



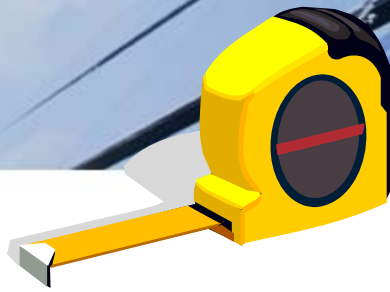
AMERICAN RIVER COLLEGE

Measuring

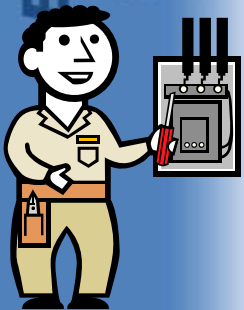
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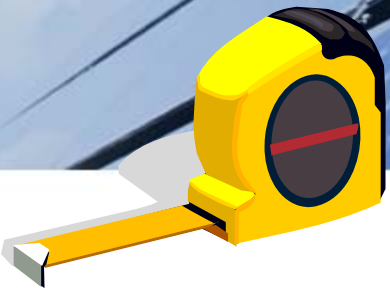




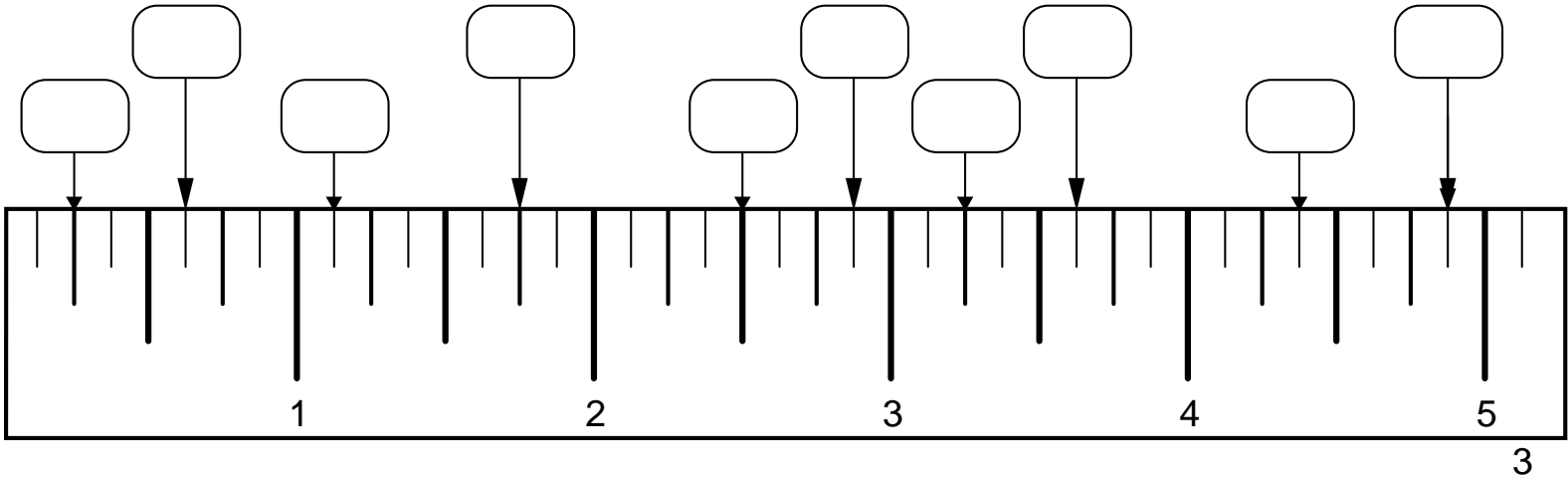
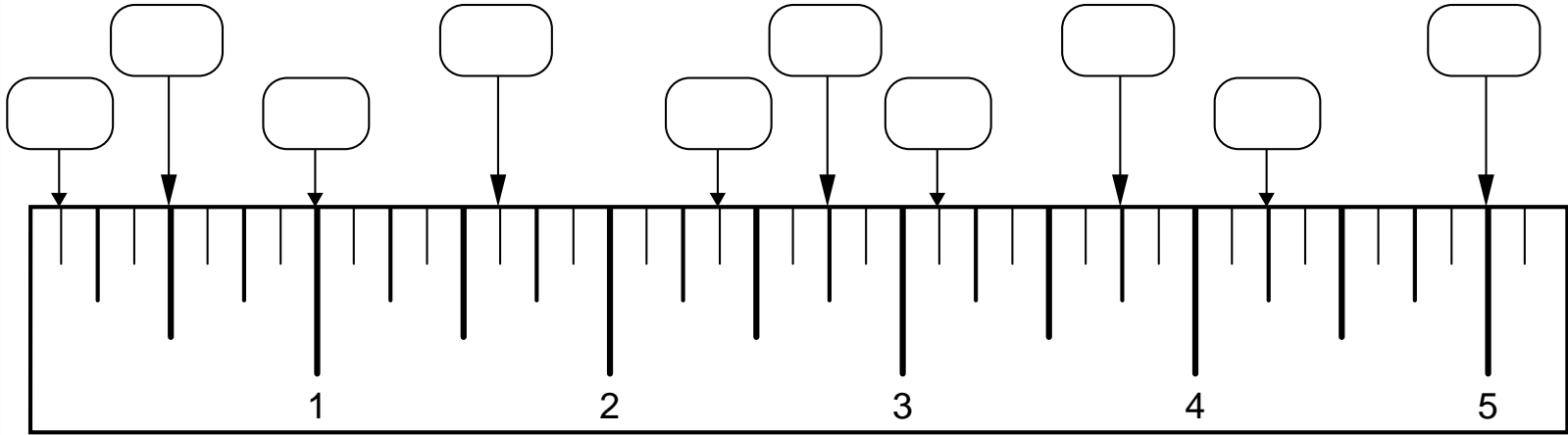
What's the big deal?



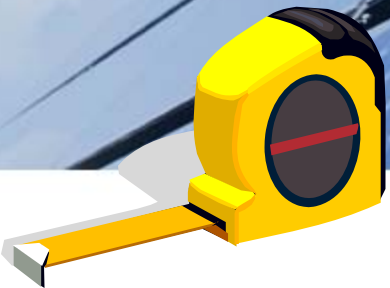
Reading a Rule



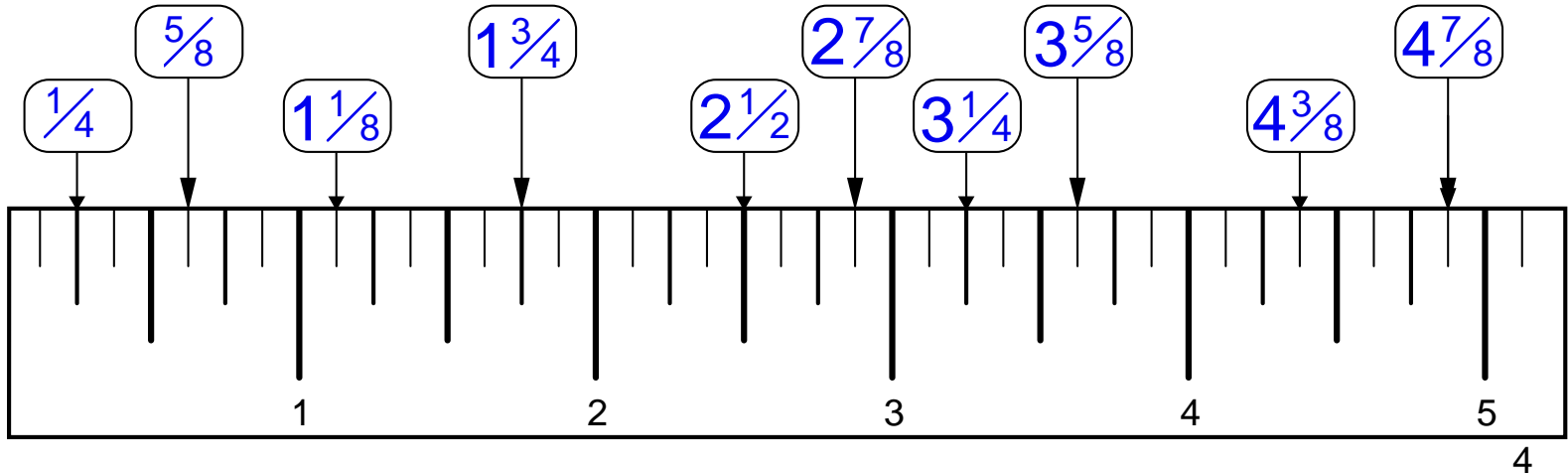
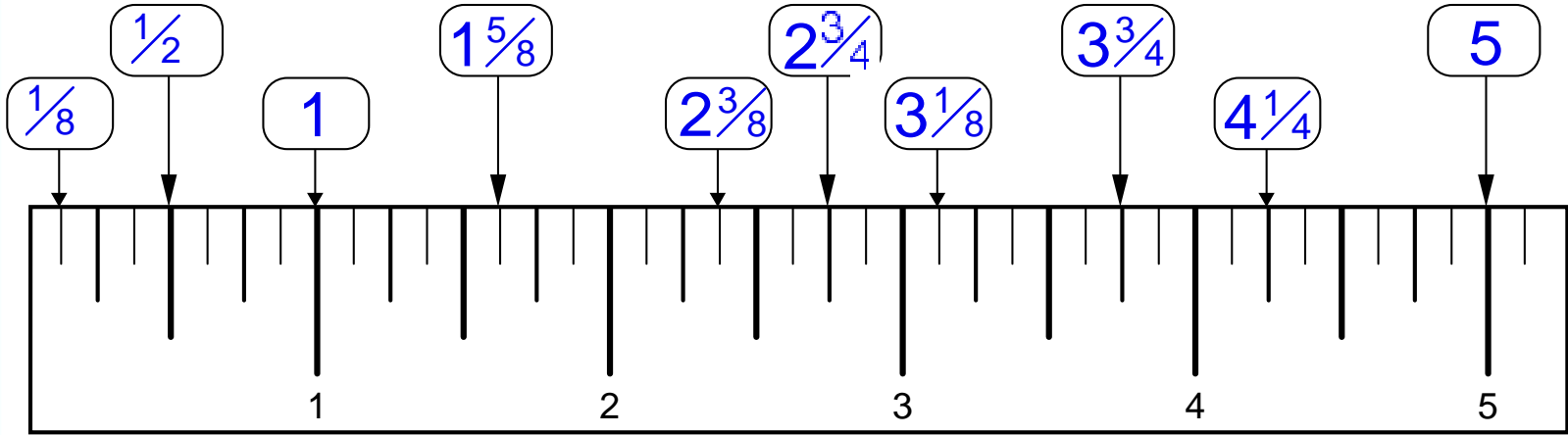
Pretest



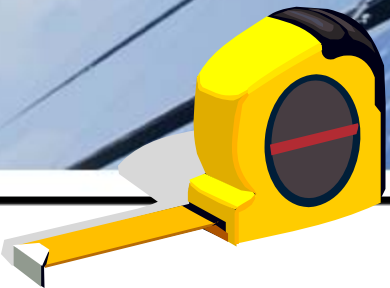
Reading a Rule



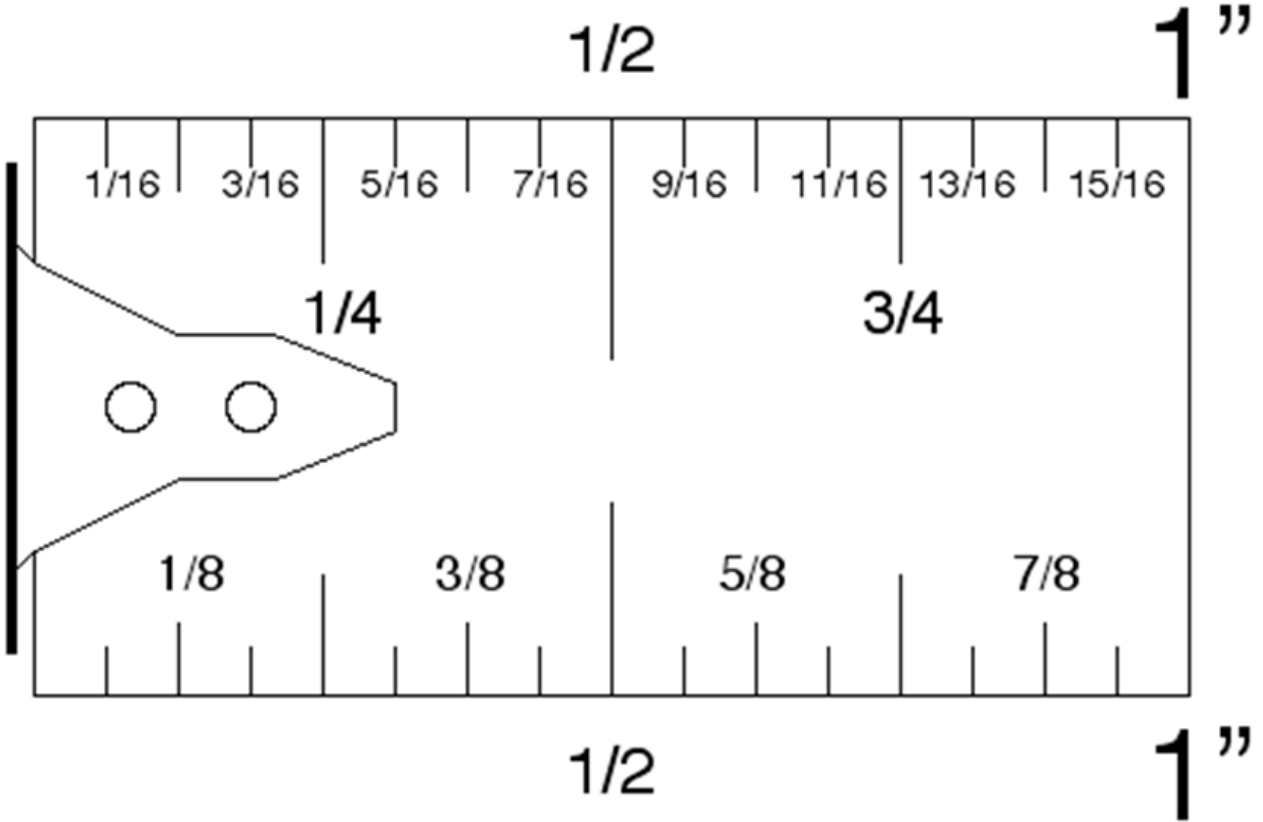
Answers



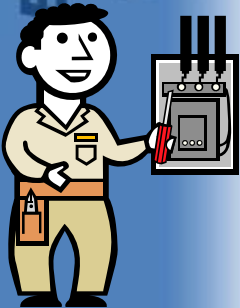
Reading a Rule



THE INCREDIBLE INCH



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Reading a Rule



Fractions of an inch / tape measure basics:

The standard construction tape measure reads to the sixteenth.

In other words, 16ths are the smallest increment on a construction tape.

There are 16 sixteenths in one inch. (16/16)

There are 8 eighths in an inch. (8/8)

There are 4 quarters in an inch. (4/4)

There are 2 halves in one inch. (2/2)

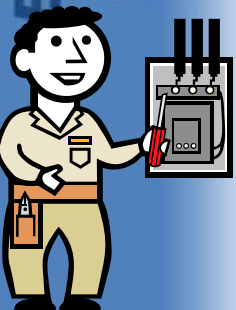
Short cuts when dividing fractions of an inch:

Half of $7/8 = 7/16$

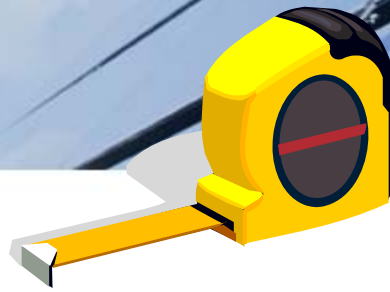
Half of $3/4 = 3/8$

Half of $5/8 = 5/16$

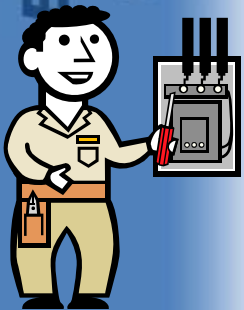
Half of $3/8 = 3/16$



Reading a Rule



Typical Measuring Tapes



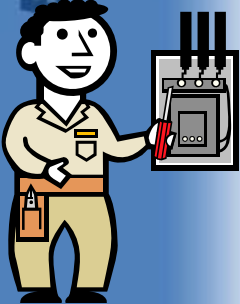
Reading a Rule



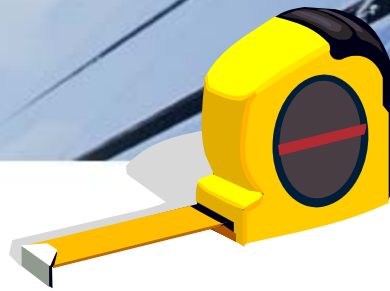
50 & 100 ft. Flexible Tapes For Longer Layouts



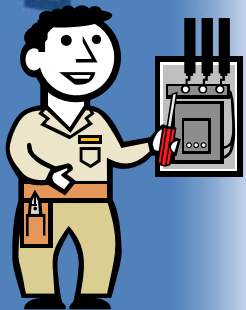
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Reading a Rule



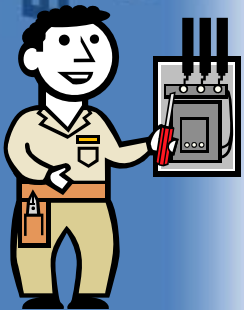
Measuring Is Usually A One Person Job



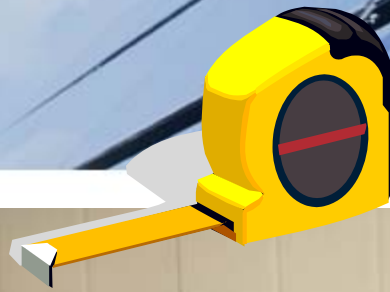
Reading a Rule



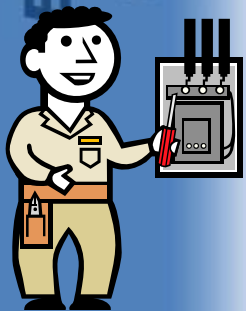
One man...



Reading a Rule

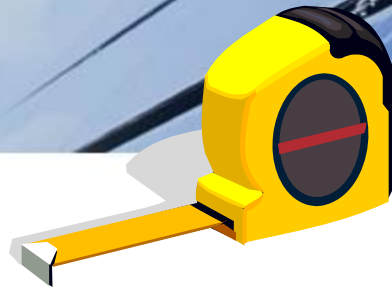


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This should have been.

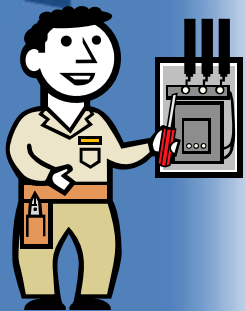
Reading a Rule



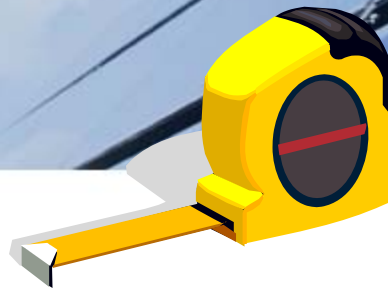
Long Runs, 2 Man Jobs...



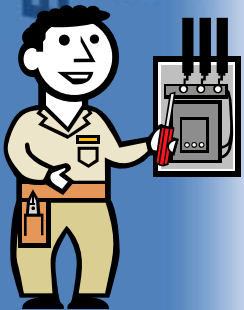
The other guy (out of frame) is holding the dumb end of the tape



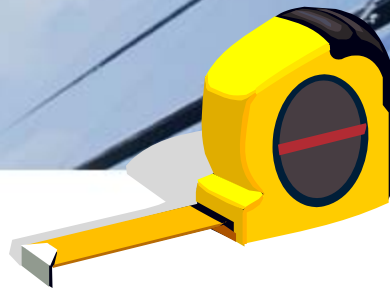
Reading a Rule



Inside Measurements:
End of tape cleat pushes against frame



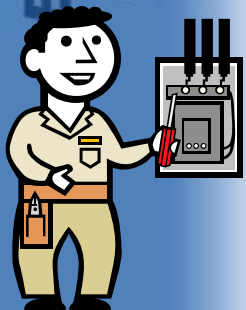
Reading a Rule



Outside Measurements



End of tape cleat hooks on outside
(The cleat adjust for inside or outside measurements)



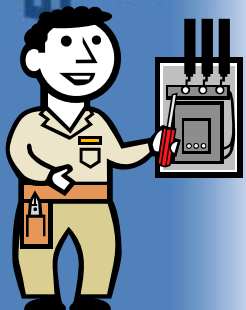
Reading a Rule



Measure From Bottom Up



One man operation



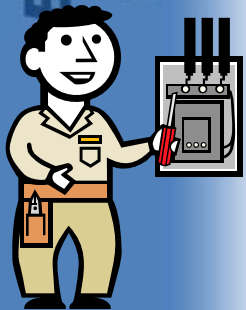
Reading a Rule



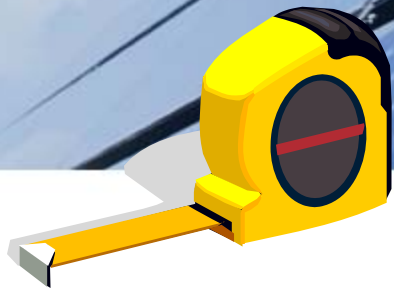
16" On Center Spacing



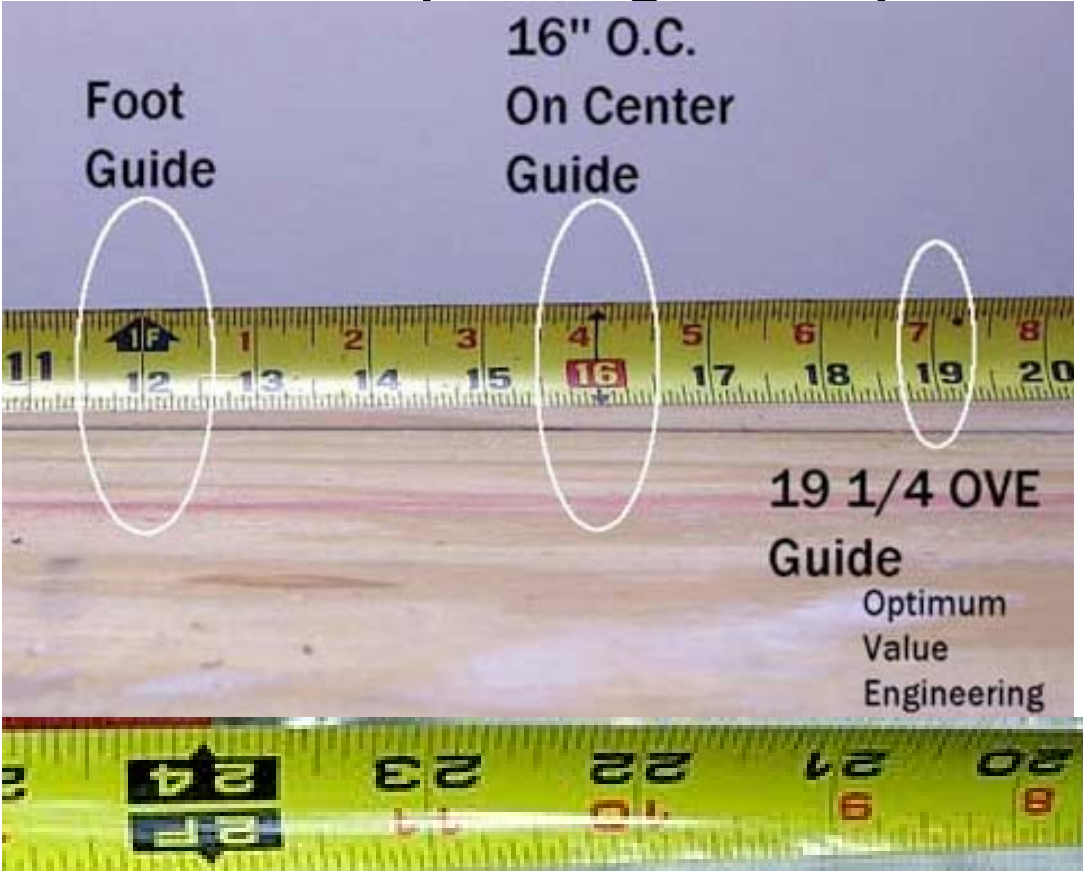
- Typical Wall Framing Layout



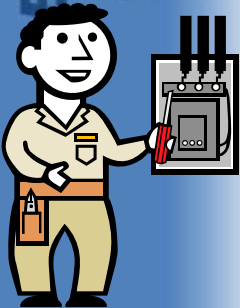
Reading a Rule



Center Spacing is Important



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Even Up-side-down!

Reading a Rule



Measuring In Inches & Feet

- 12 inches = 1 foot
- 3 feet = 1 yard

Finding Square Area of Geometric Shapes

Square foot: An area 1 ft x 1 ft = 1 square ft.

Square yard: An area 3 ft x 3 ft = 9 square ft or 1 square yard

When calculating square feet use the formulas in #1 below.

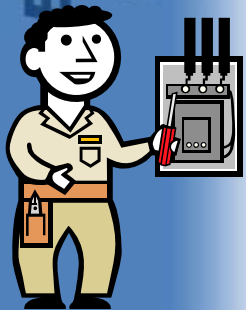
When calculating square yards, divide the total square footage by 9

Example: A is room 27 ft. x 10 ft. = 270 sq. ft.

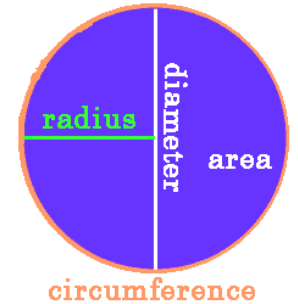
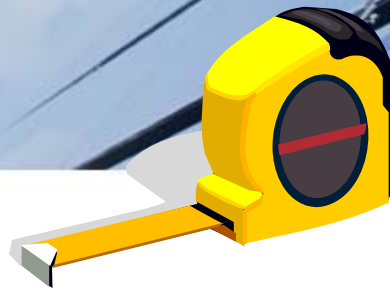
Carpet is sold by the square yard. How many sq. yds. will be required?

$$\frac{270 \text{ sq ft}}{9} = 30 \text{ sq. yds of carpet}$$

9



Reading a Rule



1. To calculate square area:

- For rectangles and squares: $\text{Length} \times \text{Width} = \text{Sq. Area}$

Example: A rectangle 4 ft long and 2 ft wide = 8 square feet
 $4 \times 2 = 8 \text{ sq. ft.}$

- For triangles: $\frac{\text{Base} \times \text{Height}}{2} = \text{sq. area}$

Example: A triangle with a base of 10 ft. and a height of 8 ft. = 40 sq. ft.

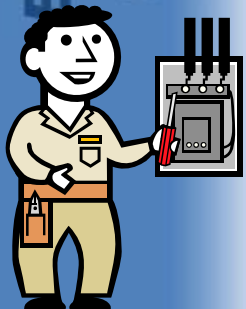
$$10 \text{ ft} \times 8 \text{ ft} = \frac{80 \text{ sf}}{2} = 40 \text{ sq. ft.}$$

- For circles $\text{Pi} \times \text{Radius Squared} = \text{square area}$
($\text{Pi} = 3.1415$)

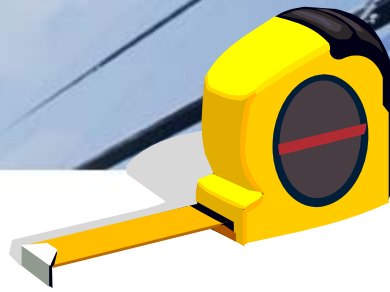
Example: A circle has a diameter of 2 ft. & a radius of 1 ft = 3.1415 sq. ft.

$$\text{Diameter} = \frac{2}{2} = \text{a radius of 1 ft}$$

$$1 \times 1 = 1 \text{ ft} \times \text{Pi} = 3.1415 \text{ sq. ft.}$$



Reading a Rule



Finding Cubic Area of Geometric Shapes

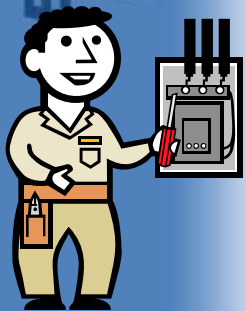
Calculate the square areas for the shapes above and then multiply by thickness or depth. If you are measuring in inches the answer will be in cubic inches. If you are measuring in feet, the answer will be in cubic feet, etc.

To find cubic yards, divide the cubic footage total by 27.

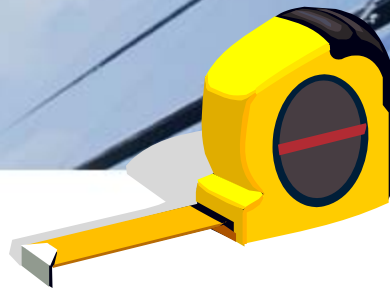
One yard = 3 feet

One square yard is $3\text{ft} \times 3\text{ft} = 9$ square feet = one square yard

One cubic yard is $3 \times 3 \times 3 = 27$ cubic feet = one cubic yard



Reading a Rule



Examples:

1. A foundation slab 27ft x 20ft x 1ft thick is to be poured with concrete.
How many cubic yards will be required?

$$27\text{ft} \times 20\text{ft} \times 1\text{ft} = \frac{540 \text{ cubic ft.}}{27} = 20 \text{ cubic yards of concrete}$$

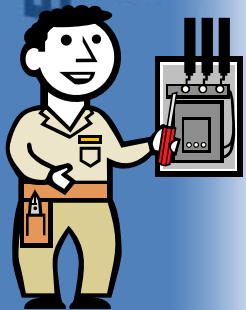
2. A column with a diameter of 2 ft. and a height of 10 ft. is to be poured with concrete.
How many cubic yards will be required?

Pi x radius squared = square area

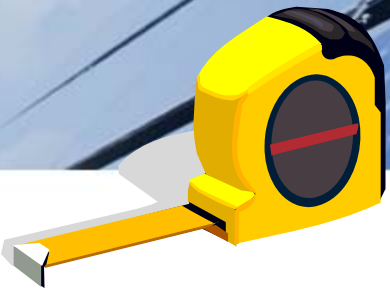
Square area x height = cubic area

Radius Square: $1 \times 1 = 1\text{ft}$

$$3.1415 \times 1\text{ft} \times 10\text{ft} = \frac{31.415 \text{ cubic ft.}}{27} = \underline{\underline{1.1635}} \text{ cubic yards of concrete}$$

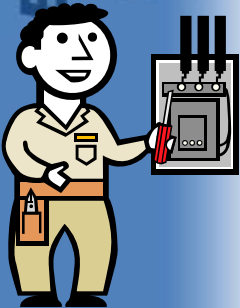
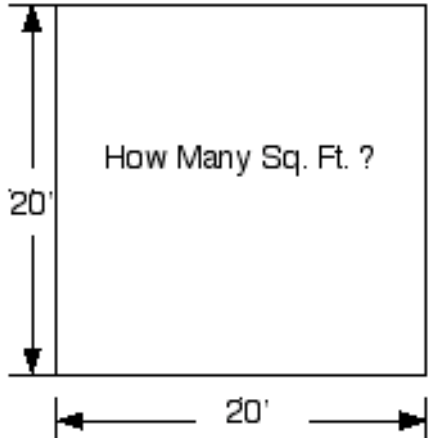
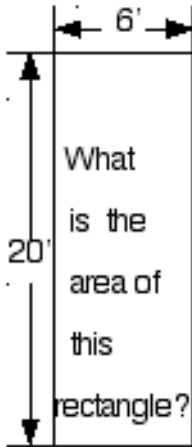
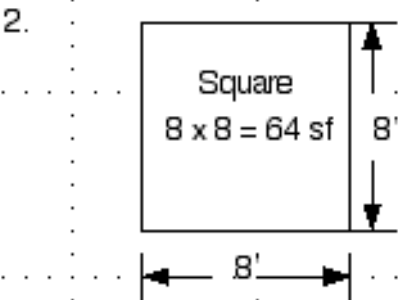
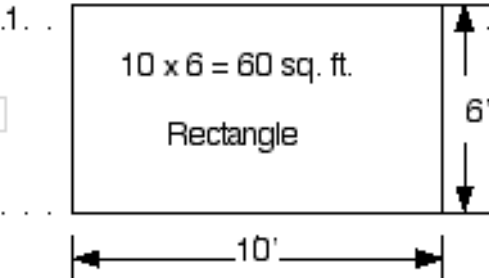


Reading a Rule

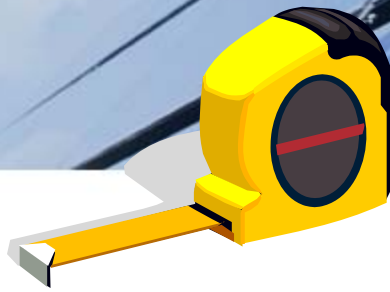


Calculating Area and Volume

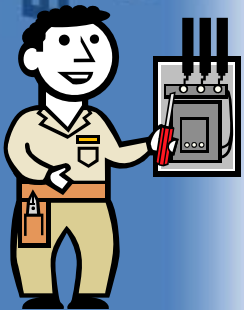
To find the area of a rectangle or a square, multiply length times width:



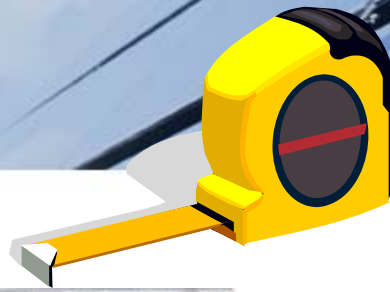
Reading a Rule



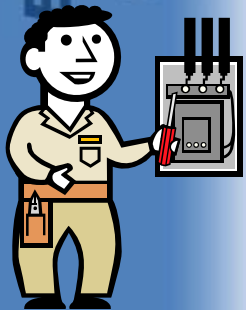
4ft x 8ft plywood
What is the area?



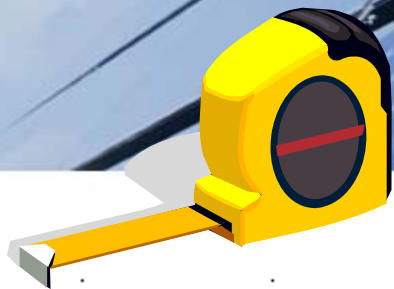
Reading a Rule



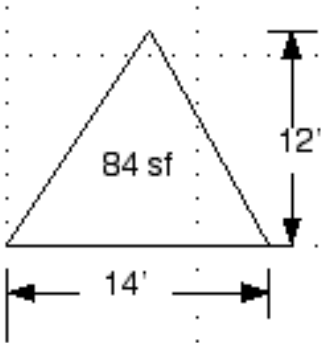
- Typical module is ~ 3ft x 5ft
- What is the area?



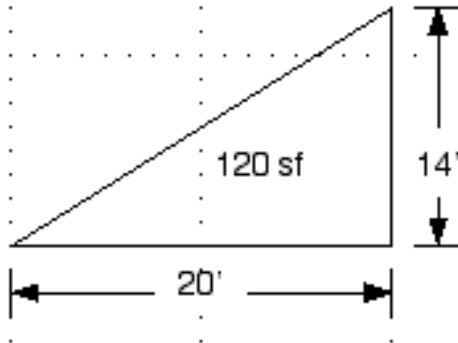
Reading a Rule



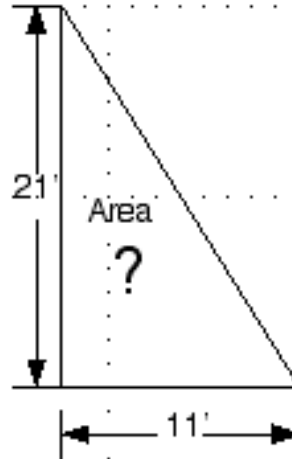
3. To find the area of a triangle, multiply the base times the height and divide by 2.



$$14 \times 12 = \frac{168}{2} = 84 \text{ sf}$$

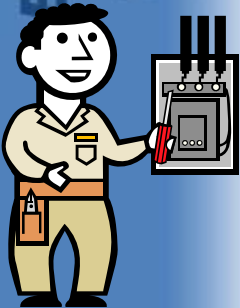
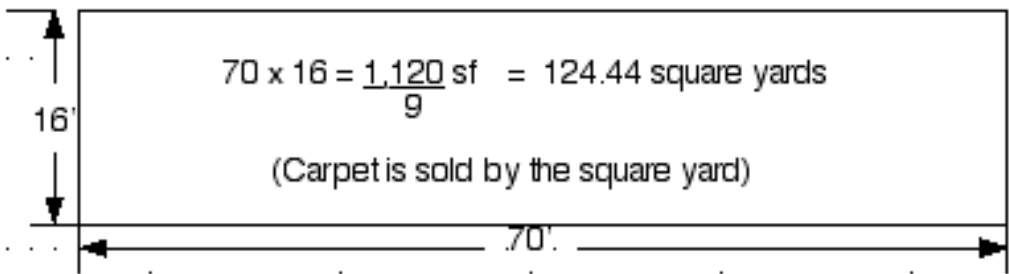


$$20 \times 14 = \frac{280}{2} = 140 \text{ sf}$$

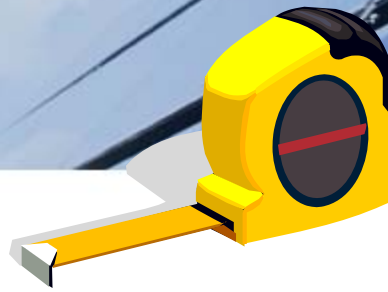


4. To find square yards, calculate square area in feet and then divide by nine.

3 ft = 1 yard 3'x3' = 9 square feet or 1 square yard
The magic number for calculating square yards is "9"

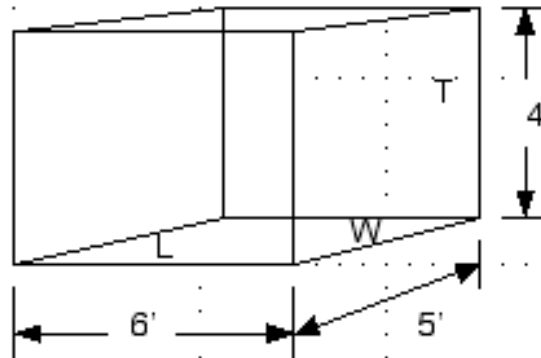


Reading a Rule



- 5 -

5. To find cubic area in feet, multiply length x width x thickness



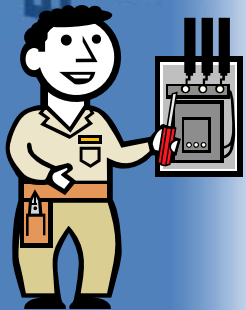
$$6 \times 5 \times 4 = 120 \text{ cubic feet}$$

N.T.S.

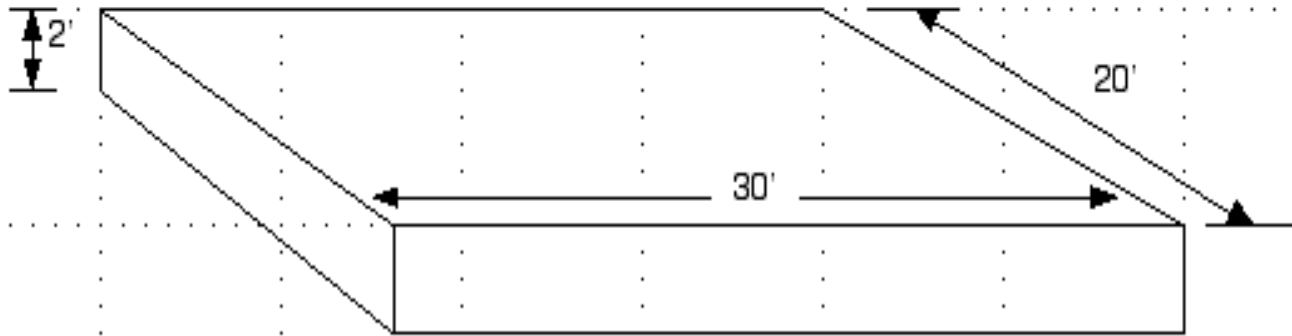
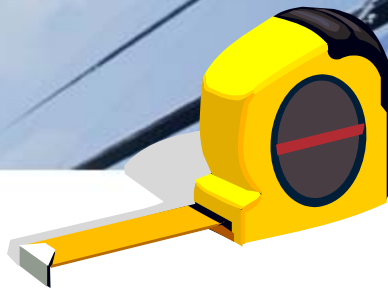
6. To find cubic yards, find cubic area of a shape and then divide by 27.

one yard = 3 feet one square yard is $3 \times 3 = 9$ square feet

one cubic yard is $3 \times 3 \times 3 = 27$ cubic feet = one cubic yard



Reading a Rule



The concrete slab above is 30 ft long, 20 ft. wide and 2 ft. thick.

$$30 \times 20 \times 2 = 1200 \text{ cubic feet} \quad \frac{1200 \text{ cf}}{27} = 44.44 \text{ cubic yards}$$

The magic number for cubic yards is 27

