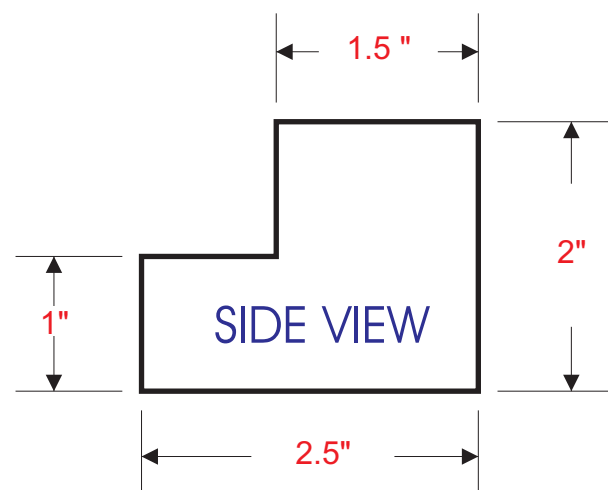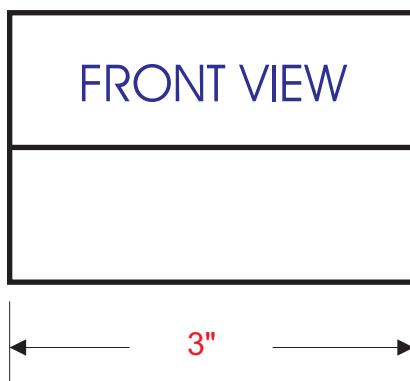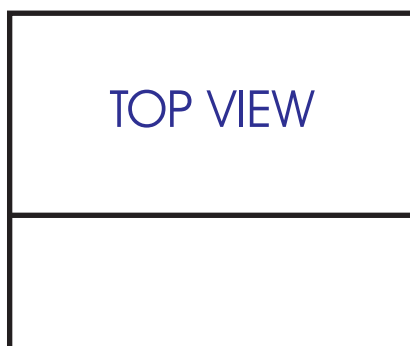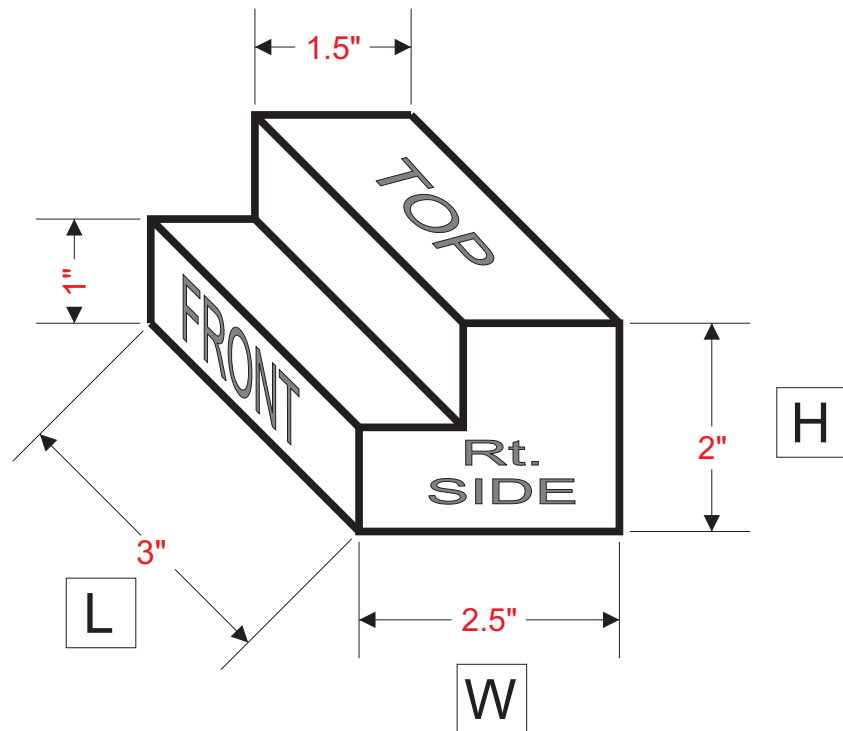# Orthographic Projection Drawings

Orthographic Projection drawings (sometimes called 3 - View or Multi-View Drawings) are an important part of the engineering process. As a rule, they show an object from three different views (Usually the Front, Top, & Right Side). Each of the views are drawn 2-D (two dimensional), and have dimensions labeling the length, width, and height of the object. An Orthographic Projection drawing should also include an isometric (3-D) sketch, to serve as a visual aid. We never include dimensions on the Isometric sketch. If you follow the following steps to complete a Multi-View Drawing, you shouldn't have any trouble, drawing any shape.

Follow these steps for each shape.

1. Front View
2. Top View
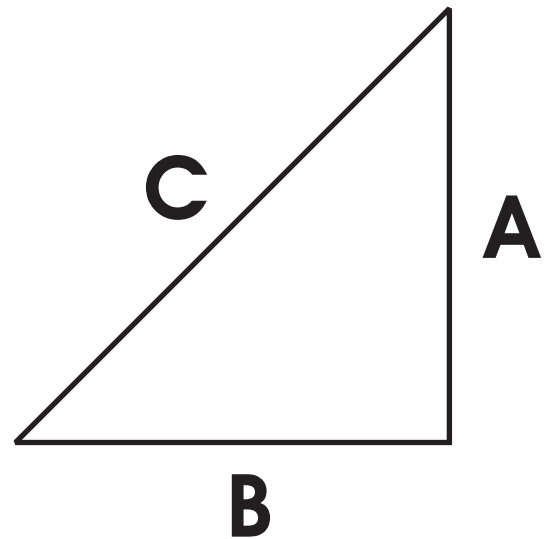3. Right Side View
4. Dimensions
5. Isometric Sketch

TOP VIEW

FRONT VIEW

SIDE VIEW

Blocks = Inches

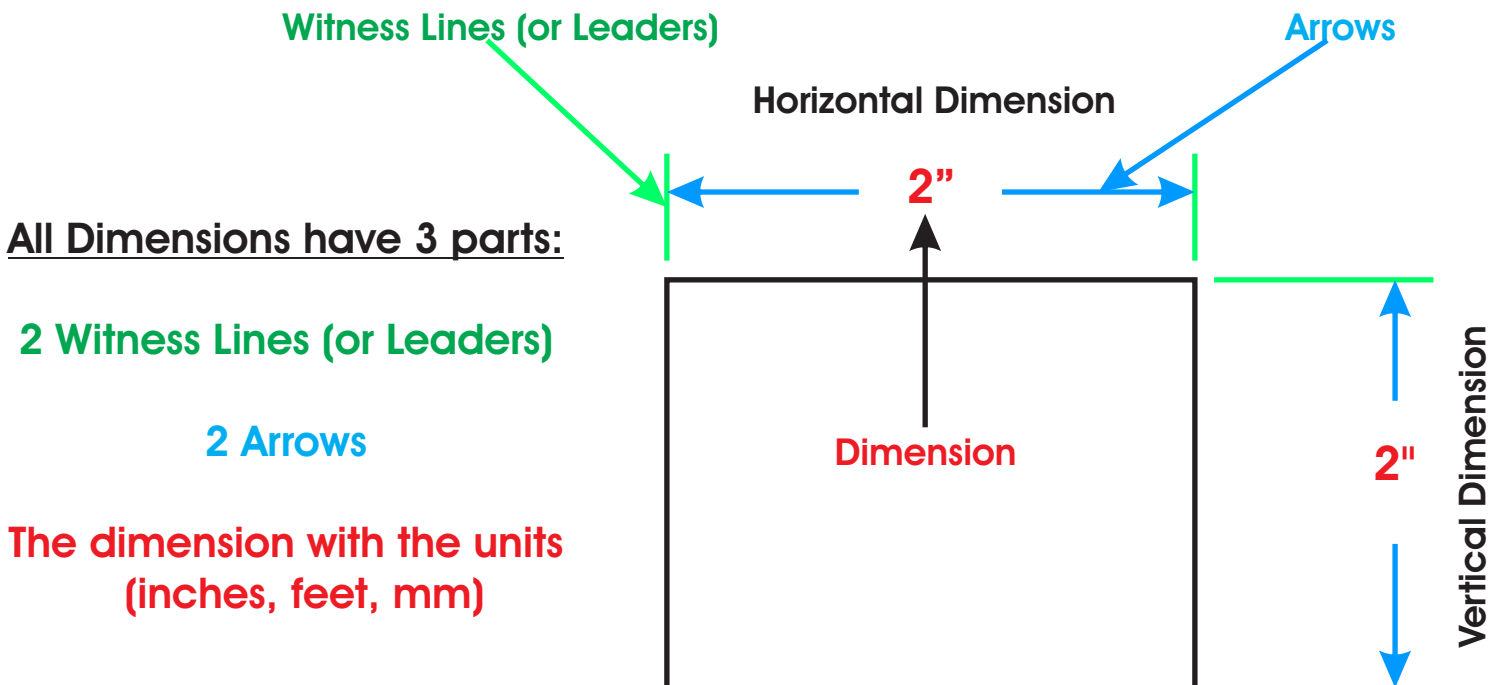|	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	

Object Lines _____

Hidden Lines _ _ _ _ _ _ _ _ .

Pythagorean theorem: $A^2 + B^2 = C^2$

To solve for C: $C = \sqrt{A^2 + B^2}$

C

A

B

DIMENSIONS

Witness Lines (or Leaders)

Arrows

Horizontal Dimension

2"

All Dimensions have 3 parts:

2 Witness Lines (or Leaders)

2 Arrows

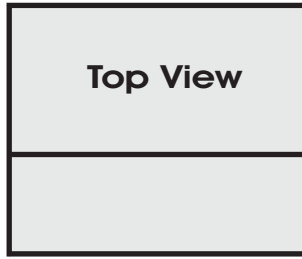The dimension with the units (inches, feet, mm)

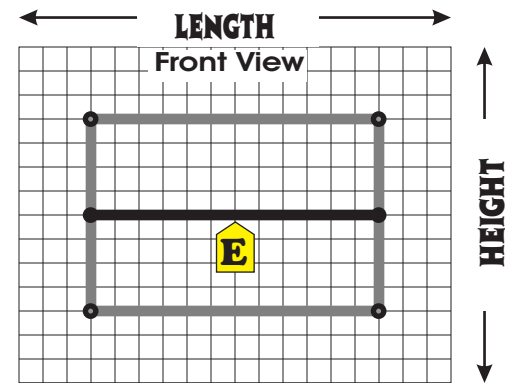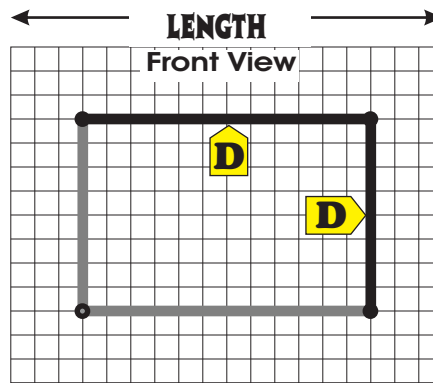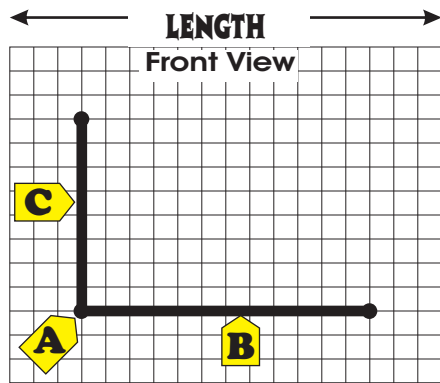Dimension

2"

Vertical Dimension

ORTHOGRAPHIC PROJECTION

1. Front View
2. Top View
3. Right Side View
4. Dimensions
5. Isometric View

Top View

Front View

Side View

1 ½"
1"
Top
Front
3"
Length
Right Side
2 ½"
Width
2"
Height

LENGTH
Front View
HEIGHT
C
A
B
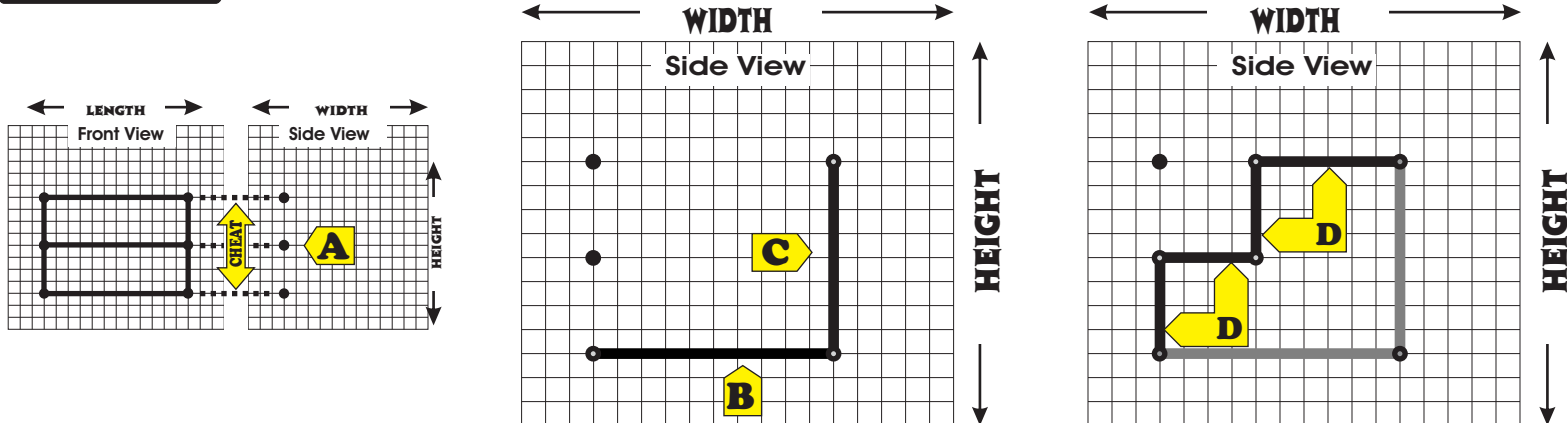
LENGTH
Front View
HEIGHT
D
D

LENGTH
Front View
HEIGHT
E
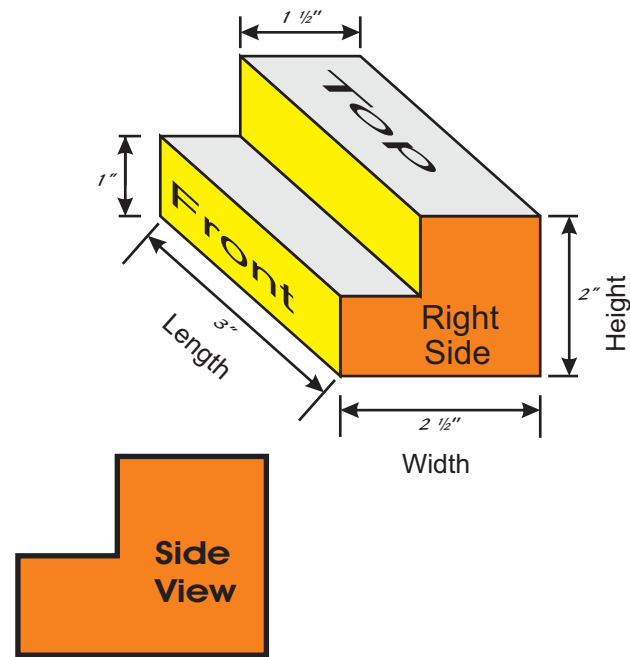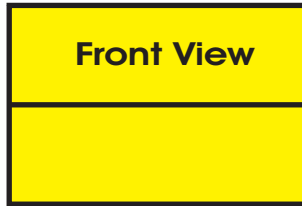
A - Place a point of origin 3 blocks over and 3 blocks up
B - Draw in the object line representing the overall length (3inches or 12 blocks)
C - Draw in the object line representing the overall height (2 inches or 8 blocks)
D - Finish drawing the object lines that represent the outside edges of the shape
E - Measure and draw any other object lines that represent more surfaces

LENGTH
Top View
WIDTH
A
CHEAT
HEIGHT

LENGTH
Top View
WIDTH
C
B
C

LENGTH
Top View
WIDTH
D
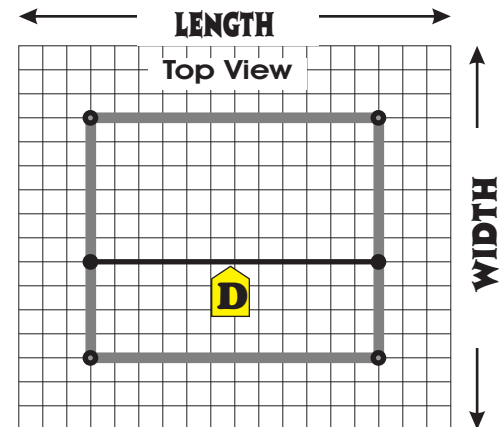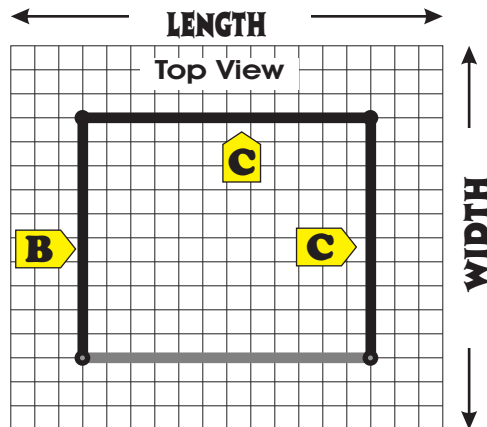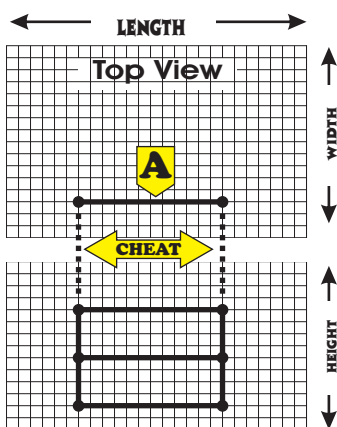
A- CHEAT Transfer the length of the shape to the top view by drawing dotted lines
B - Draw in the object line representing the overall width (2 ½ inches or 10 blocks)
C - Finish drawing the object lines that represent the outside edges of the shape
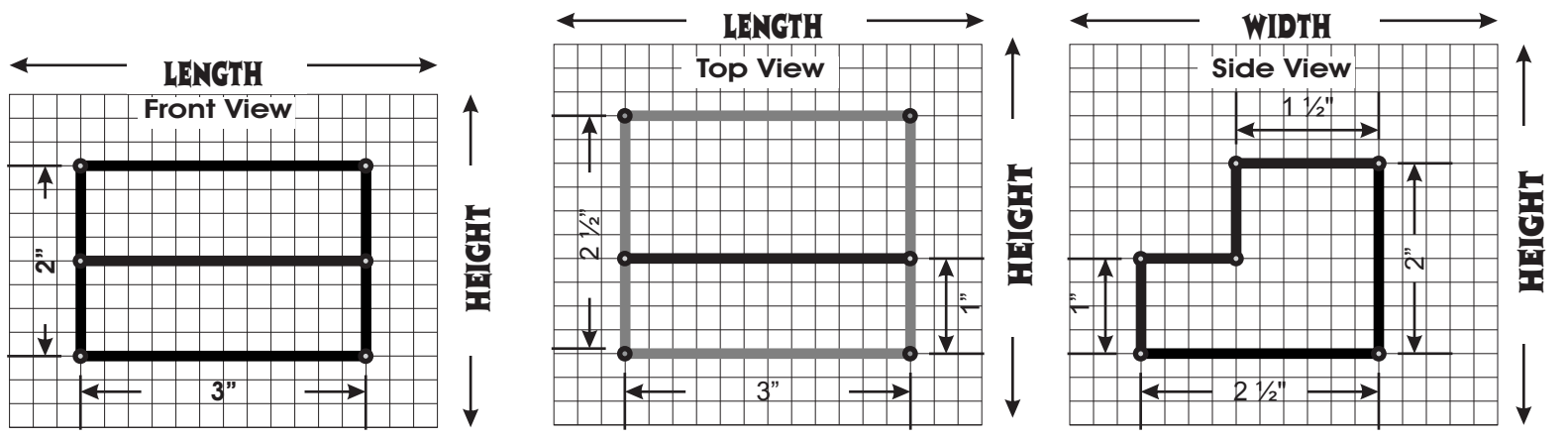D - Measure and draw any other object lines that represent more surfaces

WIDTH

Side View

HEIGHT

WIDTH

Side View

HEIGHT

LENGTH — Front View
WIDTH — Side View

CHEAT — A

HEIGHT

B

C

D

D

A- <u>CHEAT</u> Transfer the height of the shape to the side view by drawing dotted lines
B - Draw in the object line representing the overall width (2 ½ inches or 10 blocks)
C - Draw in the object line representing the overall height (2 inches or 8 blocks, you also have a dot that represents the height)
D- Finish drawing the object lines that represent the outside edges of the shape

LENGTH

Front View

HEIGHT

2"

3"

LENGTH

Top View

HEIGHT

2 ½"

1"

3"

WIDTH

Side View

HEIGHT

1 ½"

2"

1"

2 ½"

A - Dimension the overall length (either the front or top view)
B - Dimension the overall height (either the front or side view)
C - Dimension the overall width (either the top or side view)
D - Dimension any other edges, cut-outs, slants, holes, etc. (don't over dimension, it only makes the drawing look messy)

Sketch

B

2   1

3

4

5

A

Sketch

C

C   C

C

2   1

3

4

5

A

Sketch

D

D

D

D

2   1

3

4

5

A
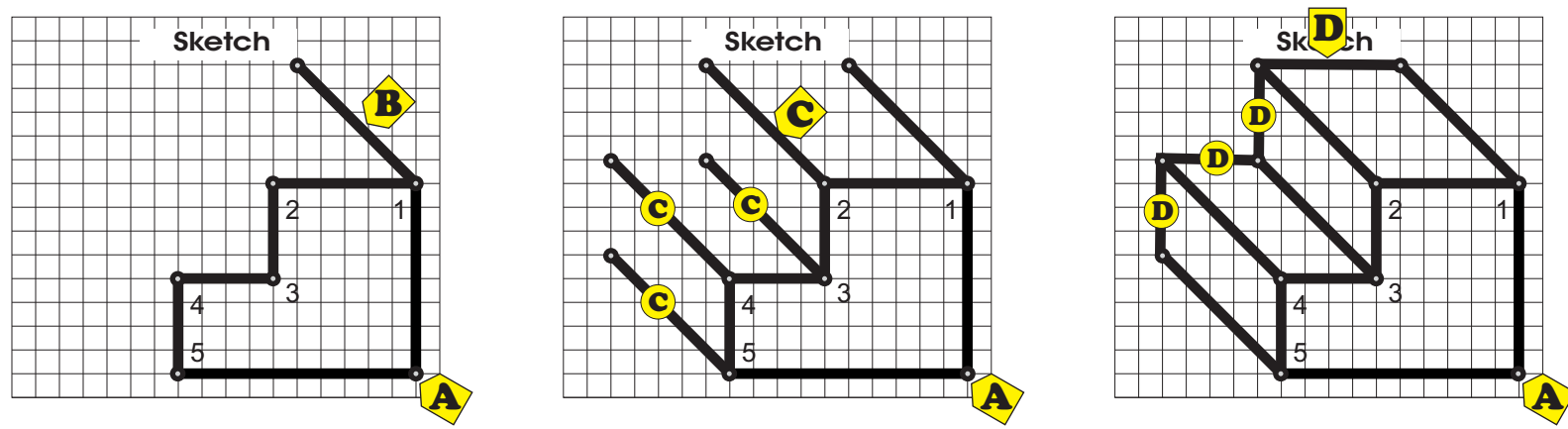
A- Draw the side view of the shape in the bottom right corner of the sketch box (over one up one)
B - Starting at point #1, draw a diagonal line up to the left 5 intersections. (take your time and hit each diagonal intersection)
C - Repeat step B for points 2, 3, 4, and 5.
D - Now simply connect all 5 dots and your isometric view will be complete.