

Task

3

Overview

Use geometry and measurement to center a rectangular figure.

Communicate mathematically.

Matting a Photo

Long Task

Task Description

Students write directions on how to cut an opening for a $3\frac{1}{2}$ -by-5-inch photo from a 5-by-7-inch rectangular matte board.

Assumed Mathematical Background

It is assumed that students have had some experience with calculation involving fractions and measurement.

Core Elements of Performance

- use visual reasoning, measurement, and calculations involving fractions to reason about rectangles in an applied setting
- write a clear and complete set of directions

Circumstances

Grouping: Following some entry work in pairs, students complete an individual written response.

Materials: inch rulers (marked to sixteenths of inches) and tape

Estimated time: 45 minutes

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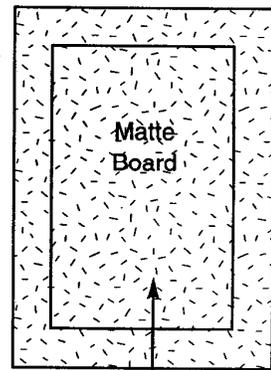
Matting a Photo

This problem gives you the chance to

- *use geometric and measurement ideas in an applied setting*
- *communicate mathematical ideas to an audience*

You and your partner have been hired by the Do-It-Yourself Frame Store to help customers matte their own pictures. A customer wants to matte a photograph that is a common size: $3\frac{1}{2}$ inches by 5 inches.

All mattes start off as a solid rectangular piece of cardboard. The one that would be used for this sized photograph measures 5 inches by 7 inches.

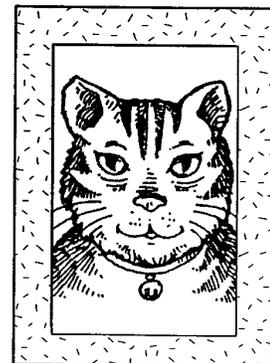


Cut a rectangular opening

A rectangular opening needs to be cut into the center of the matte to display the $3\frac{1}{2}$ -by-5-inch picture, which is positioned behind the matte.

The opening in the matte needs to overlap the photo by $\frac{1}{8}$ to $\frac{1}{4}$ inch all the way around, so the photo edge will not slip out once the picture is framed.

Customers have access to rulers that measure to the nearest $\frac{1}{16}$ inch.



Middle Grades Package 2



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Name _____

Date _____

With a partner

1. Write a first draft of very specific instructions that a customer could use to mat a $3\frac{1}{2}$ -by-5-inch photo. Your instructions should include a diagram and they should be written for any customer who is matting a photo for the first time.
2. To test your instructions, follow them to mat the picture using the next two pages. Make notes of any problems with your instructions.

On your own

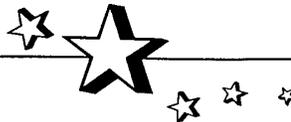
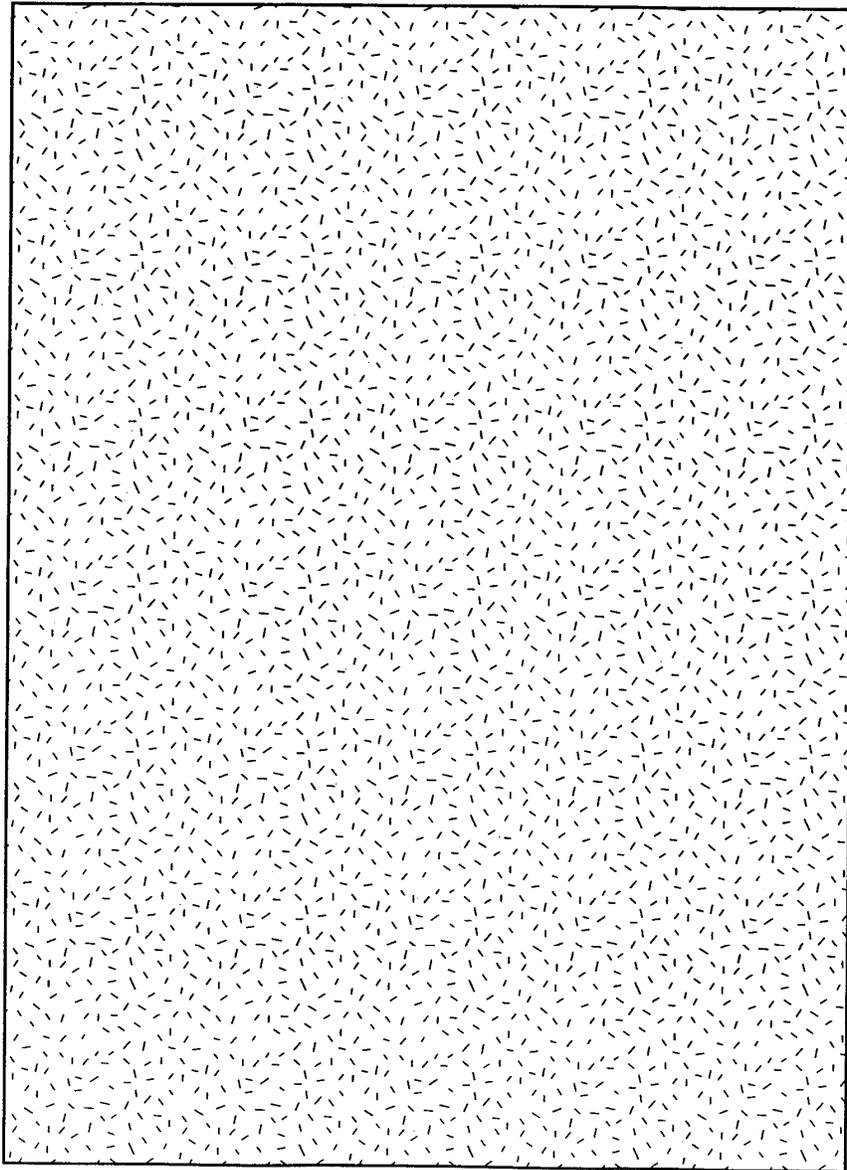
3. Write a final set of instructions. You may modify and refine your draft to make them as clear and specific as possible for customers. Remember, even new customers must be able to follow your set of instructions and they should include a diagram.

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Name

Date

Matte Board



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Name _____

Date _____

3½-by-5-inch picture



Matting a Photo

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A Sample Solution

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First, to find out where to put the photo, compute the difference between the width of the matte and the width of the photo.

$$5 - 3\frac{1}{2} = 1\frac{1}{2} \text{ inches}$$

Now, you want this amount to be divided evenly on both sides of the photograph.

$$1\frac{1}{2} \div 2 = \frac{3}{4}$$

Add the $\frac{1}{4}$ -inch overlap to get the final answer width of the matte on each side of the photo.

$$\frac{3}{4} + \frac{1}{4} = 1 \text{ inch}$$

Now you need to do the same thing to find the width of the matte at the top and bottom of the picture. Again, find the difference between the length of the picture and the length of the matte.

$$7 - 5 = 2 \text{ inches}$$

Now, you want this amount to be divided evenly on both sides of the photograph.

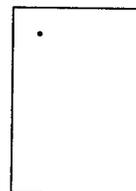
$$2 \div 2 = 1 \text{ inch}$$

Add the $\frac{1}{4}$ -inch overlap to get the final answer for the width of the matte above and below the picture.

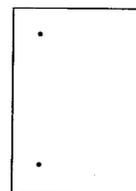
$$1 + \frac{1}{4} = 1\frac{1}{4} \text{ inches}$$

Now we need to cut the opening in the matte for the photo. Make the marks on the back of the matte so that they do not show when you are finished.

1. Measure in 1 inch from the 7-inch side of the matte.
Mark this place with a dot.



2. Repeat this process on the same side of the matte but at a different point on the side.

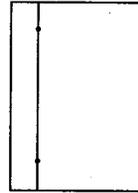


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Matting a Photo ■ A Sample Solution

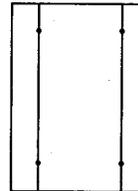
3. Draw a line through these two marks creating a line parallel to the edge of the mat.



Task

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4. Repeat the above steps on the opposite side of the mat.

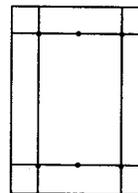


5. Now measure in $1\frac{1}{4}$ inches from the top of the mat and mark a dot.

6. Do this again at a different point from the top of the mat board.

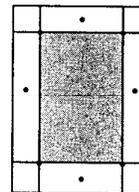
7. Draw the line connecting the dots.

8. Repeat this to draw a line $1\frac{1}{4}$ inches from the bottom of the mat.



9. Cut out the inside rectangle from the mat board.

10. From the opening that you have just cut out, measure in $\frac{1}{4}$ inch on all four sides and mark this on the back of the mat.



11. Tape the photo to the back of the mat so it is centered in the $\frac{1}{4}$ -inch marks you just made. Turn the mat over and you are done.

Matting a Photo

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