

*Important Concepts . . .*

# Preview Review



**Mathematics   Grade 8   TEACHER KEY**  
**W3 - Lesson 4: Drawing 3-D Objects**

## Important Concepts of Grade 8 Mathematics

W1 - Lesson 1 .....	Perfect Squares and Square Roots
W1 - Lesson 2 .....	Working with Ratios and Rates
W1 - Lesson 3 .....	Multiplying and Dividing Fractions
W1 - Lesson 4 .....	Multiplying and Dividing Integers
W1 - Lesson 5 .....	Working with Percents
W1 - Review	
W1 - Quiz	
W2 - Lesson 1 .....	Modelling and Solving Linear Equations Using Algebra Tiles
W2 - Lesson 2 .....	Solving Linear Equations
W2 - Lesson 3 .....	Graphing and Analyzing Linear Relations
W2 - Lesson 4 .....	Critiquing the Representation of Data
W2 - Lesson 5 .....	Probability of Independent Events
W2 - Review	
W2 - Quiz	
W3 - Lesson 1 .....	Pythagorean Theorem
W3 - Lesson 2 .....	Calculating Surface Area
W3 - Lesson 3 .....	Calculating Volume
W3 - Lesson 4 .....	Drawing 3-D Objects
W3 - Lesson 5 .....	Congruence of Polygons
W3 - Review	
W3 - Quiz	

## Materials Required

Protractor  
Ruler  
Calculator

**No Textbook  
Required**

**This is a stand-  
alone course.**

## Mathematics Grade 8

Version 6

Preview/Review W3 - L4

ISBN 1-891894-00-6

**Publisher: Alberta Distance Learning Centre**

**Written by: Monica dHamrait**

**Reviewed by: Patty Rogerson**

**Project Coordinator: Donna Silgard**

**Preview/Review Publishing Coordinating Team:**

**Heather Martel and Nicole Mckeand**



Alberta Distance Learning Centre has an Internet site that you may find useful. The address is as follows: <http://www.adlc.ca>

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

## ALL RIGHTS RESERVED

Copyright © 2010, by Alberta Distance Learning Centre, 4601-63 Avenue, Barrhead, Alberta, Canada, T7N 1P4. Additional copies may be obtained from Alberta Distance Learning Centre.

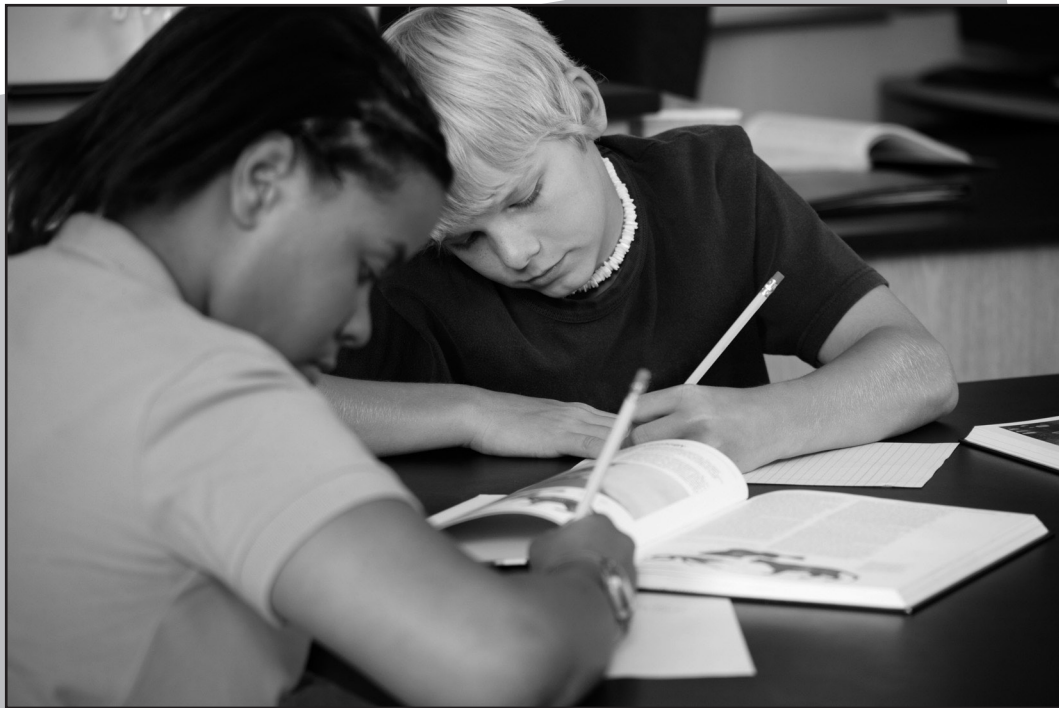
No part of this courseware may be reproduced or transmitted in any form, electronic or mechanical, including photocopying (unless otherwise indicated), recording, or any information storage and retrieval system, without the written permission of Alberta Distance Learning Centre.

Every effort has been made both to provide proper acknowledgement of the original source and to comply with copyright law. If cases are identified where this effort has been unsuccessful, please notify Alberta Distance Learning Centre so that appropriate corrective action can be taken.

**IT IS STRICTLY PROHIBITED TO COPY ANY PART OF THESE MATERIALS UNDER THE TERMS OF A LICENCE FROM A COLLECTIVE OR A LICENSING BODY.**

# Preview/Review Concepts for Grade Eight Mathematics

## Teacher Key



***W3 – Lesson 4:***

***Drawing 3-D Objects***

## OBJECTIVES

By the end of this lesson, you will be able to:

- Create nets for a given 3-D object.
- Draw and label the top, front and side views for a given 3-D object.
- Compare different views of a given 3-D object to the object.
- Draw and label the top, front and side views that result from a given

## GLOSSARY

**Net** – a diagram that illustrates all the different shapes that make up a three-dimensional object; what the object would look like if it was laid out flat.

## W3 – Lesson 4: Drawing a 3-D Object

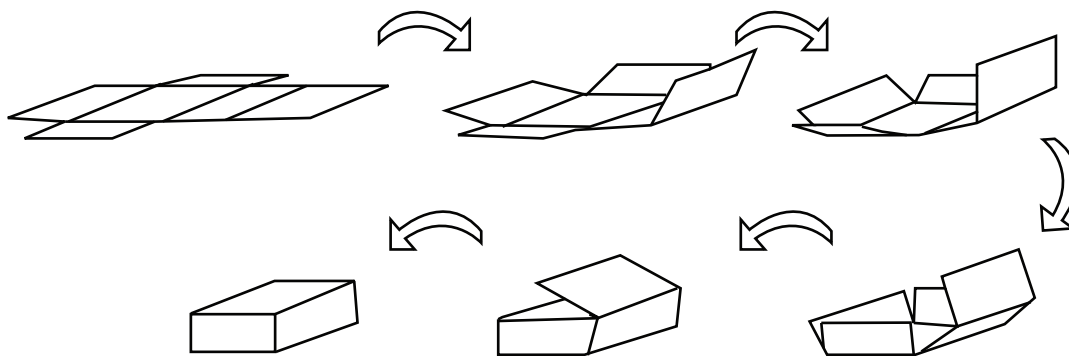
### Materials required:

- Paper, Pencil, Calculator, Square dot paper

### Creating 3-D objects from Nets

Nets are diagrams that illustrate all the different shapes that make up a three-dimensional object. In other words, a net illustrates what an object would look like if it was laid out flat.

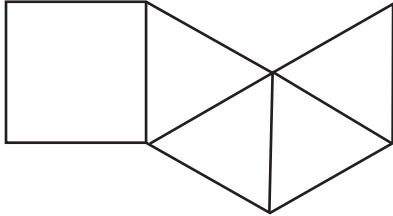
You can build a 3-D object from a net by cutting out the net and gluing the edges together.



However, you may not be able to cut the net out of the paper every time. In these cases, you must visualize the edges of the net coming together and forming the 3-D object.

**Example 1**

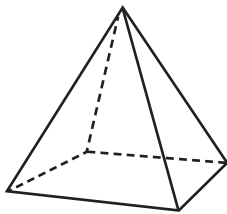
Which 3-D object can be created from the given net?



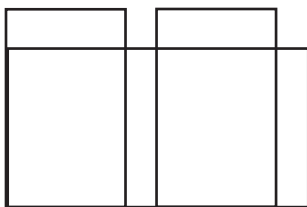
The net has 4 congruent triangles and 1 square.

When folded, the congruent triangles will join to form the sides and the square will become the base.

This is a net of a square based pyramid.

**Example 2**

Determine if the following net is correct for a right rectangular prism.

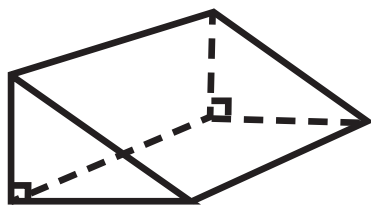
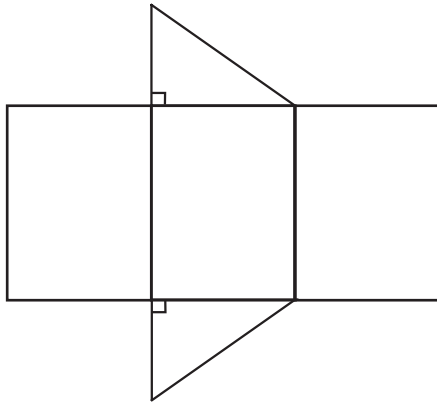


When folded together, the two sides would overlap and the other side would be open.

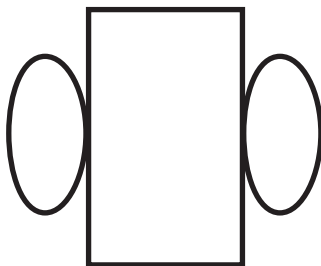
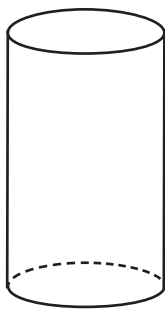
Therefore, this net is not the correct net for a right rectangular prism.

**Practice Questions**

1. Draw a sketch of the 3-D object the following net represents.



2. Draw a net of a given 3-D object.



## Drawing 3-D Objects

To draw a 3-D object, you must sketch it from three different views: the front, top and side views.

Use square dot paper to sketch the views.

There is a special way to set up the drawings as you create them.

Step 1: Draw the front view.

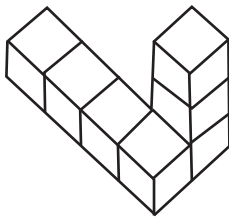
Step 2: Draw the top view and place it above the front view.

Step 3: Draw the side views and place them beside the front view.

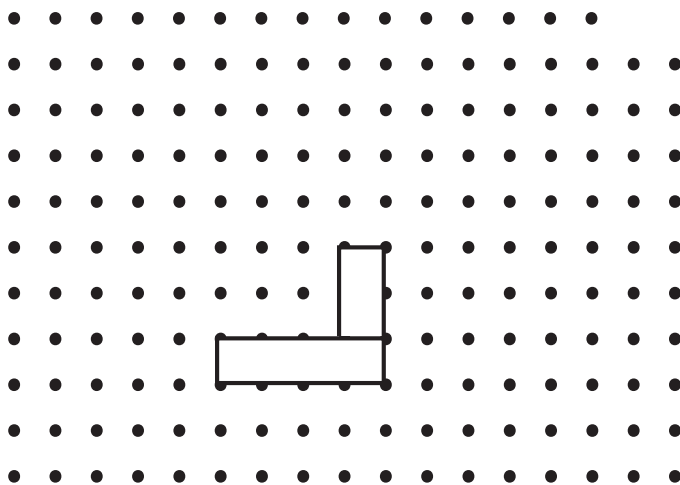
Step 4: Draw in the broken lines to show how the different views align.

### Example 1

Draw the front, top, and side views of the following 3-D object.

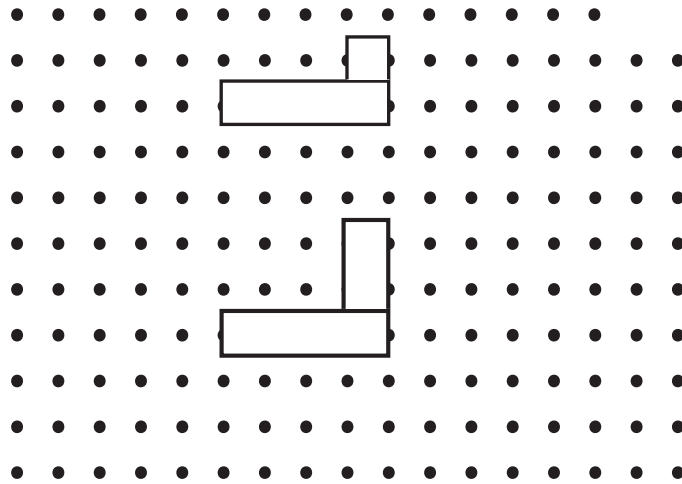


Step 1: Draw the front view.

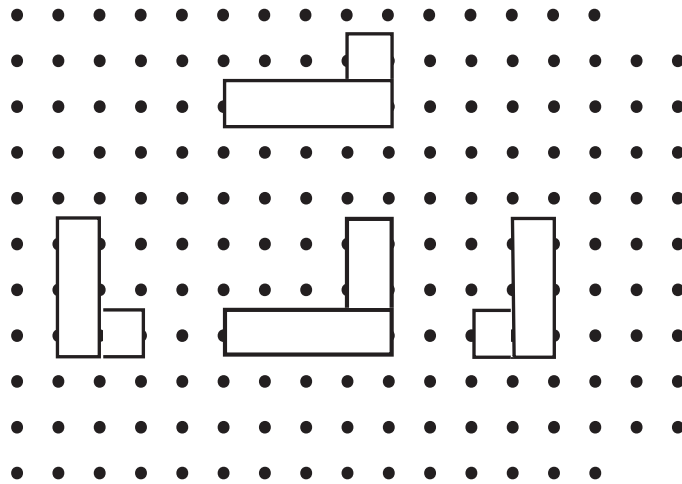




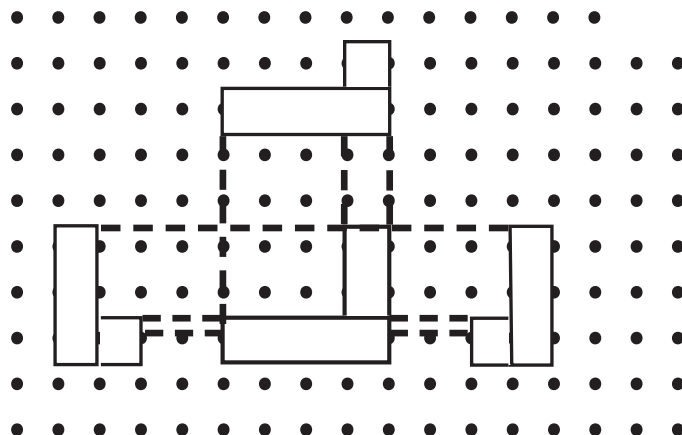
Step 2: Draw the top view and place it above the front view.



Step 3: Draw the side views and place them beside the front view.



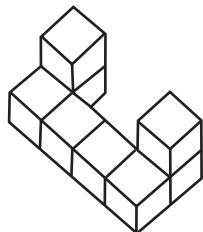
Step 4: Draw in the broken lines to show how the different views align.



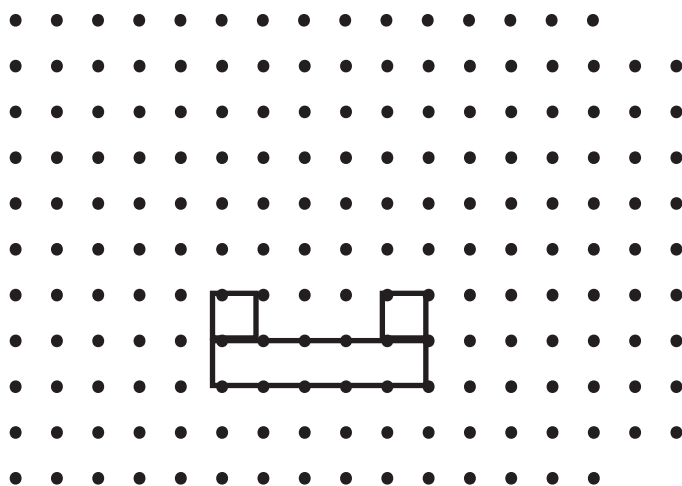
## Practice Questions

1. Draw the front, top, and side views of the following 3-D objects.

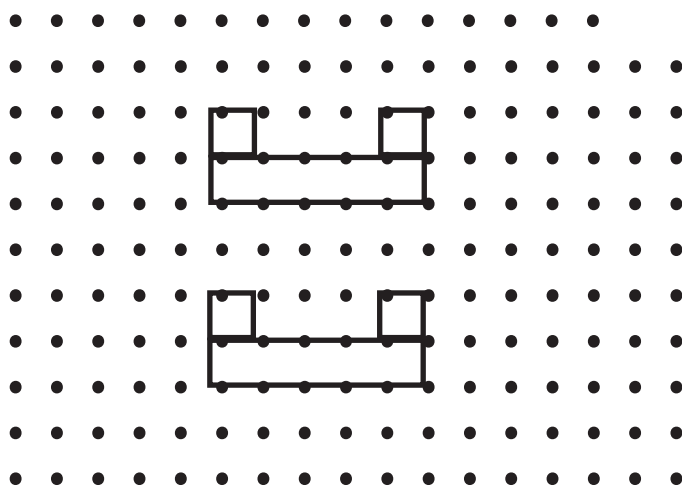
a.



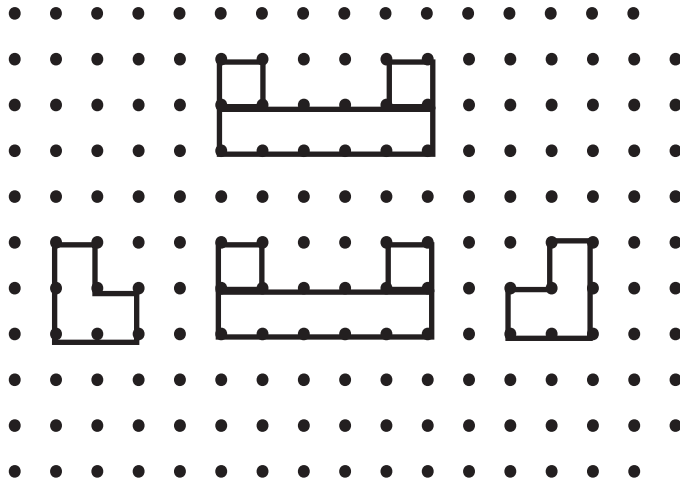
Step 1: Draw the front view.



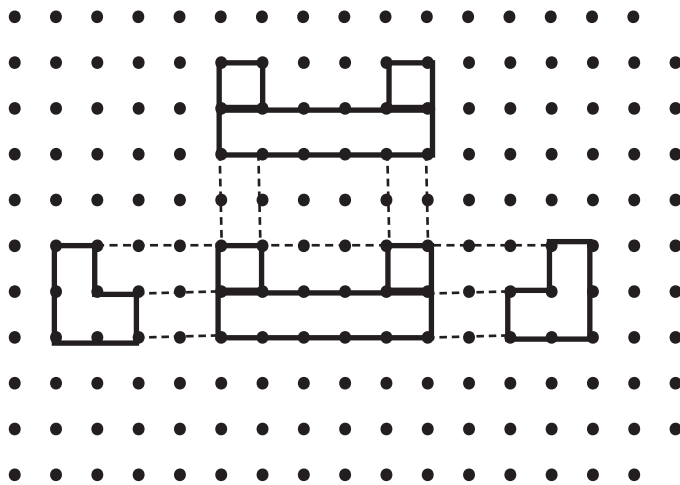
Step 2: Draw the top view and place it above the front view.



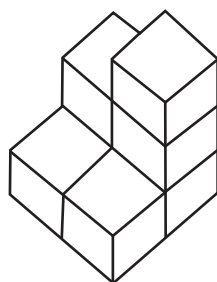
Step 3: Draw the side views and place them beside the front view.



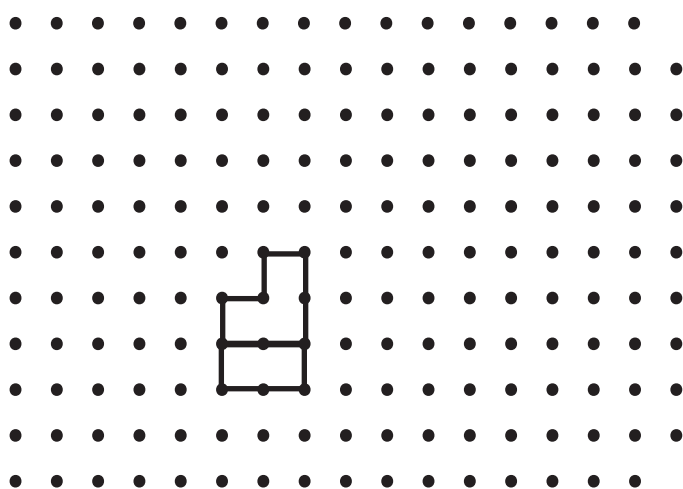
Step 4: Draw in the broken lines to show how the different views align.



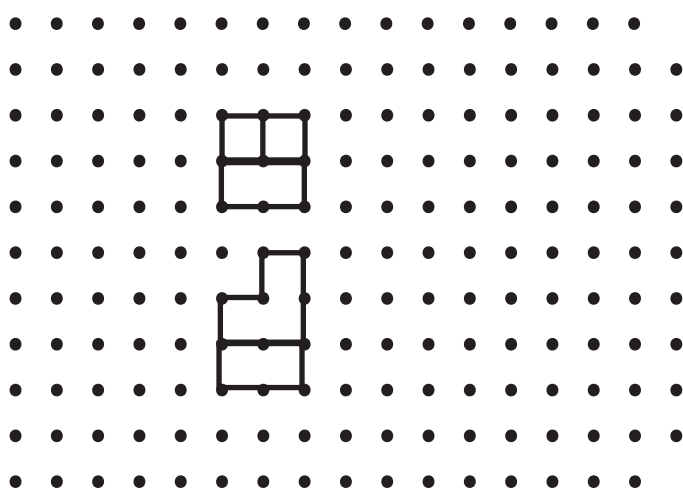
b.



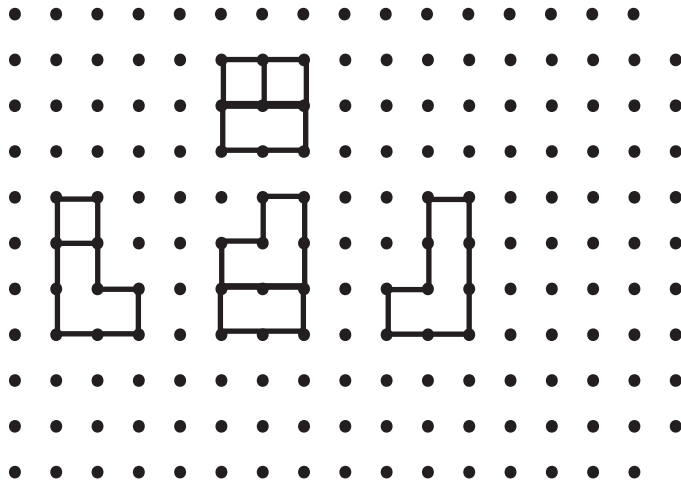
Step 1: Draw the front view.



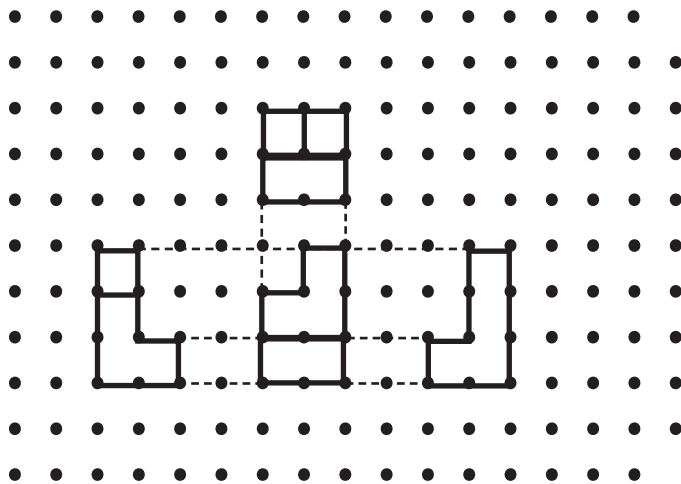
Step 2: Draw the top view and place it above the front view.



Step 3: Draw the side views and place them beside the front view.



Step 4: Draw in the broken lines to show how the different views align.

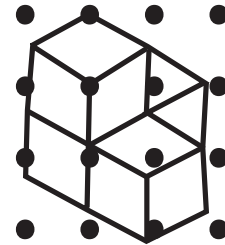
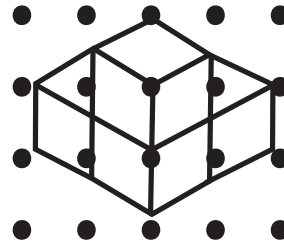
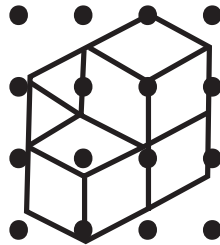
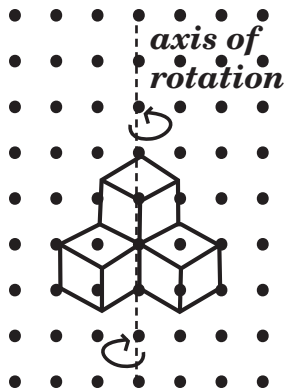


## Drawing Views of Rotated Objects

An object can be rotated horizontally around a vertical axis of rotation. The rotation can be clockwise or counterclockwise.

### Horizontal Rotation

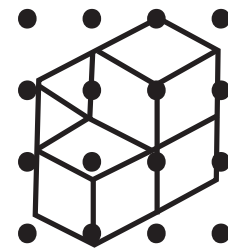
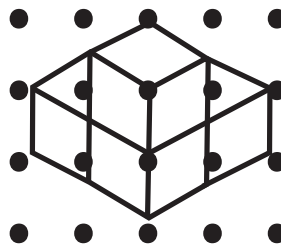
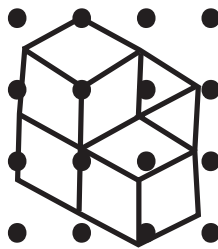
Original position       $90^\circ$  rotation clockwise       $180^\circ$  rotation clockwise       $270^\circ$  rotation clockwise



$90^\circ$  rotation  
counterclockwise

$180^\circ$  rotation  
counterclockwise

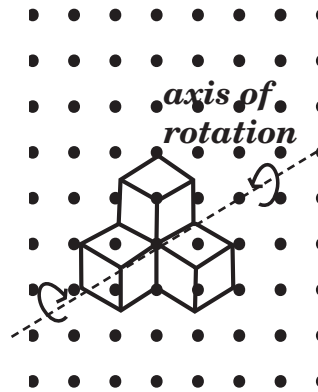
$270^\circ$  rotation  
counterclockwise



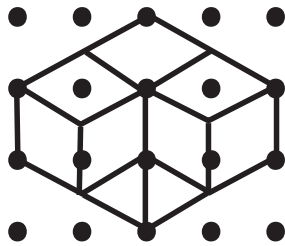
An object can also be rotated vertically around a horizontal axis of rotation. The rotation can be toward you or way from you.

### Vertical Rotation

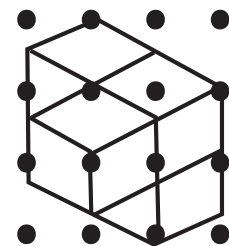
Original position



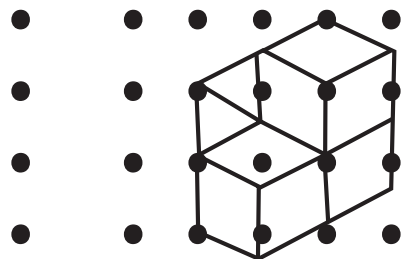
90° rotation  
toward you



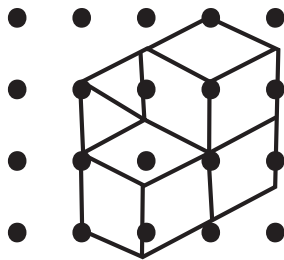
180° rotation  
toward you



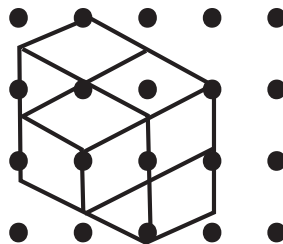
270° rotation  
toward you



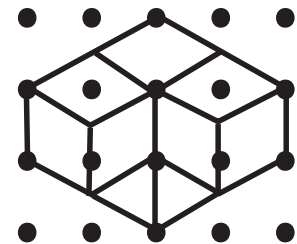
90° rotation away  
from you



180° rotation away  
from you



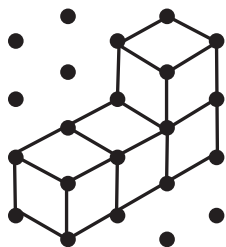
270° rotation away  
from you



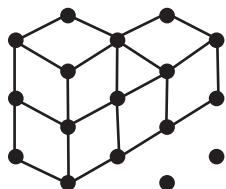
Draw the views of rotated objects using the same method you applied before. However, in this situation, first determine the new orientation of the rotated object. Then begin making your drawings.

**Example 1**

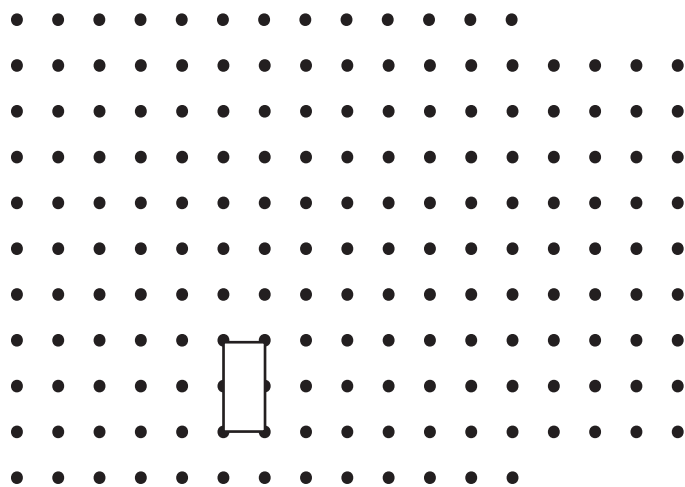
The following object is rotated  $180^\circ$  about the horizontal axis. Draw the front, top, and side views after the rotation is applied.



Step 1: Determine the image of the original object after the rotation is applied.

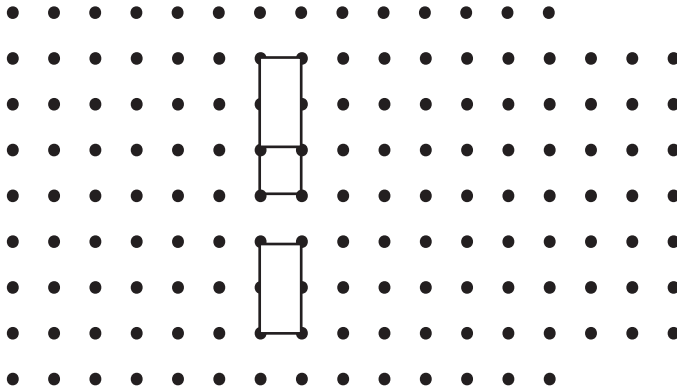


Step 2: Draw the front view.

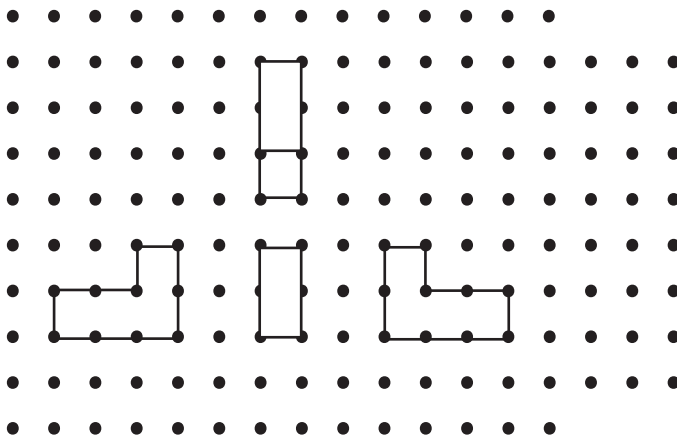




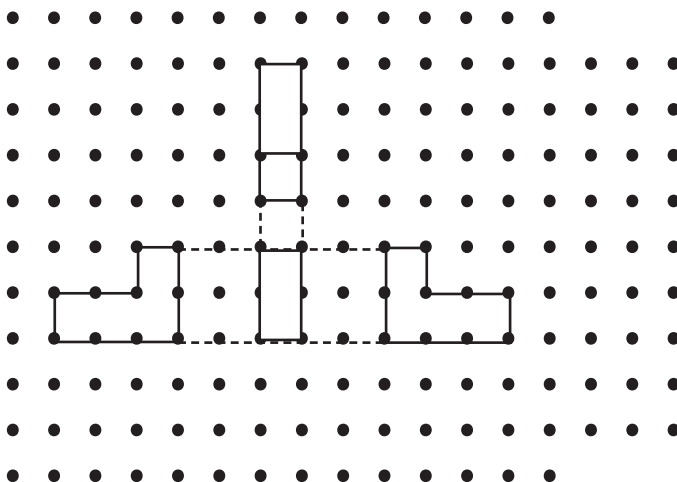
Step 3: Draw the top view and place it above the front view.



Step 4: Draw the side views and place them beside the front view.

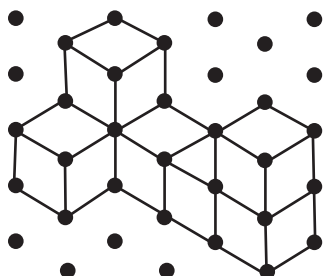


Step 5: Draw in the broken lines to show how the different views align.

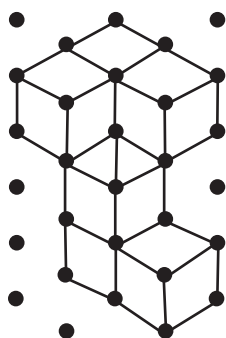


## Practice Questions

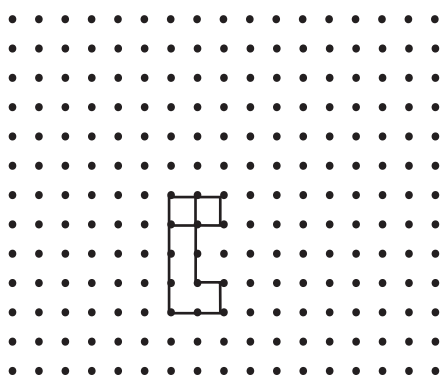
- The following object is rotated  $90^\circ$  towards you about the vertical axis. Draw the front, top, and side views after the rotation is applied.



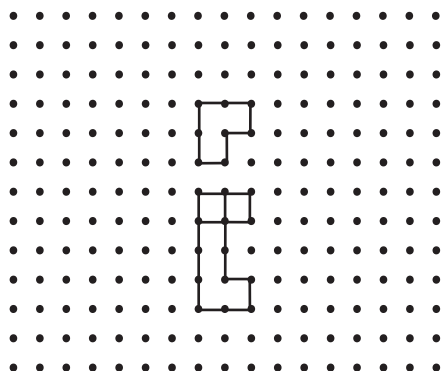
Step 1: Determine the image of the original object after the rotation is applied.



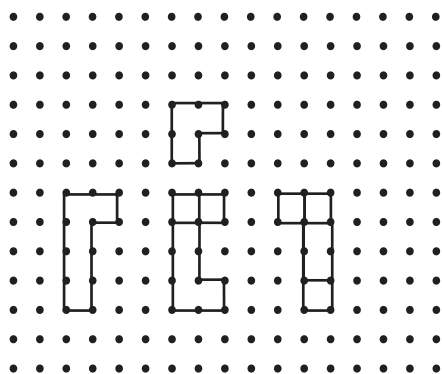
Step 2: Draw the front view.



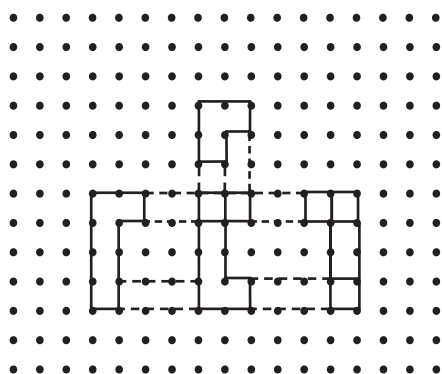
Step 3: Draw the top view and place it above the front view.



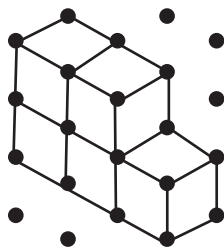
Step 4: Draw the side views and place them beside the front view.



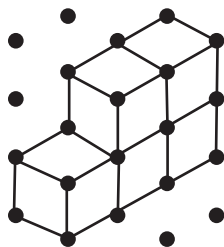
Step 5: Draw in the broken lines to show how the different views align.



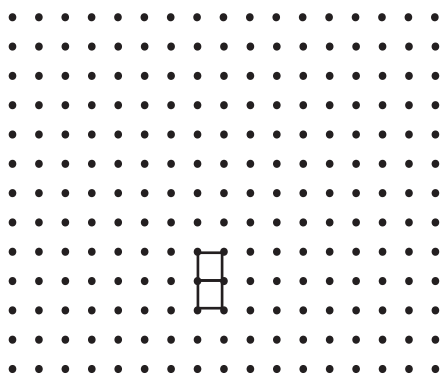
2. The following object is rotated  $270^\circ$  counterclockwise about the horizontal axis. Draw the front, top, and side views after the rotation is applied.



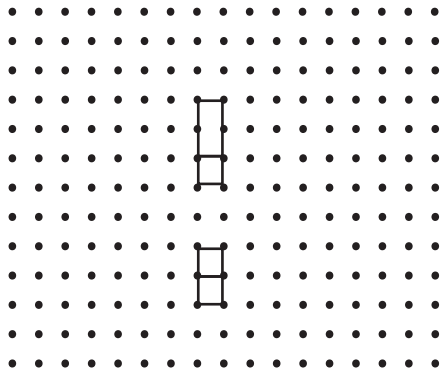
Step 1: Determine the image of the original object after the rotation is applied.



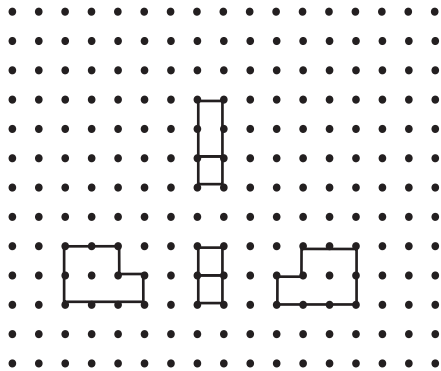
Step 2: Draw the front view.



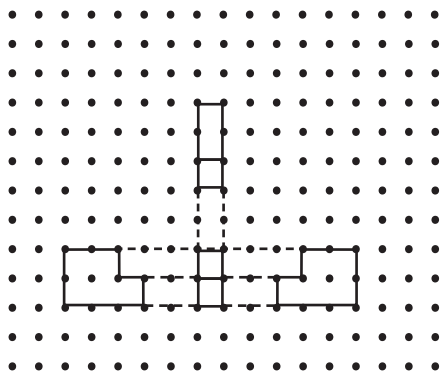
Step 3: Draw the top view and place it above the front view.



Step 4: Draw the side views and place them beside the front view.

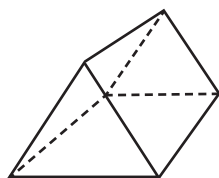
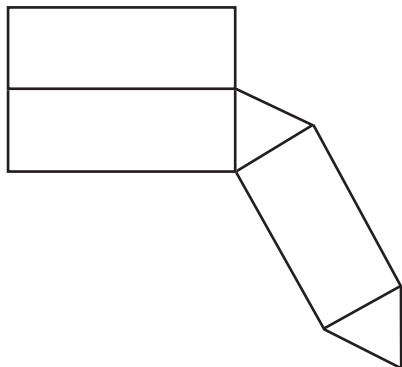


Step 5: Draw in the broken lines to show how the different views align.

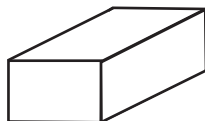
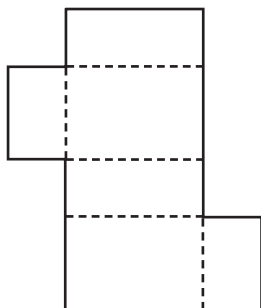


## Lesson 4: Assignment

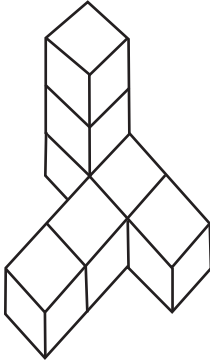
1. Draw a sketch of the 3-D object the following net represents.



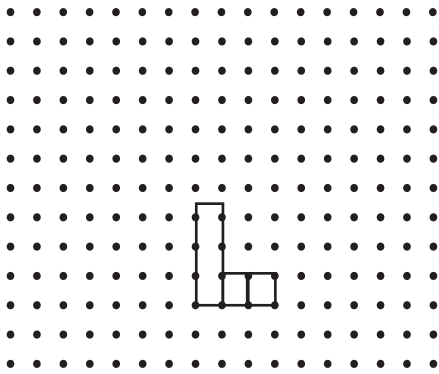
2. Draw a sketch of the 3-D object the following net represents.



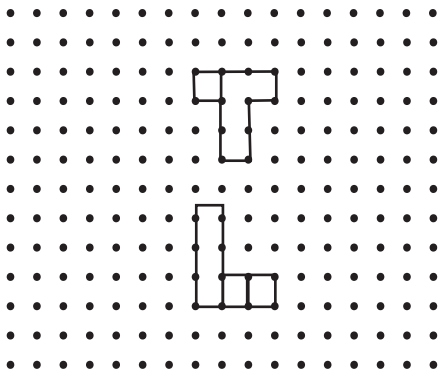
3. Draw the front, top, and side views of the following 3-D objects.



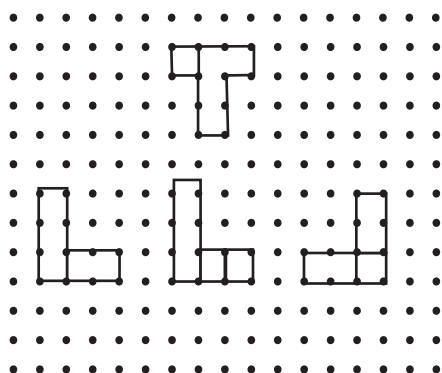
Step 1: Draw the front view.



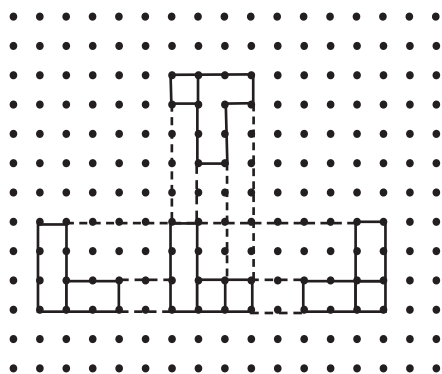
Step 2: Draw the top view and place it above the front view.



Step 3: Draw the side views and place them beside the front view.

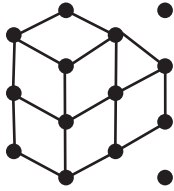


Step 4: Draw in the broken lines to show how the different views align.

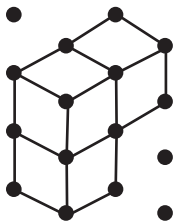




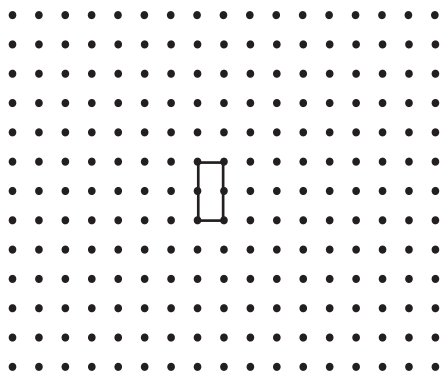
4. The following object is rotated  $180^\circ$  away from you about the vertical axis. Draw the front, top, and side views after the rotation is applied.



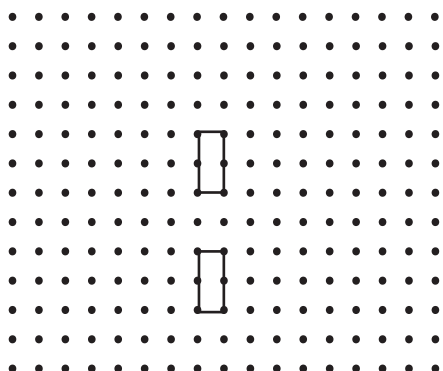
Step 1: Determine the image of the original object after the rotation is applied.



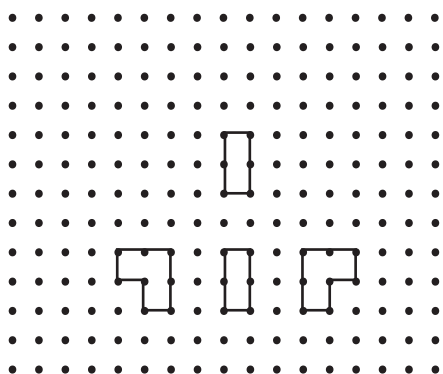
Step 2: Draw the front view.



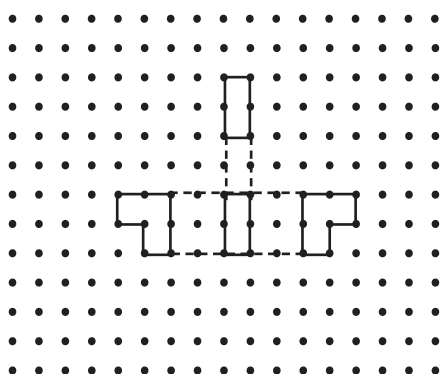
Step 3: Draw the top view and place it above the front view.



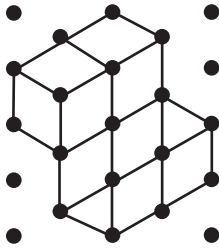
Step 4: Draw the side views and place them beside the front view.



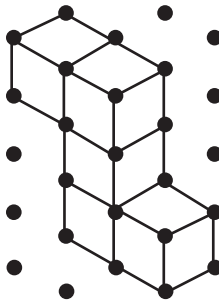
Step 5: Draw in the broken lines to show how the different views align.



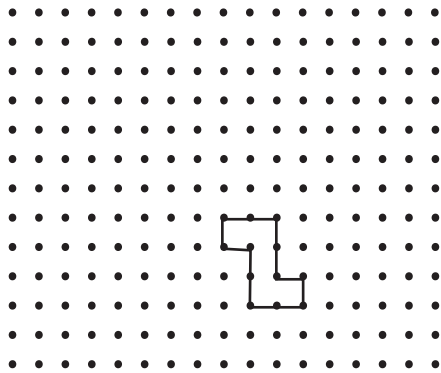
5. The following object is rotated  $270^\circ$  counterclockwise about the horizontal axis. Draw the front, top, and side views after the rotation is applied.



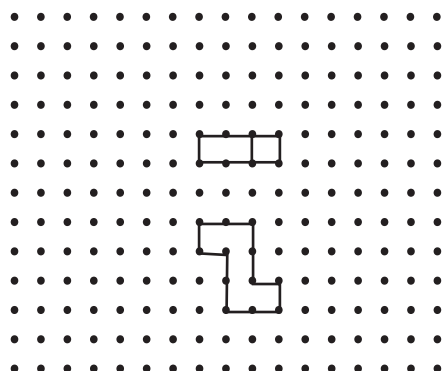
Step 1: Determine the image of the original object after the rotation is applied.



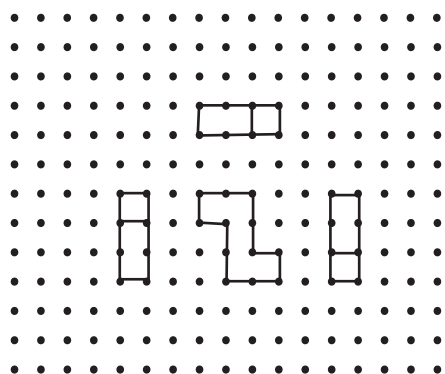
Step 2: Draw the front view.



Step 3: Draw the top view and place it above the front view.



Step 4: Draw the side views and place them beside the front view.



Step 5: Draw in the broken lines to show how the different views align.

