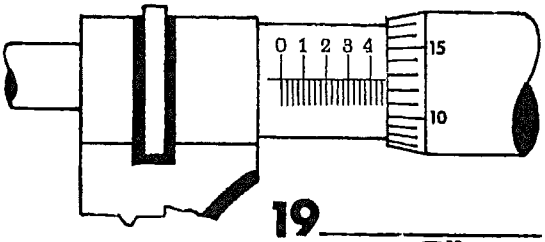
13 1" mike



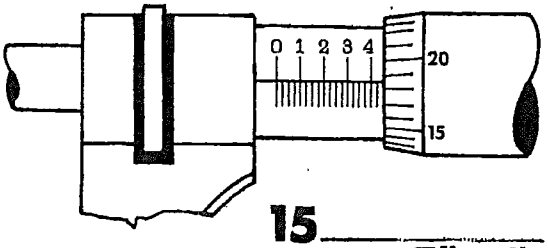
18 1" mike



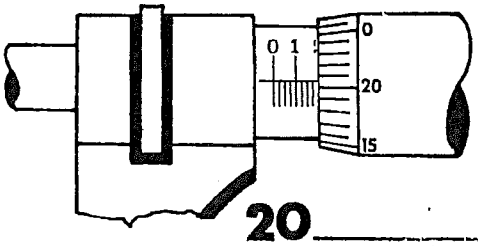
14 1" mike



19 5" mike



15 5" mike



20 4" mike

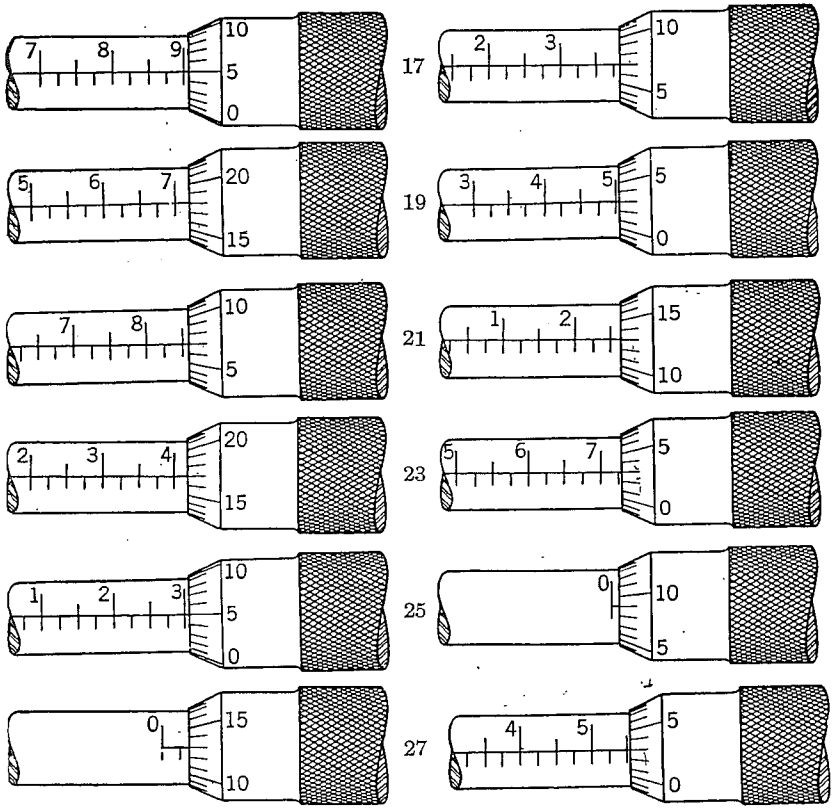
EXERCISES

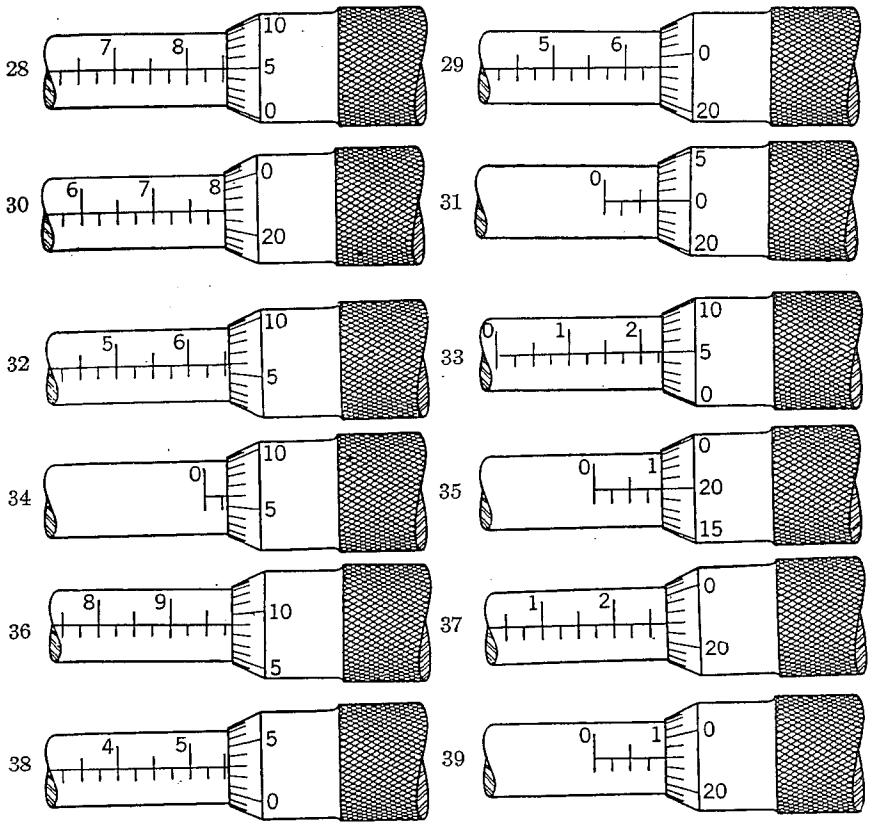
State as a decimal the length that each of the following distances indicates:

1. Five major on sleeve
2. Three minor on sleeve
3. Eight major on sleeve
4. Three major, two minor on sleeve
5. Five major, three minor on sleeve
6. Five on thimble
7. Twelve on thimble
8. Nineteen on thimble
9. One on thimble
10. Thirteen on thimble

Two minor on sleeve, and eight on thimble
Three minor on sleeve, and sixteen on thimble
Two major and two minor on sleeve, and six on thimble
Eight major, one minor on sleeve, and eleven on thimble
Four major on sleeve, nine on thimble

Make the following readings:





What to do when a line on the thimble is not exactly at the main line of the sleeve

How would you make the reading on the micrometer shown below?

In this case, there are six major division points on the sleeve. This corresponds to a distance of 0.6 in. There are in addition three minor divisions showing on the sleeve. This corresponds to 3 x 0.025, or 0.075 in. The main line of the sleeve falls between 8 and 9 on the thimble. We choose the division point which is nearer the main line. Here the nearer one is 8. Hence the reading is 0.6 + 0.075 + 0.008, or 0.683 in. (In order to avoid errors in addition, it would be well to write the decimals in a column with decimal points in line.)

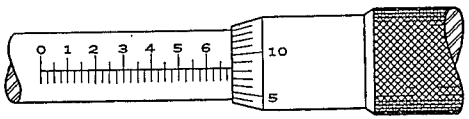
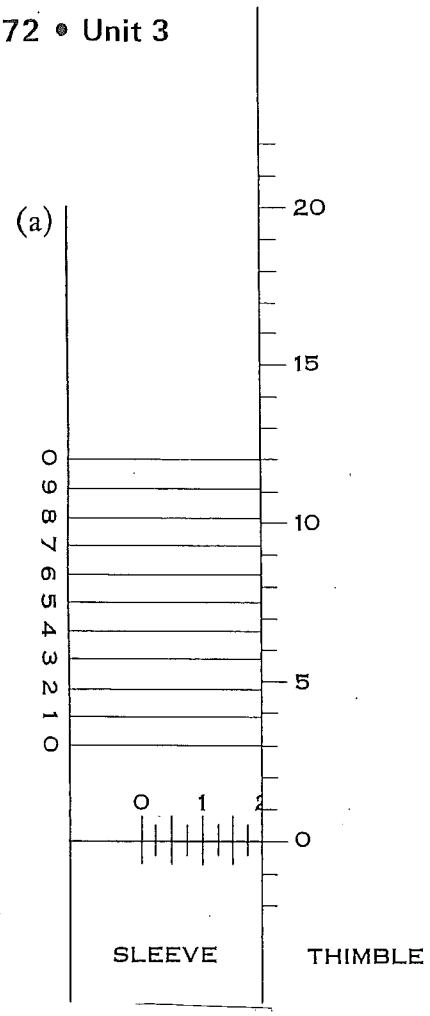
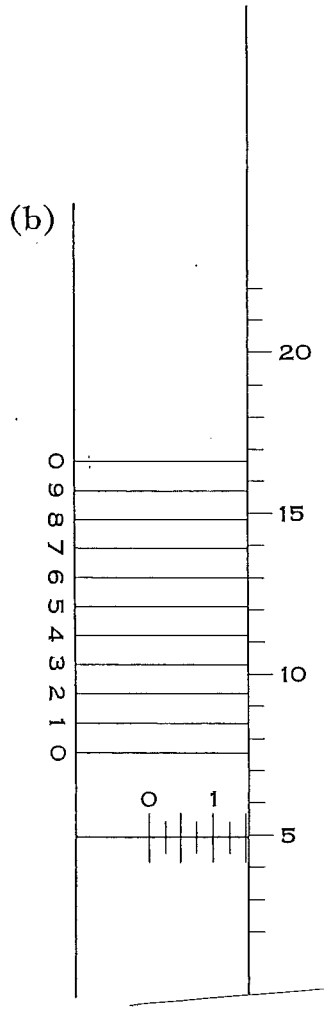
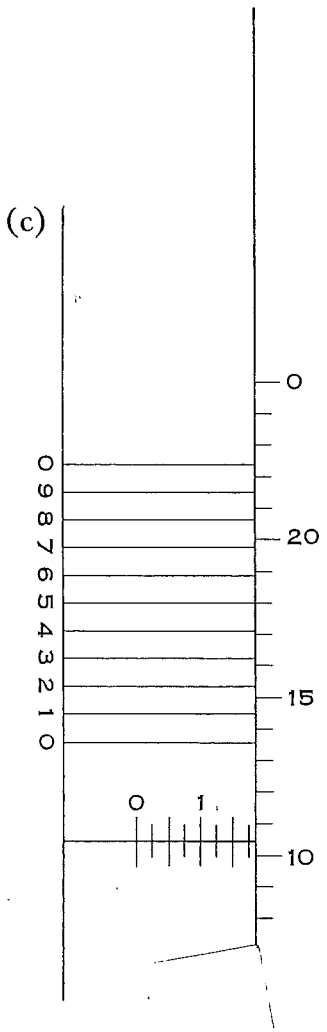


Fig. 3-12.


(a)
20
15
10
5
0
0 9 8 7 6 5 4 3 2 1 0
0 1 2
SLEEVE
THIMBLE


(b)
20
15
10
5
0 9 8 7 6 5 4 3 2 1 0
0 1


(c)
0
20
15
10
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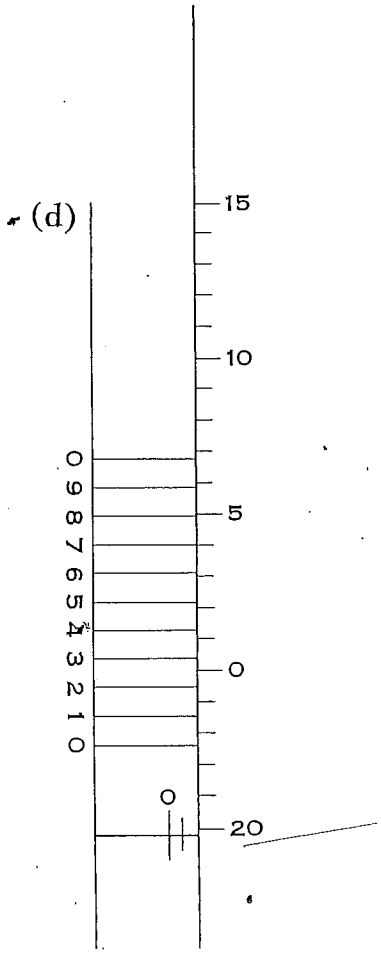
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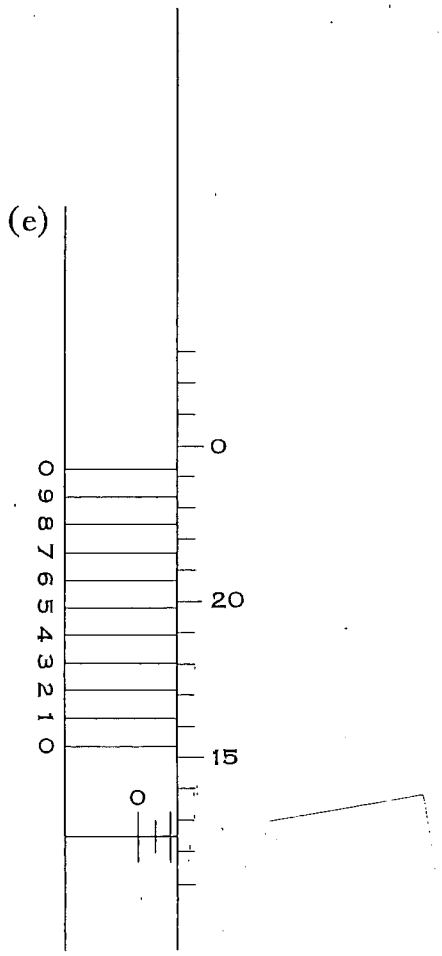
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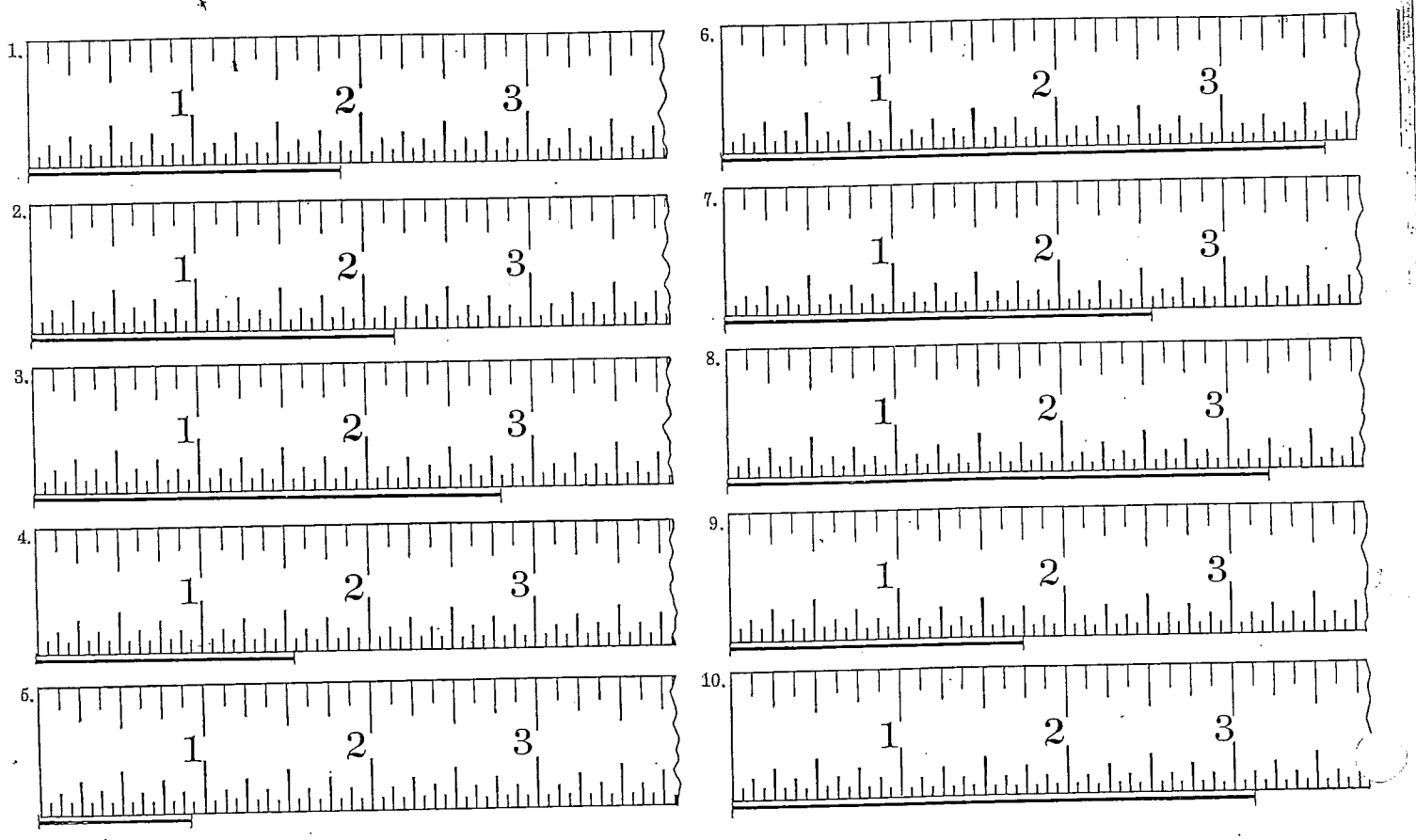
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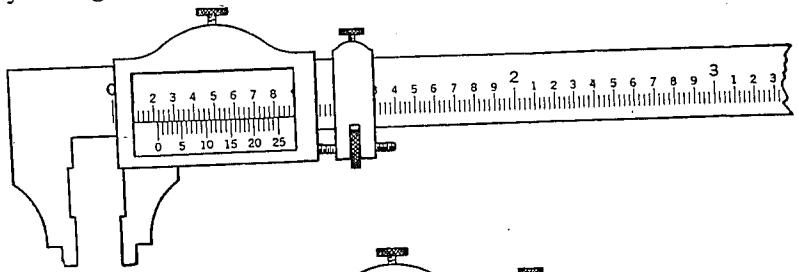
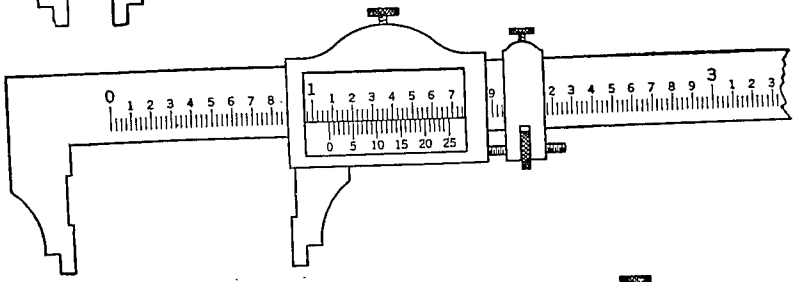
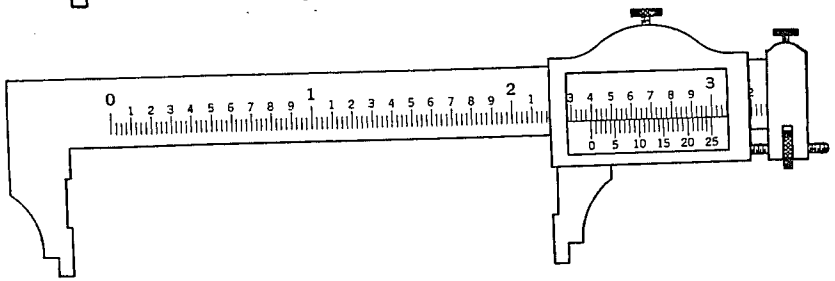
EXERCISES

Make the readings on the vernier calipers shown. (These figures are ghtly enlarged for ease in reading.)







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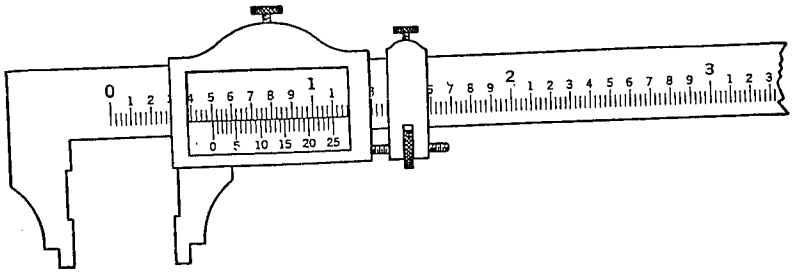

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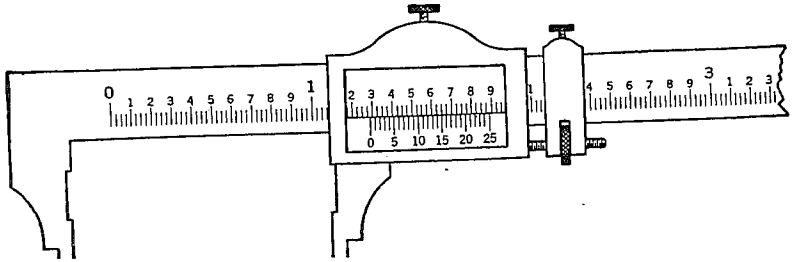

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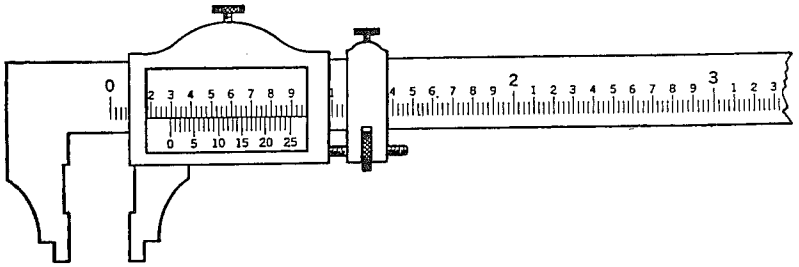

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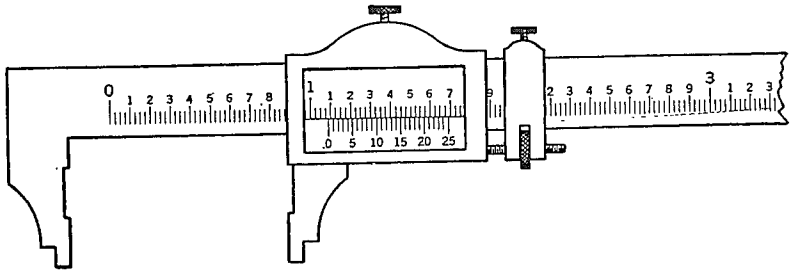

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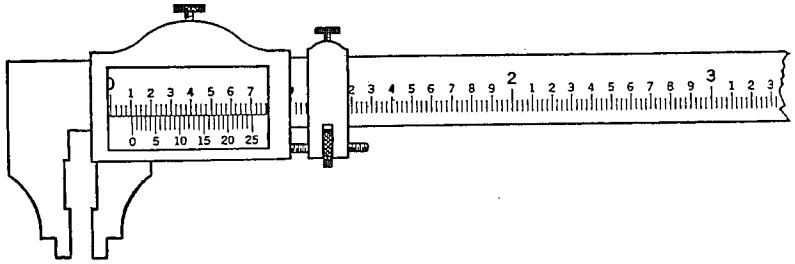

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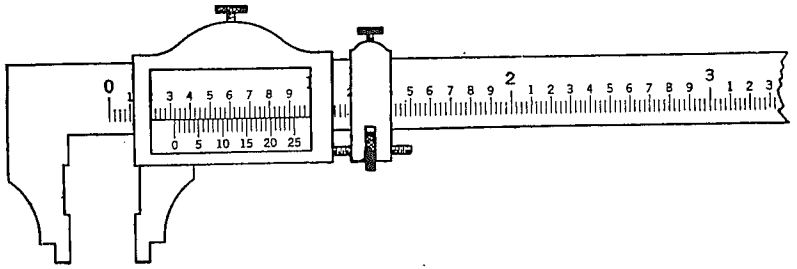

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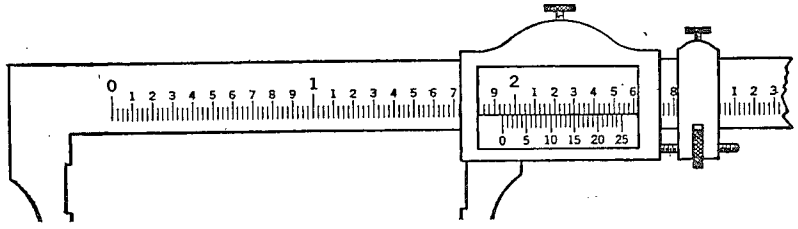
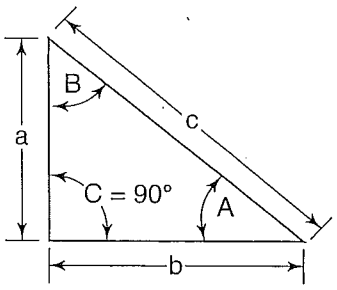


Solution of Right-Angled Triangles



As shown in the illustration, the sides of the right-angled triangle are designated *a* and *b* and the hypotenuse, *c*. The angles opposite each of these sides are designated *A* and *B*, respectively.

Angle *C*, opposite the hypotenuse *c* is the right angle, and is therefore always one of the known quantities.

Sides and Angles Known	Formulas for Sides and Angles to be Found		
Sides *a*; side *b*	$c = \sqrt{a^2 + b^2}$	$\tan A = \frac{a}{b}$	$B = 90° - A$
Sides *a*; hypotenuse *c*	$b = \sqrt{c^2 - a^2}$	$\sin A = \frac{a}{c}$	$B = 90° - A$
Sides *b*; hypotenuse *c*	$a = \sqrt{c^2 - b^2}$	$\sin B = \frac{b}{c}$	$A = 90° - B$
Hypotenuse *c*; angle *B*	$b = c \times \sin B$	$a = c \times \cos B$	$A = 90° - B$
Hypotenuse *c*; angle *A*	$b = c \times \cos A$	$a = c \times \sin A$	$B = 90° - A$
Side *b*; angle *B*	$c = \frac{b}{\sin B}$	$a = b \times \cot B$	$A = 90° - B$
Side *b*; angle *A*	$c = \frac{b}{\cos A}$	$a = b \times \tan A$	$B = 90° - A$
Side *a*; angle *B*	$c = \frac{a}{\cos B}$	$b = a \times \tan B$	$A = 90° - B$
Side *a*; angle *A*	$c = \frac{a}{\sin A}$	$b = a \times \cot A$	$B = 90° - A$

FIGURE 2.2.13 Table showing different forms of the Pythagorean Theorem and several formulas used to calculate side lengths and angles of right triangles. ©Cengage Learning 2012

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