

Aaron's Designs

T1

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

Aaron is drawing some designs for greetings cards.

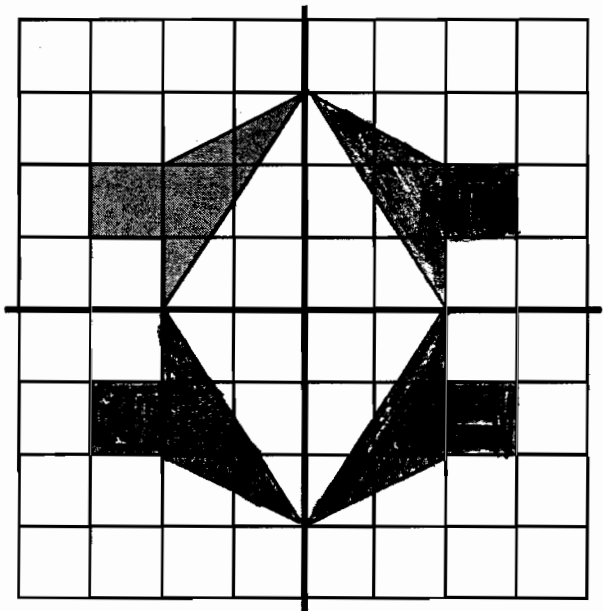
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

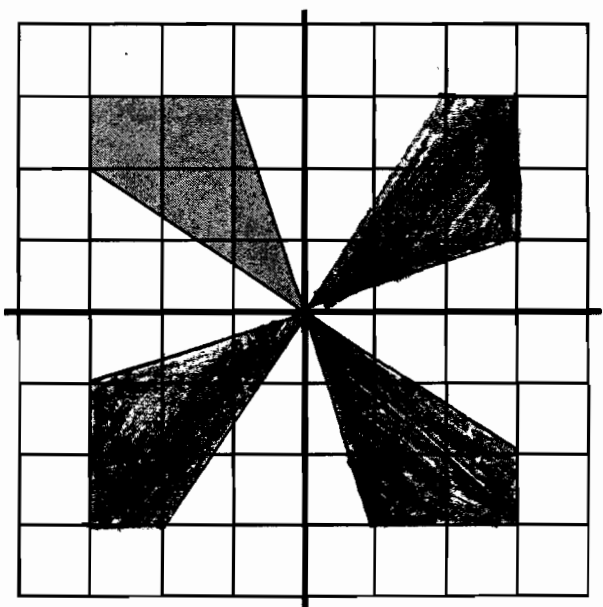


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

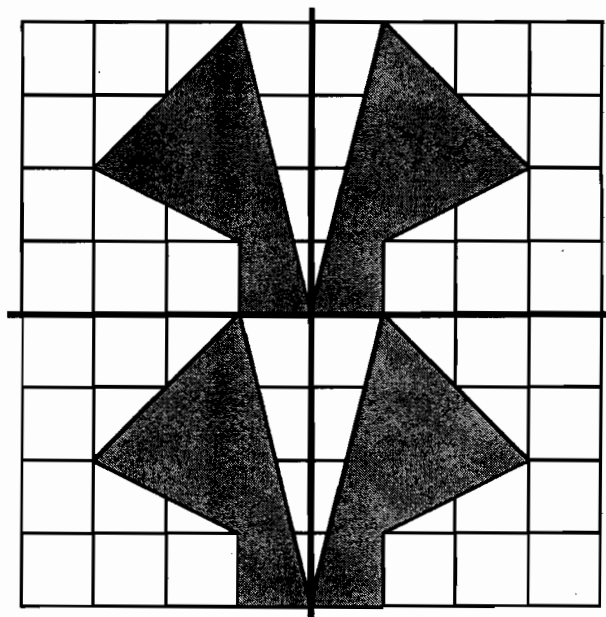
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

He translated the first shape 4 units
downward ✓, and then reflected both
shapes across the bold vertical line. ✓

Aaron's Designs

T2

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

Aaron is drawing some designs for greetings cards.

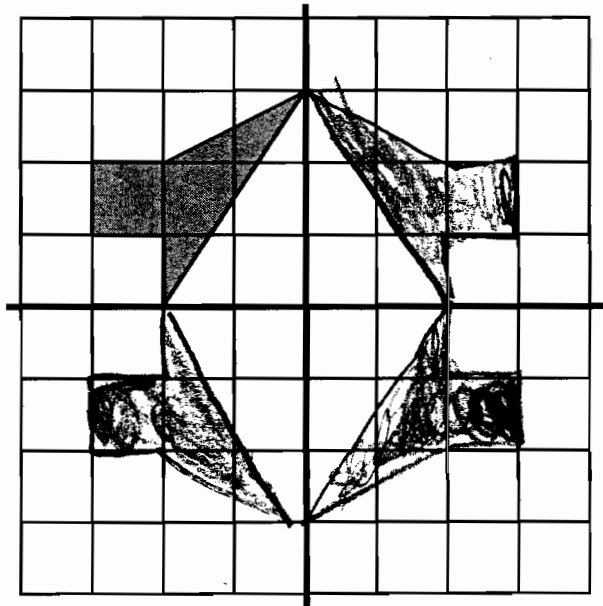
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

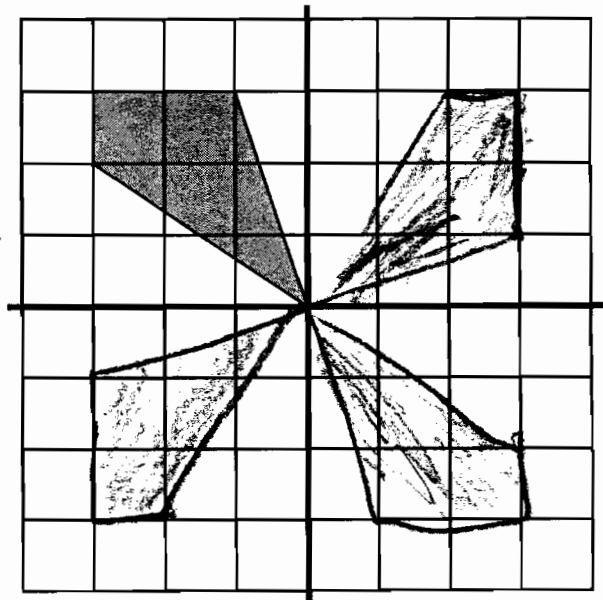


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

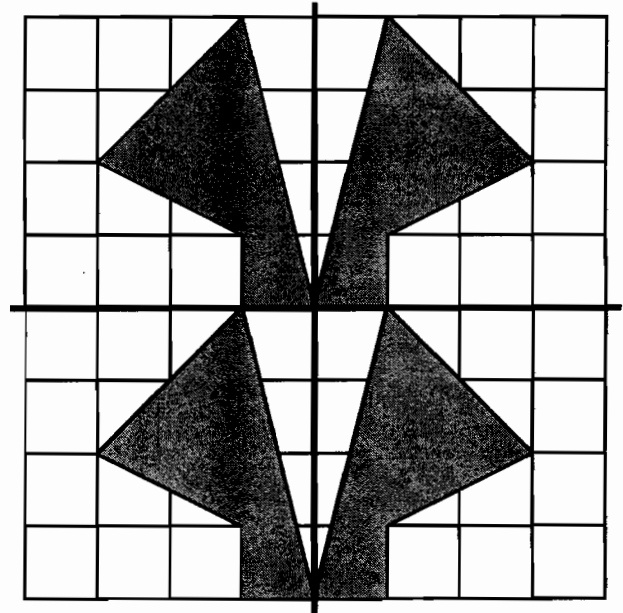
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

∧

○
○
○

Aaron's Designs

T3

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

Aaron is drawing some designs for greetings cards.

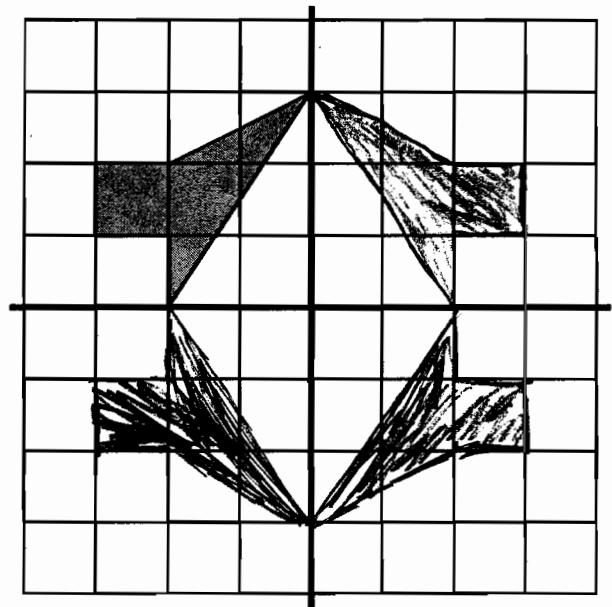
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

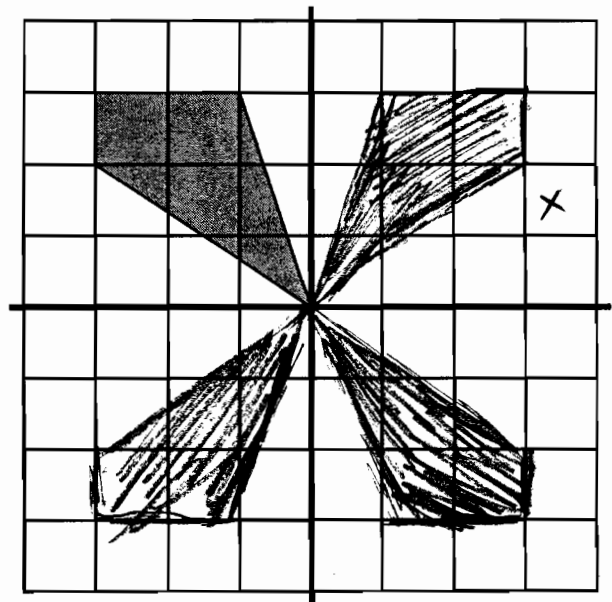


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

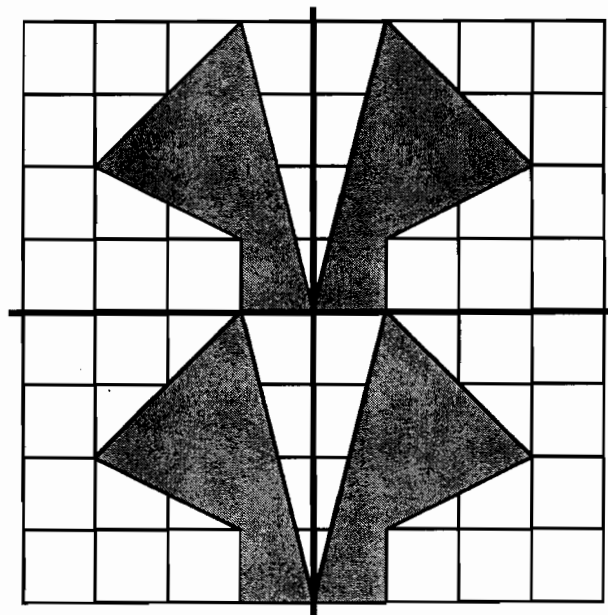
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

Aaron tilted his page 45° to the left to get his 3rd shape and
 45° to the right to get his 2nd and 4th.

x

0

0

0

Aaron's Designs

T4

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

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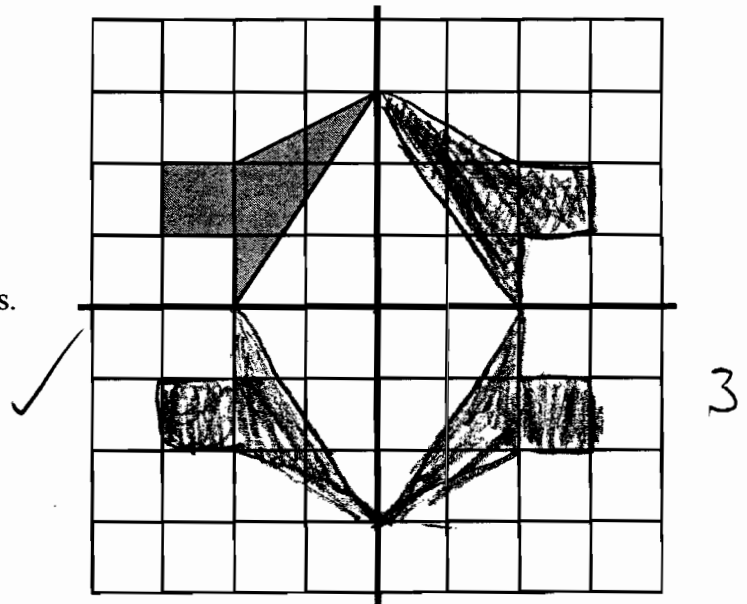
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

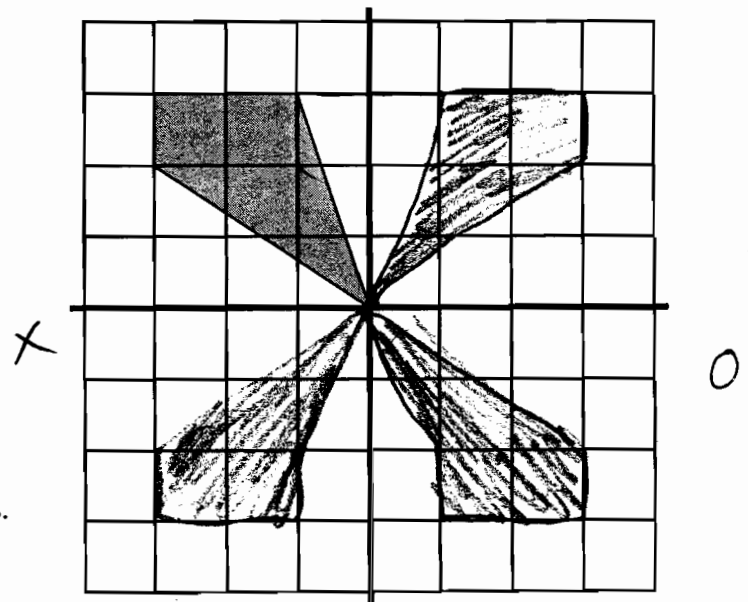


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

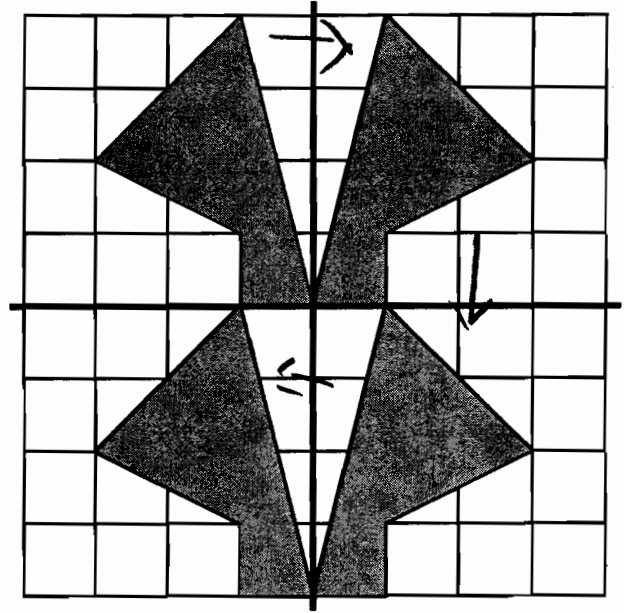
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

Reflected it across the vertical axis, ✓ 1
 then slid it across the 1
 horizontal, then reflected back 0
 to the other side

Aaron's Designs

T5

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

Aaron is drawing some designs for greetings cards.

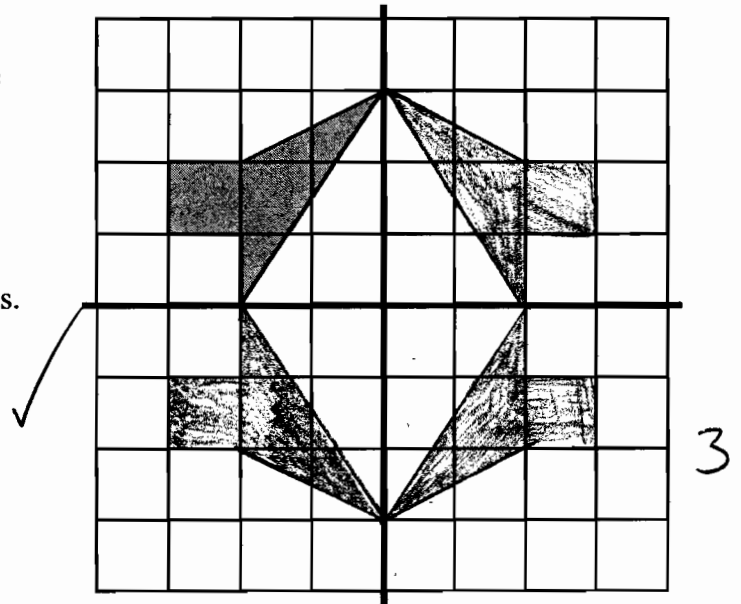
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

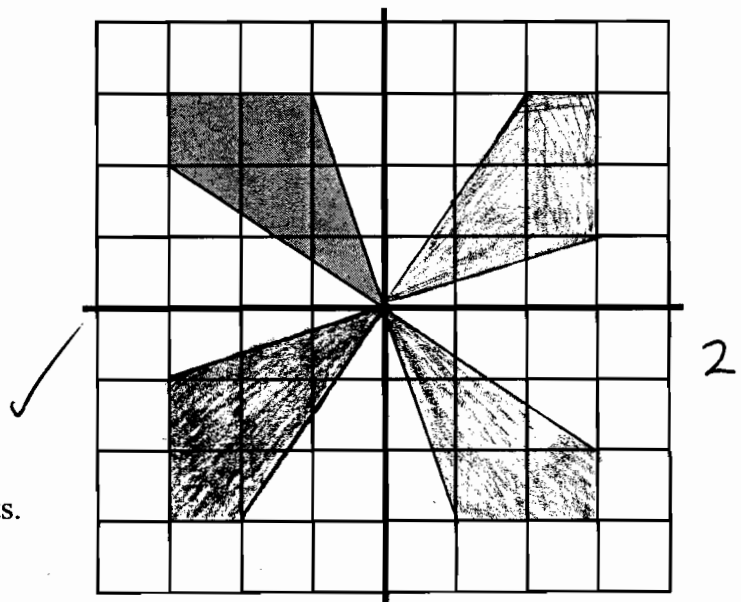


2. To finish drawing Aaron's second design, rotate the gray shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the third shape.

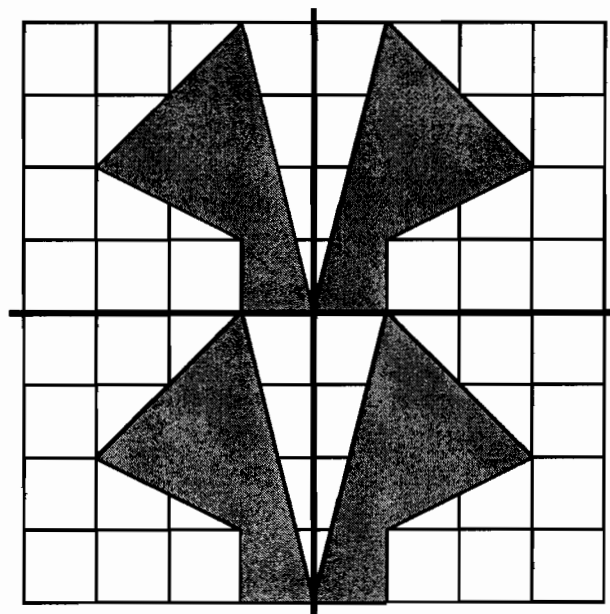
Rotate the third shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

He took the top left corner and
 flipped it to top right ✓ then he 1
 slid the top left & right down to 1
 bottom left & right ^ 0

Aaron's Designs

S1

This problem gives you the chance to:

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- describe transformations needed to make a given pattern

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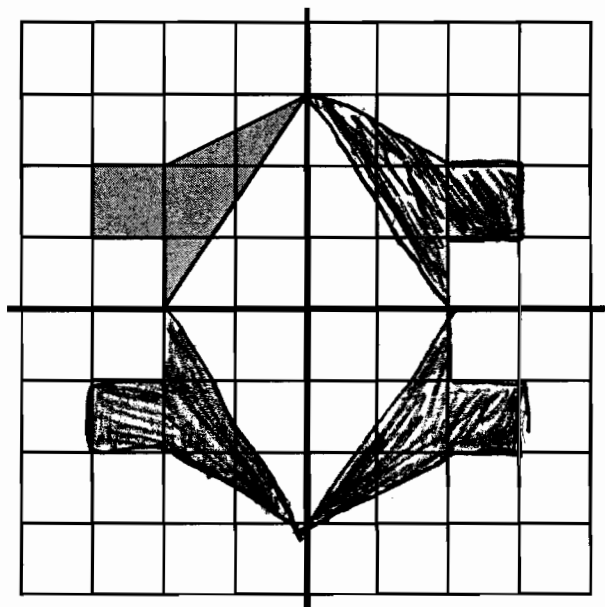
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

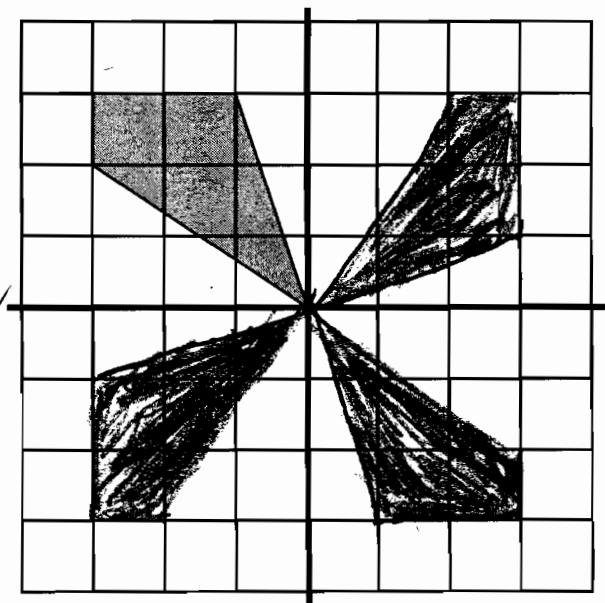


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

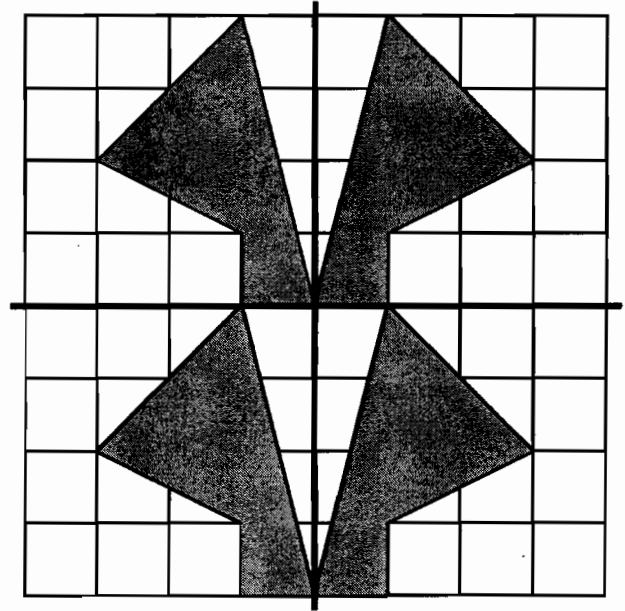
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

He reflected the shape ^{over the vertical line}, translated the shape down 4 units and again, reflected it over the vertical line.

Aaron's Designs

S2

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

Aaron is drawing some designs for greetings cards.

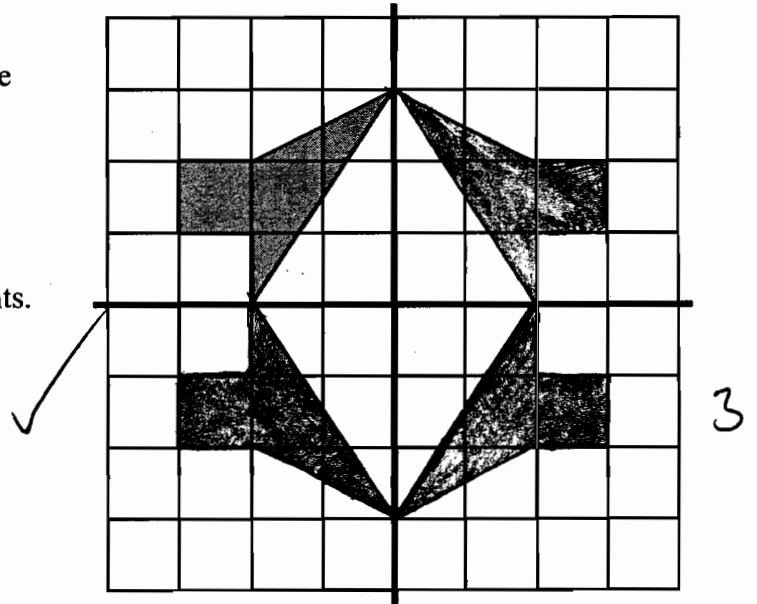
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

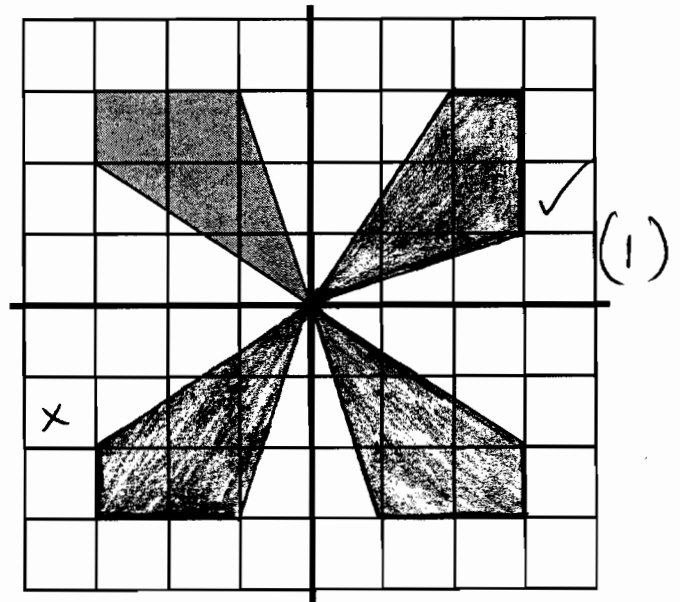


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

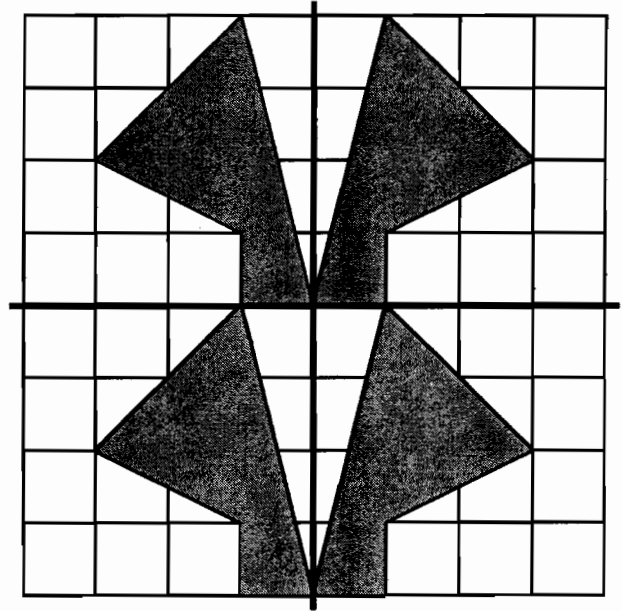
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

Aaron flipped the shape horizontally ✓ 1
 from the left-right quadrants, and 0
 copied the figure exactly as it 0
 is for the up-down quadrants. 0
 ^

Aaron's Designs

S3

This problem gives you the chance to:

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- describe transformations needed to make a given pattern

Aaron is drawing some designs for greetings cards.

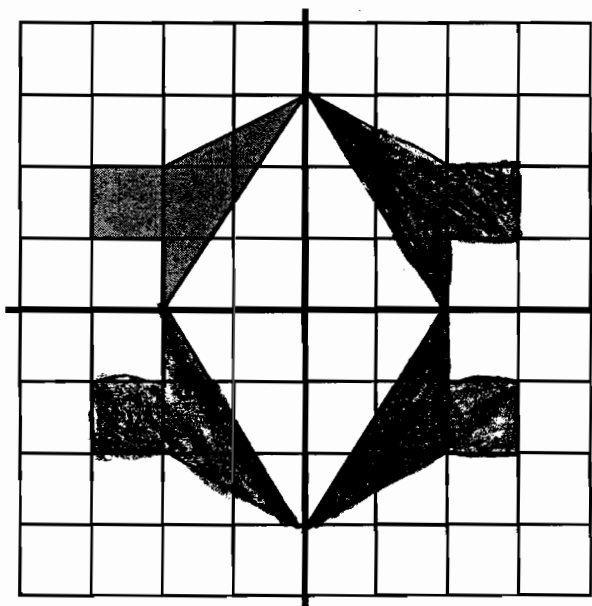
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

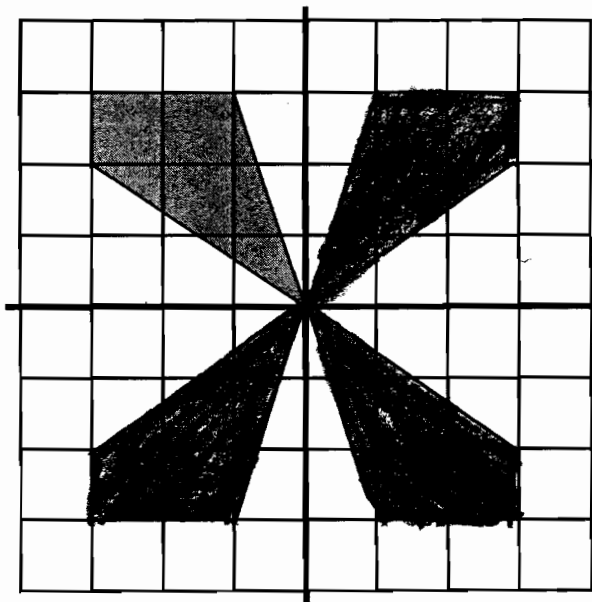


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

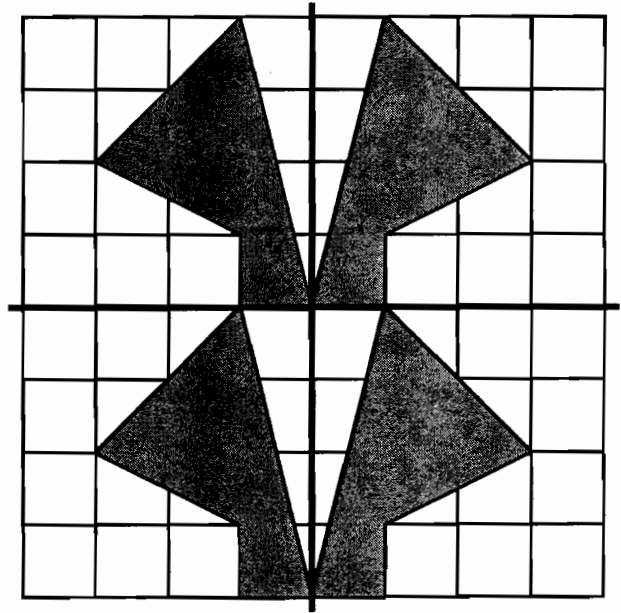
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

He just used the same design
 both times x 0
 _____ 0
 _____ 0

Aaron's Designs

S4

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

Aaron is drawing some designs for greetings cards.

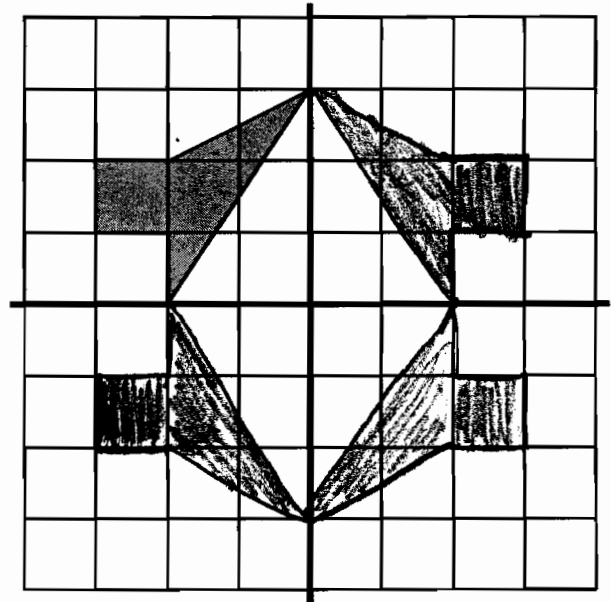
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

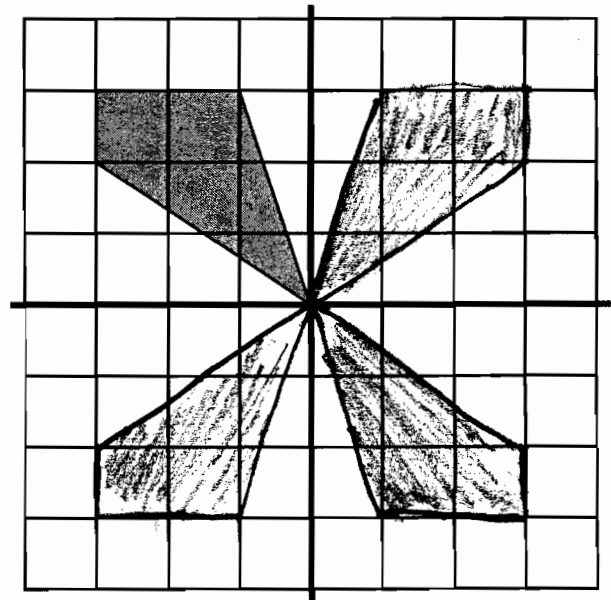


2. To finish drawing Aaron's second design, rotate the gray shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the third shape.

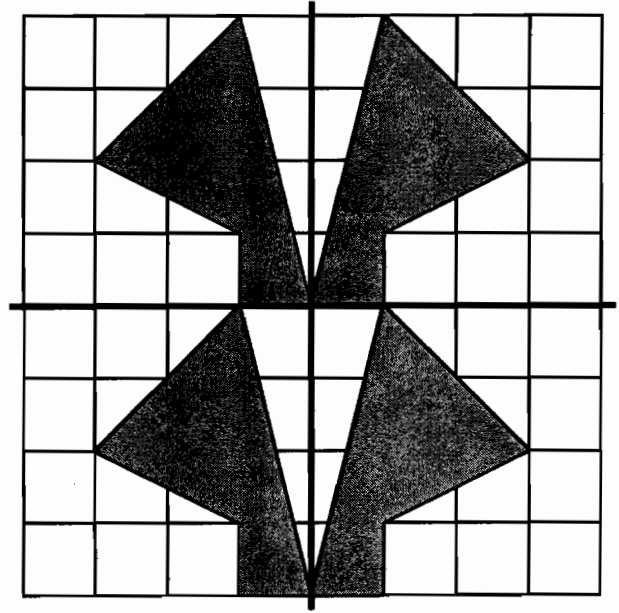
Rotate the third shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

He reflected the first design about
 the vertical line then he transformed
 that one over the horizontal line and reflected
 that one over the vertical line

8

4

Aaron's Designs

S5

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

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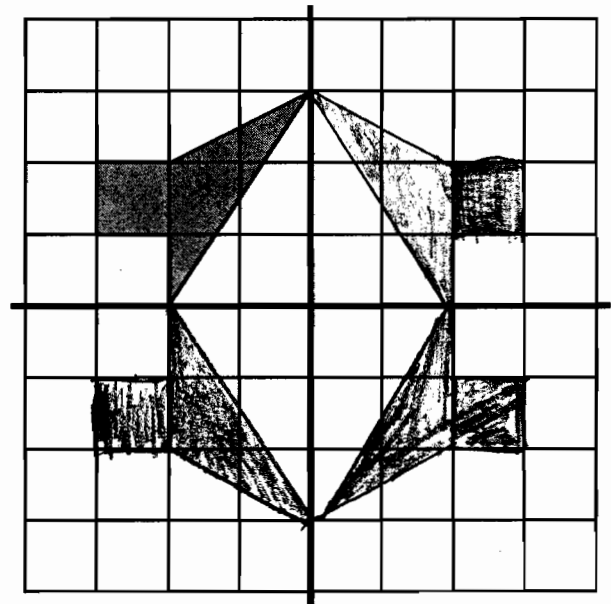
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

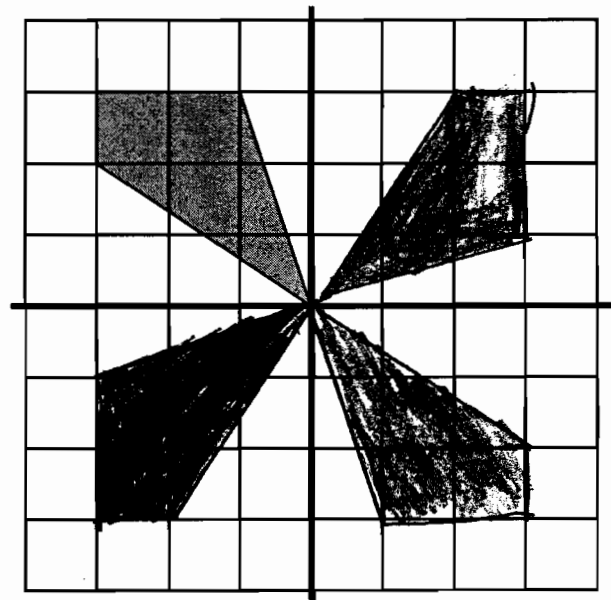


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

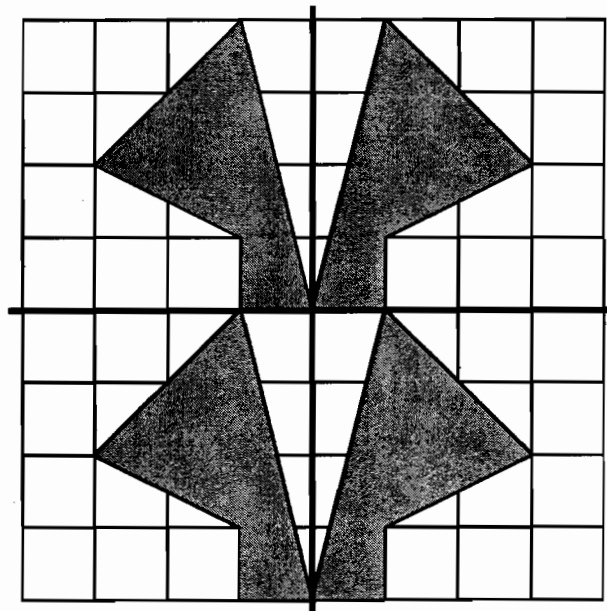
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

1. Mirror original shape 0
 2. ~~mirror~~ reflected image on bottom half 0
- x
-
- 0
-
- 0
-

Aaron's Designs

S6

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

Aaron is drawing some designs for greetings cards.

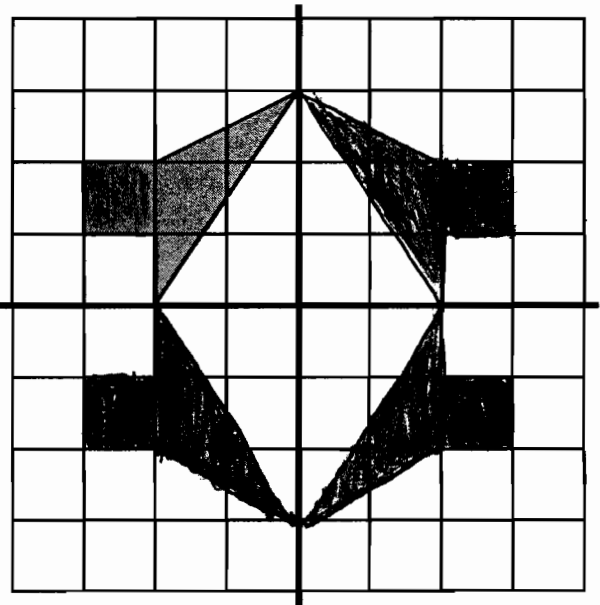
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

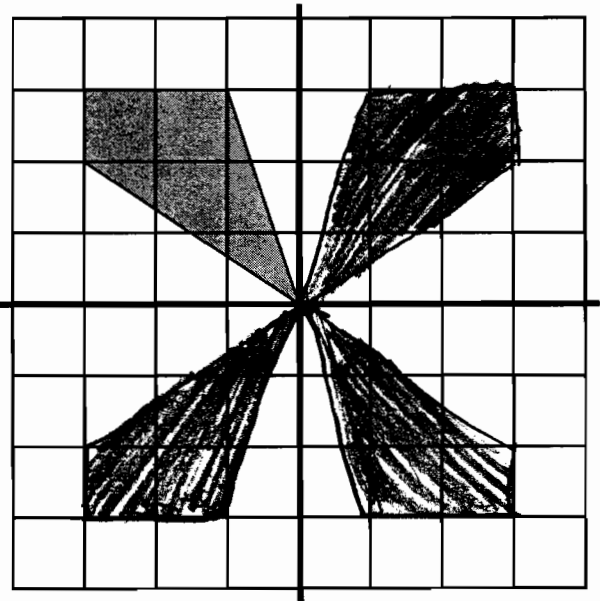


2. To finish drawing Aaron's second design, rotate the gray shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the third shape.

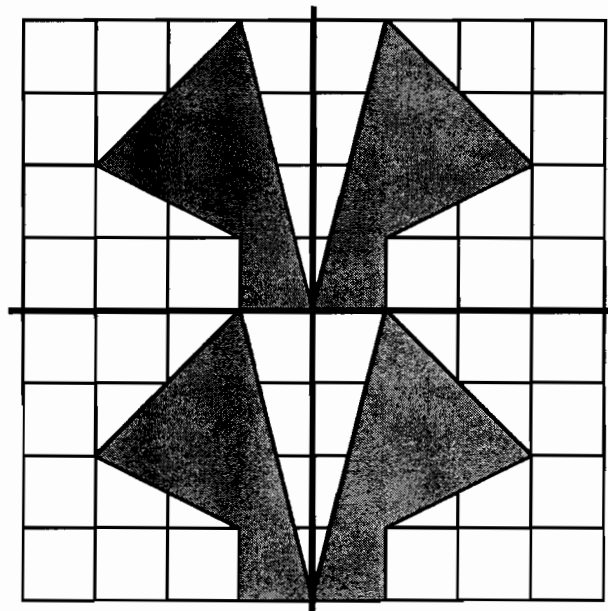
Rotate the third shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

Aaron's first design, all of the shapes are facing inward. In his second design, the shapes are facing outward. His third design, the shapes are facing out but the top one is facing up and not down.

0

0

0

1

Aaron's Designs

S7

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

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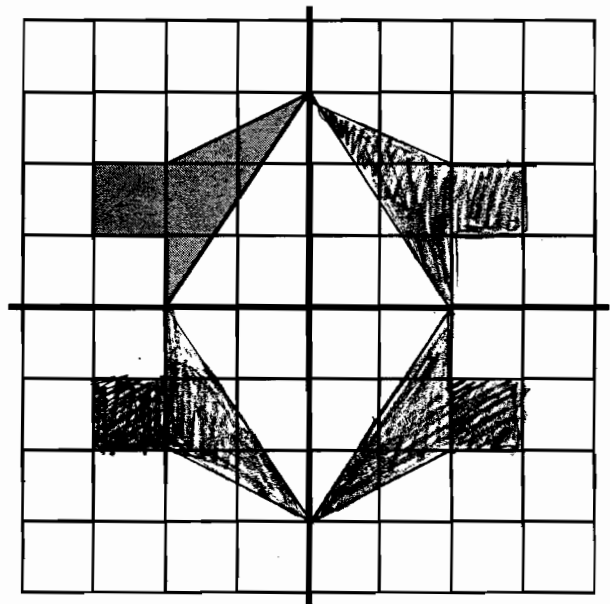
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

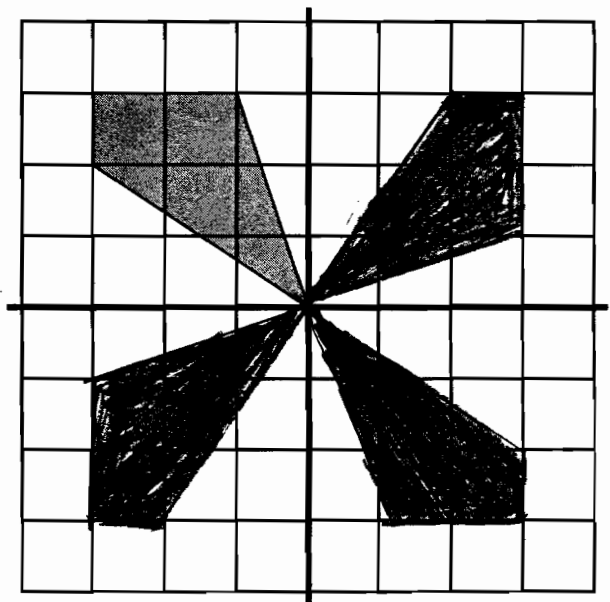


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

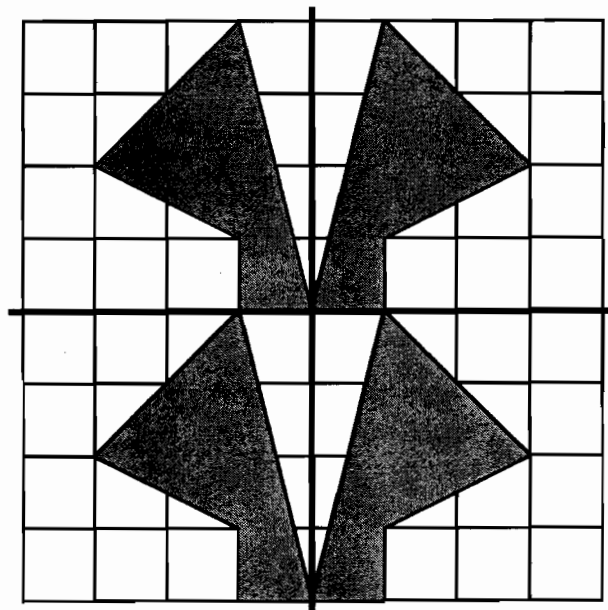
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

At first he reflected the design
over the vertical line. ✓

BOD Then he transferred this new
design 4 measures down.

Aaron's Designs

S8

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

Aaron is drawing some designs for greetings cards.

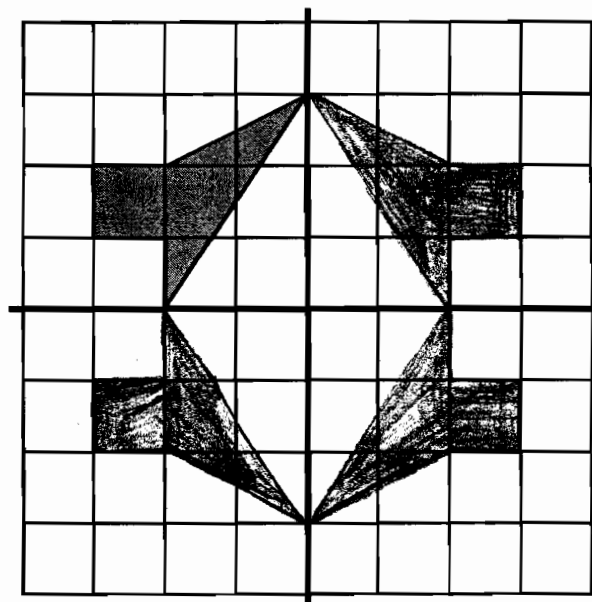
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

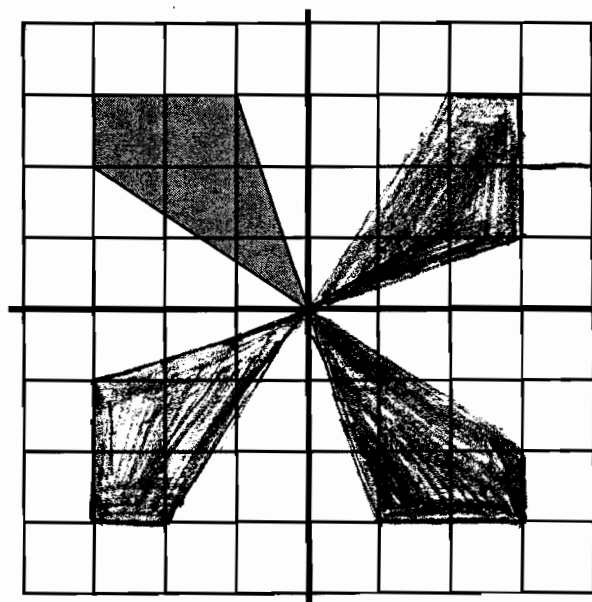


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

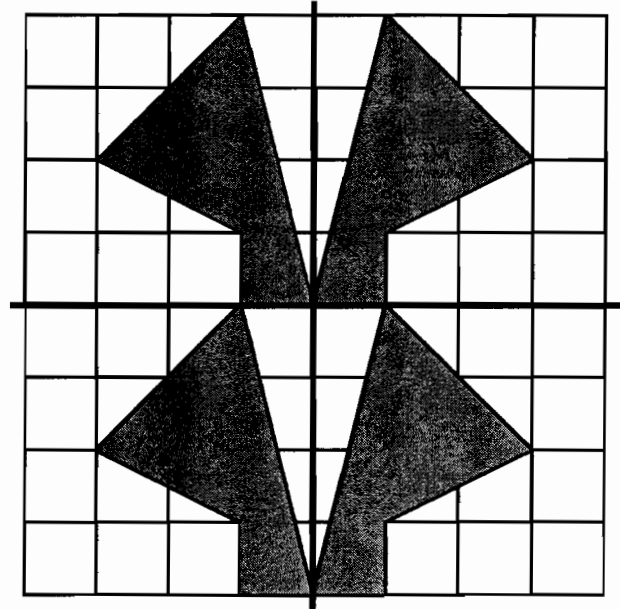
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

BOD Aaron copied the design down and reflected it across

1
1
0

Aaron's Designs

S9

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

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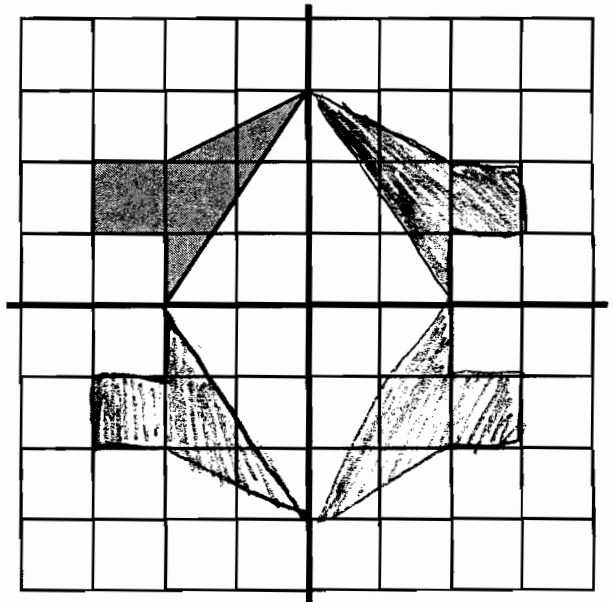
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

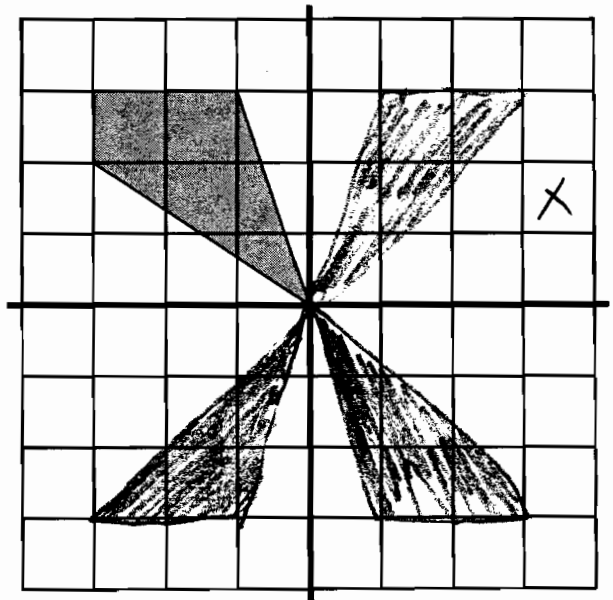


2. To finish drawing Aaron's second design, rotate the gray shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the third shape.

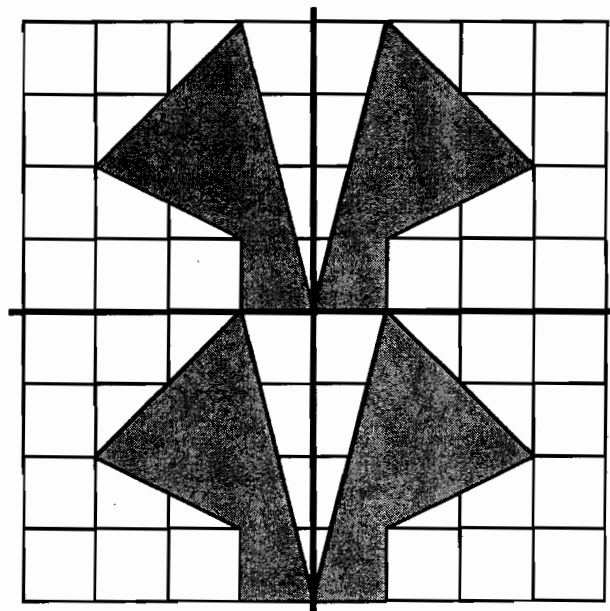
Rotate the third shape $\frac{1}{4}$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design.

He reflected the shape in quadrant 2 over the vertical line. Then he slid the shape down[^] to quadrant 4 & reflected the shape about the vertical line.

1
1
0

Aaron's Designs

S10

This problem gives you the chance to:

- draw reflections and rotations of a given figure on a grid
- describe transformations needed to make a given pattern

Aaron is drawing some designs for greetings cards.

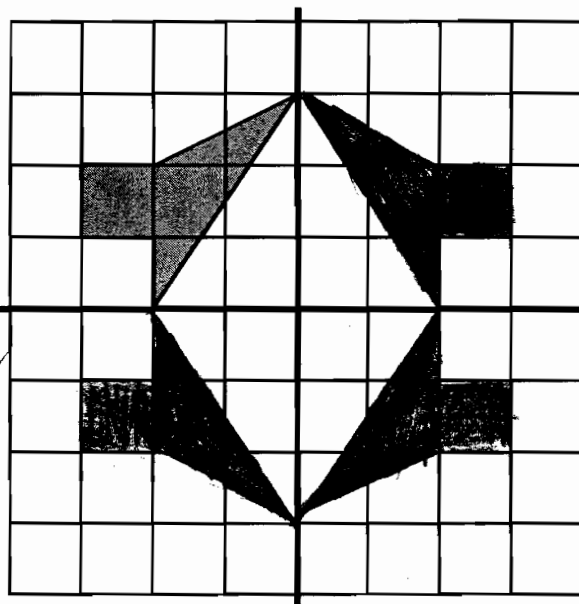
He divides a grid into 4 quadrants and starts by drawing a shape in one quadrant.

He then reflects, rotates or translates the shape into the other three quadrants.

1. Finish Aaron's first design by reflecting the gray shape over the vertical line.

Then reflect both of the shapes over the horizontal line.

This will make a design in all four quadrants.

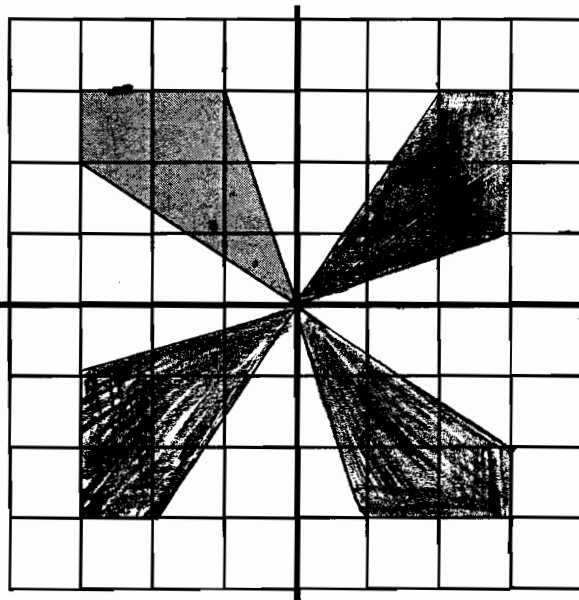


2. To finish drawing Aaron's second design, rotate the gray shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the second shape.

Rotate the second shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the third shape.

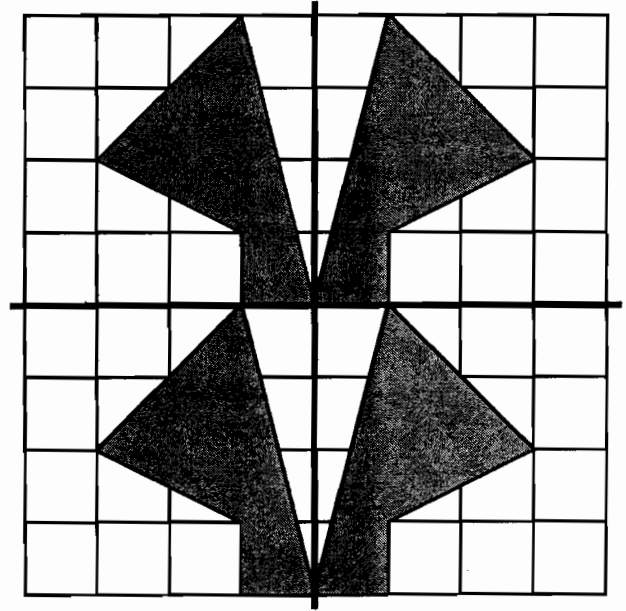
Rotate the third shape $1/4$ of a turn in a clockwise direction about the origin. Then draw the fourth shape.

This will make a design in all four quadrants.



3. This is Aaron's third design.

He started with one gray shape in the top left hand quadrant of the grid and transformed it to make the design.



Describe the transformations that Aaron may have used to draw this design. ✓

He slid the shape down then flipped it then
he slid it up ^

1
1
0