

# Nets and Drawings for Visualizing Geometry

UNIT 1 LESSON 1

# Section 1.1 – Nets and Drawings for Visualizing Geometry

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## STUDENTS WILL BE ABLE TO:

- MAKE NETS AND DRAWINGS OF THREE-DIMENSIONAL FIGURES.

## KEY VOCABULARY:

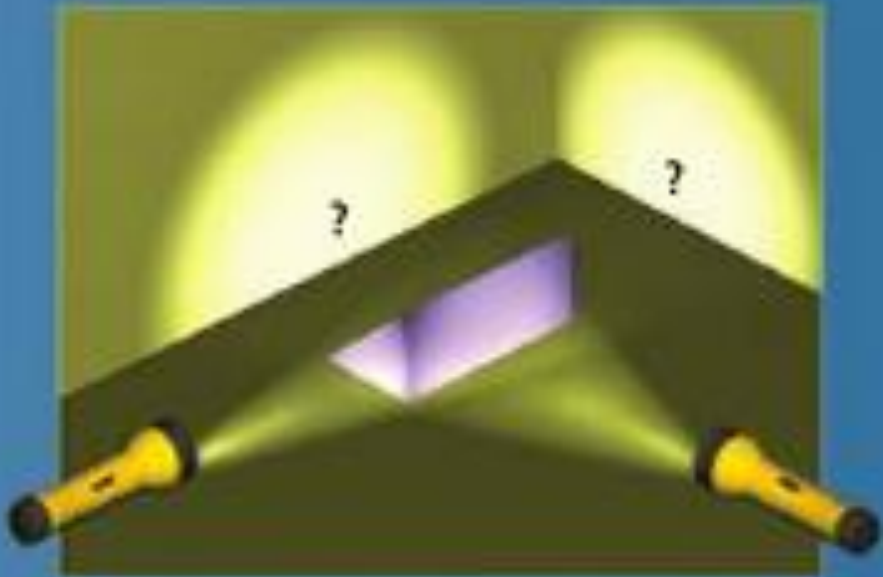
- NET
- ISOMETRIC DRAWING
- ORTHOGRAPHIC DRAWING

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### Getting Ready!

When you shine a flashlight on an object, you can see a shadow on the opposite wall. What shape would you expect the shadows in the diagram to have? Explain your reasoning.



The diagram shows a 3D scene within a rectangular frame. In the foreground, a dark green triangular prism is positioned on a blue floor. Two yellow flashlights are placed on the floor, one on the left and one on the right, both pointing towards the prism. The prism has a purple rectangular cutout on its front face. In the background, a yellow wall is visible. Two bright, circular yellow light patches are cast onto the wall, each marked with a black question mark. The entire scene is set against a blue background.

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IN THE SOLVE IT, YOU HAD TO “SEE” THE PROJECTION OF ONE SIDE OF AN OBJECT ONTO A FLAT SURFACE. VISUALIZING FIGURES IS A KEY SKILL THAT YOU WILL DEVELOP IN GEOMETRY.

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YOU CAN REPRESENT A THREE DIMENSIONAL OBJECT WITH A TWO-DIMENSIONAL FIGURE USING SPECIAL DRAWING TECHNIQUES.

A **NET** IS A TWO-DIMENSIONAL DIAGRAM THAT YOU CAN FOLD TO FORM A THREE-DIMENSIONAL FIGURE. A NET SHOWS ALL OF THE SURFACES OF A FIGURE IN ONE VIEW.

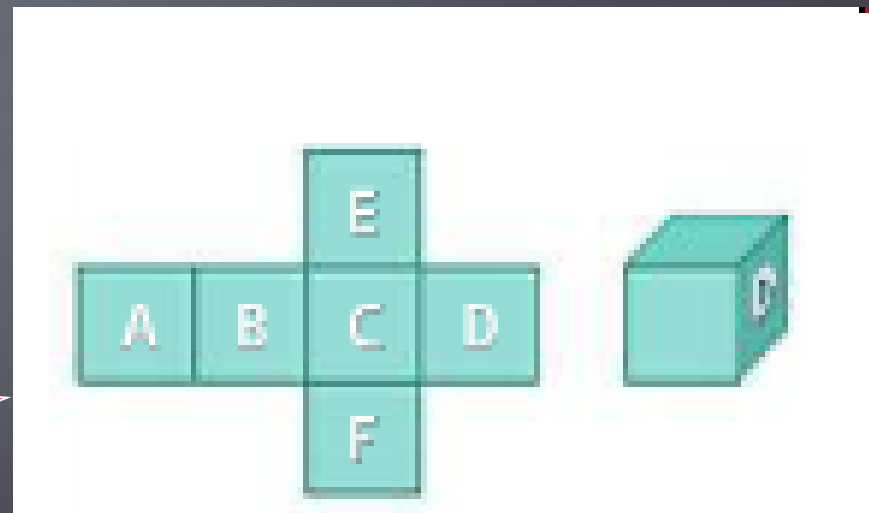
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## PROBLEM 1:

THE NET AT THE RIGHT FOLDS INTO THE CUBE SHOWN BESIDE IT. WHICH LETTERS WILL BE ON THE TOP AND FRONT OF THE CUBE?

How can you see the 3-D figure? Visualize folding the net at the seams so that the edges join together. Track the letter positions by seeing one surface move in relation to another.



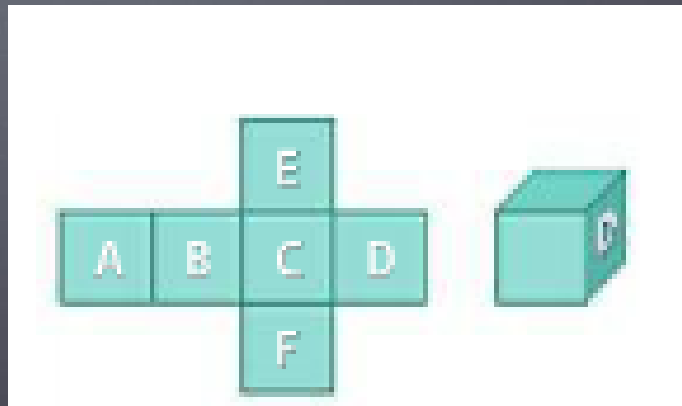
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## PROBLEM 1:

HOW CAN YOU DETERMINE BY LOOKING AT THE NET THAT SURFACE E AND SURFACE F WILL BE OPPOSITE ONE ANOTHER IN THE CUBE?

IF THE CUBE WERE TURNED ONE QUARTER-TURN COUNTERCLOCKWISE WITHOUT LIFTING THE BOTTOM SURFACE, WHICH SURFACE WOULD BE AT THE FRONT OF THE CUBE?



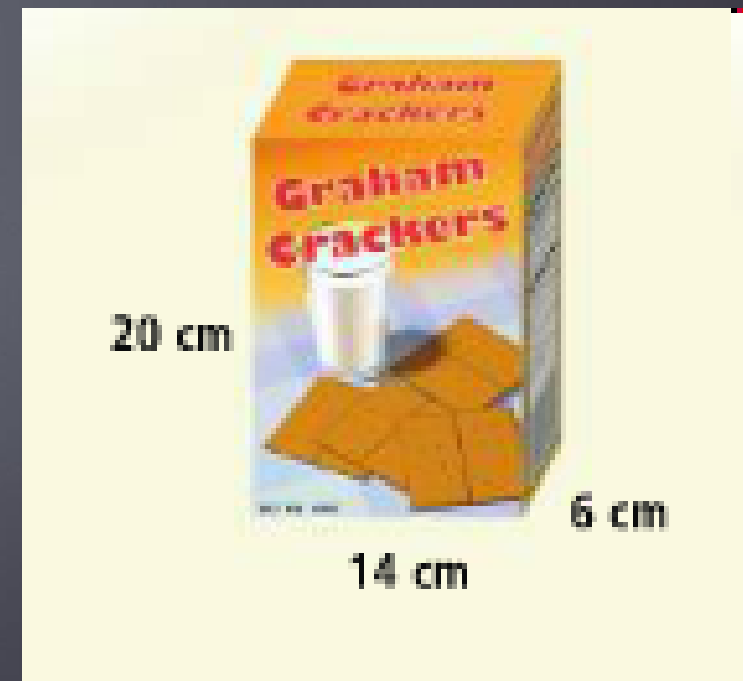


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## PROBLEM 2:

WHAT IS THE NET FOR THE GRAHAM CRACKER BOX TO THE RIGHT? LABEL THE NET WITH ITS DIMENSIONS.





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## PROBLEM 2:

WHAT IS A NET FOR THE FIGURE AT THE RIGHT?  
LABEL THE NET WITH ITS DIMENSIONS.

IS THERE ANOTHER POSSIBLE NET  
FOR THE FIGURE?

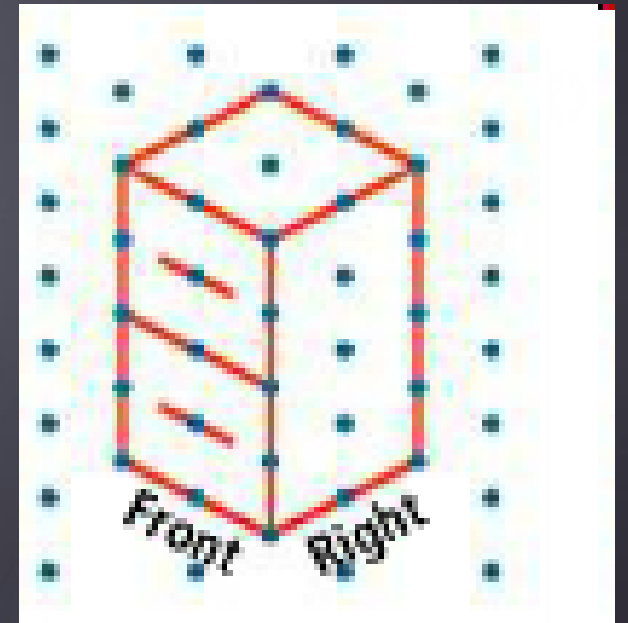


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AN **ISOMETRIC DRAWING** SHOWS A CORNER VIEW OF A THREE DIMENSIONAL FIGURE. IT ALLOWS YOU TO SEE THE TOP, FRONT, AND SIDE OF THE FIGURE. YOU CAN DRAW AN ISOMETRIC DRAWING ON ISOMETRIC DOT PAPER. THE SIMPLE DRAWING OF A FILE CABINET AT THE RIGHT IS AN ISOMETRIC DRAWING.

A **NET** SHOWS A 3-D FIGURE AS A FOLDED OUT FLAT SURFACE. AN **ISOMETRIC DRAWING** SHOWS A 3-D FIGURE USING SLANTED LINES TO REPRESENT DEPTH.



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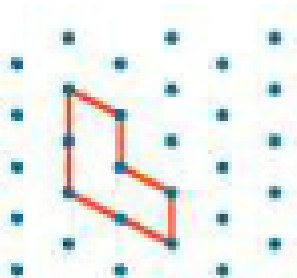
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## PROBLEM 3:

WHAT IS AN ISOMETRIC DRAWING OF THE CUBE STRUCTURE AT THE RIGHT?

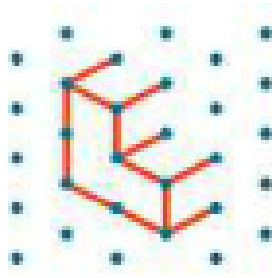
### Step 1

Draw the front edges.



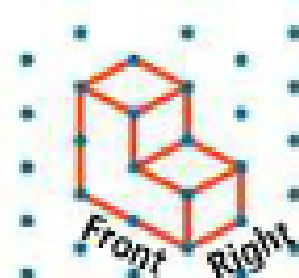
### Step 2

Draw the right edges.



### Step 3

Draw the back edges.

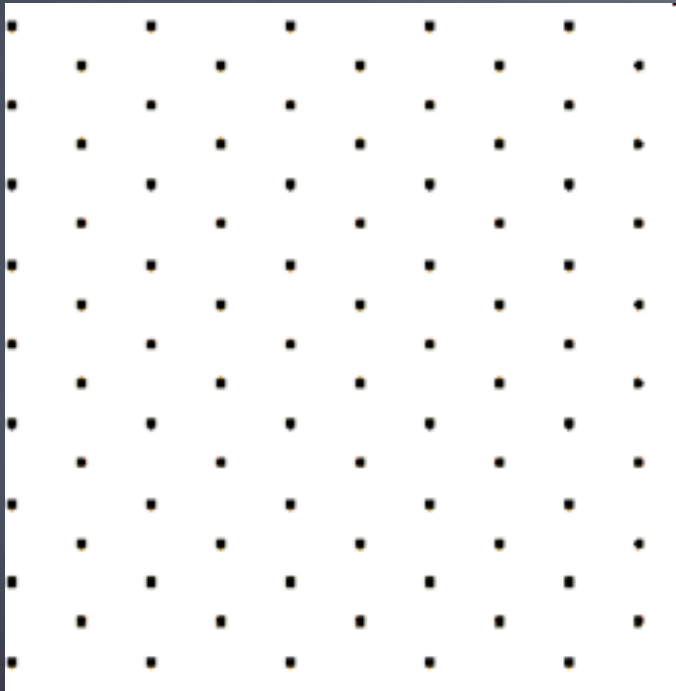


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## PROBLEM 3:

WHAT IS AN ISOMETRIC DRAWING OF THE CUBE STRUCTURE AT THE RIGHT?



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AN ORTHOGRAPHIC DRAWING IS ANOTHER WAY TO REPRESENT A 3-D FIGURE. AN ORTHOGRAPHIC DRAWING SHOWS THREE SEPARATE VIEWS, A TOP VIEW, A FRONT VIEW, AND A RIGHT-SIDE VIEW.

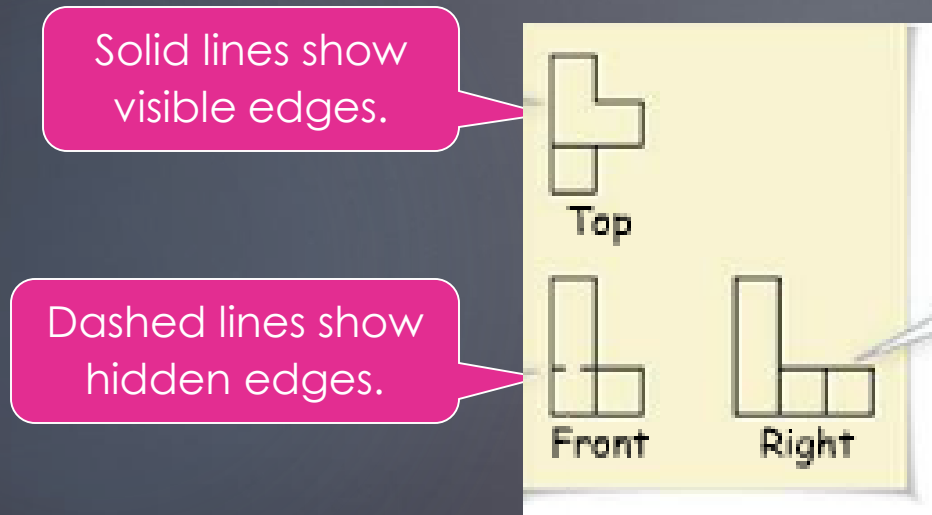
ALTHOUGH AN ORTHOGRAPHIC DRAWING MAY TAKE MORE TIME TO ANALYZE, IT PROVIDES UNIQUE INFORMATION ABOUT THE SHAPE OF A STRUCTURE.

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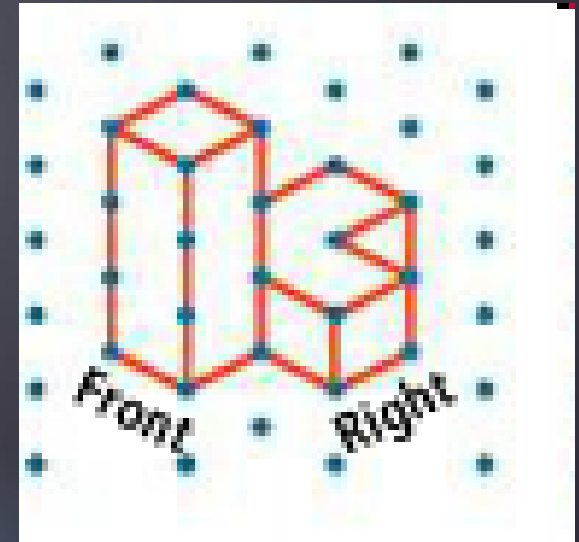
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## PROBLEM 4:

WHAT IS THE ORTHOGRAPHIC DRAWING FOR THE ISOMETRIC DRAWING AT THE RIGHT?



An isometric drawing shows the same three views.



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## PROBLEM 4:

WHAT IS THE ORTHOGRAPHIC DRAWING FOR THE ISOMETRIC DRAWING AT THE RIGHT?

