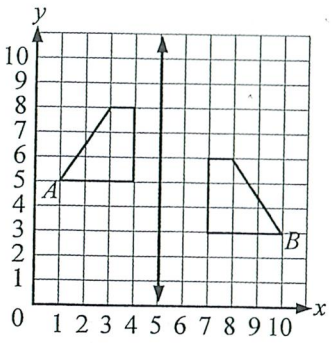
Use the following information to answer the next question.

This graph shows the transformation of a figure from position A to position B.



18. Which of the following transformations will move the figure from position A to position B?

A. Slide down one, flip vertically, then slide right two.

B. Flip vertically, slide right two, then slide down one.

C. Slide right one, slide down two, then flip vertically.

D. Flip vertically, slide right one, then slide down two.

CHALLENGER QUESTION

Use the following information to answer the next question.

Original shape | Image 1 | Image 2

The given images show a series of transformations from the original image to image 2.

19. Which of the following series of transformations occurred between the original image, image 1, and image 2?

A. A 90° counterclockwise rotation and then a translation

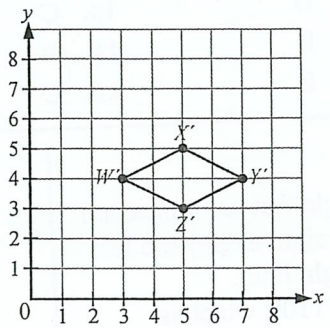
B. A reflection and then a 90° counterclockwise rotation

C. A 90° clockwise rotation and then a translation

D. A reflection and then a 90° clockwise rotation

Use the following information to answer the next question.

Rectangle $W'X'Y'Z'$ was drawn after a 90° counterclockwise rotation about the point (5, 4).



Written Response

20. Draw the original rectangle $WXYZ$.

Answers and Solutions – Unit Test

1. B	5. B	9. A	13. B	17. WR
2. D	6. D	10. C	14. C	18. D
3. B	7. B	11. D	15. C	19. D
4. B	8. B	12. C	16. D	20. WR

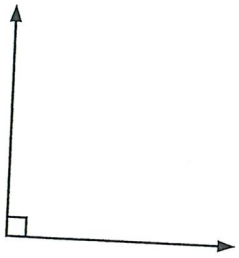
1. B

An obtuse angle is an angle that has a measure that is greater than 90° (a right angle) and less than a 180° angle (a straight line).
Angle 2 has a measure of 110°, which is *greater* than 90° and *less* than 180°.
$90° < 110° < 180°$

Angle 2 is an obtuse angle.

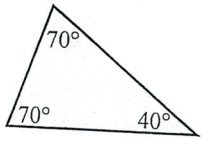
2. D

This diagram shows a 90° angle, which forms a square corner where the two perpendicular rays meet. These angles are classified as right angles.

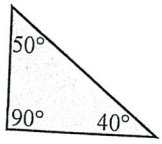


3. B

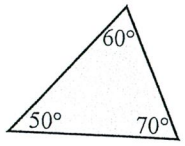
The sum of the three angles of a triangle must add up to 180 degrees to be correctly constructed.



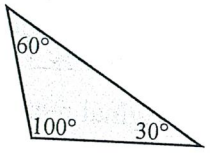
$70° + 70° + 40° = 180°$ The triangle is correctly constructed.



$50° + 90° + 40° = 180°$ The triangle is correctly constructed.



$50° + 60° + 70° = 180°$ The triangle is correctly constructed.



$60° + 100° + 30° = 190°$ The triangle is incorrectly constructed.

4. B

The sum of the interior angles of any quadrilateral is 360°.

5. B

Step 1
Count the number of units across→ to determine the lengths of the given rectangles.
Count the number of units upward↑ to determine the widths of the given rectangles.

Step 2
Use a perimeter formula like $P = 2 \times (l + w)$ to determine the perimeters of the given rectangles.
Use the area formula $A = l \times w$ to determine the areas of the given rectangles.
Substitute the appropriate numbers for the lengths and widths in the formulas.

Step 3
Rectangle II:
$P = 2 \times (l + w)$
$P = 2 \times (4 + 4)$
$P = 16$ units
$A = l \times w$
$A = 4 \times 4$
$A = 16$ units^2

Rectangle II has a perimeter of 16 units and an area of 16 units^2.

6. D

Step 1
First, determine the volume of one board game by multiplying the length (20 cm) by the width (60 cm) by the height (3 cm).
$V = l \times w \times h$
$V = 20 \times 60 \times 3 = 3\,600$ cm^3

Step 2
To determine the minimum volume of a crate that can hold 5 board games, multiply the volume of one game by 5.
$3\,600 \times 5 = 18\,000$ cm^3

The minimum volume of the crate would be 18000 cm^3.

7. B

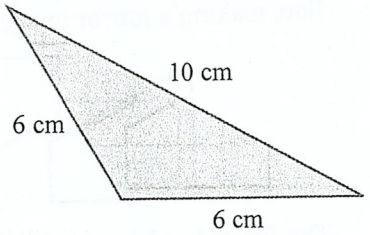
Step1
Examine the angle measures.
Each angle has a different measure. One angle is 72°, one is 70°, and one is 38°.

Step 2
Identify the name of the triangle.
Recall that a triangle with three different side lengths and three different angle measures is a scalene triangle.
Since all three angles of the given triangle have different measures, the triangle is a scalene triangle.

8. B

Step 1
Recall the characteristics of an isosceles triangle.
An isosceles triangle has two equal side lengths and two equal interior angles.

Step 2
Identify the isosceles triangle.
The triangles in the alternatives do not show the measures of the angles, but the measures of the side lengths are given.
This triangle has two side lengths that are 6 cm long.



It is an isosceles triangle.

9. A

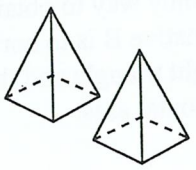
The definition of a regular polygon is that it contains sides of equal length and angles of equal measure.

10. C

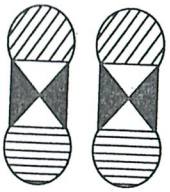
A polygon with three or more unequal sides is called an irregular polygon. Among the alternatives given, only the triangle has unequal sides. The triangle is an irregular polygon.

11. D

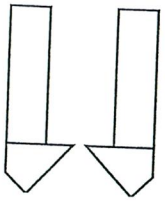
Analyze each set of figures to determine what transformations have taken place.



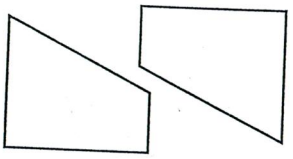
The figure has been translated diagonally.



The figure has been translated to the right.



The figure has been flipped over a vertical flip line, making a mirror image.



The figure has been turned or rotated 180°.

12. C

Since figure 2 is a mirror image of figure 1, the transformation that occurred was a reflection, or a flip, of figure 1 across the vertical line to create figure 2.

13. B

Alternative A is obtained by translating a square and an octagon vertically and horizontally.

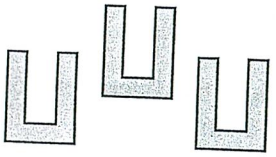
Alternative C has spaces between the shapes, therefore it cannot be classified as a tiling pattern.

Alternative D is obtained by translating the shape vertically and horizontally.

The only way to obtain the inverted triangle in alternative B is to horizontally translate the upright triangle and then reflect it about a horizontal axis.

14. C

A translation slides a figure from one location to another without turning or changing the size or shape. The following design was created by translating the letter.



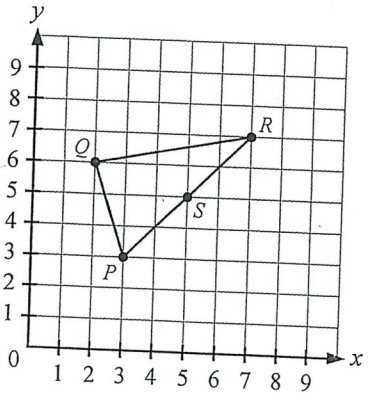
The only change is that the shape slides to different placements.

15. C

Step 1
Plot the coordinates.

When plotting points on a Cartesian plane, find the first coordinate on the x-axis. Then, move vertically upward until you find the second coordinate on the y-axis. Plot the point where the two axes intersect.

When the given points are plotted on the Cartesian plane, join them with straight lines.



Step 2
Identify the shape made.

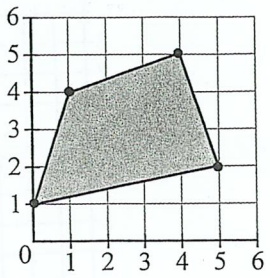
When the points are plotted and connected with straight lines, the shape formed is a triangle.

16. D

The first number in the coordinate (to the left of the comma) is the number located on the x-axis. The second number in the coordinate (to the right of the comma) is the corresponding number on the y-axis.

The design that Marcy drew will have a dot where each of the given coordinate pairs intersects on the grid.
(0, 1), (5, 2), (4, 5), and (1, 4).

This is the design that Marcy drew.



17. WR

Step 1
Write the coordinates for the data shown in the table of values.
The first number in the ordered pair (to the left of the comma) is the term number. The second number in the ordered pair (to the right of the comma) is the term.
(1, 2)(2, 6)(3, 10)

Step 2
Plot (1, 2) by following these directions:

- Start at 0, and move to the right on the x-axis until you reach 1.
- Move vertically until you reach the line that the 2 from the y-axis is on.
- Make a dot where the two lines intersect.

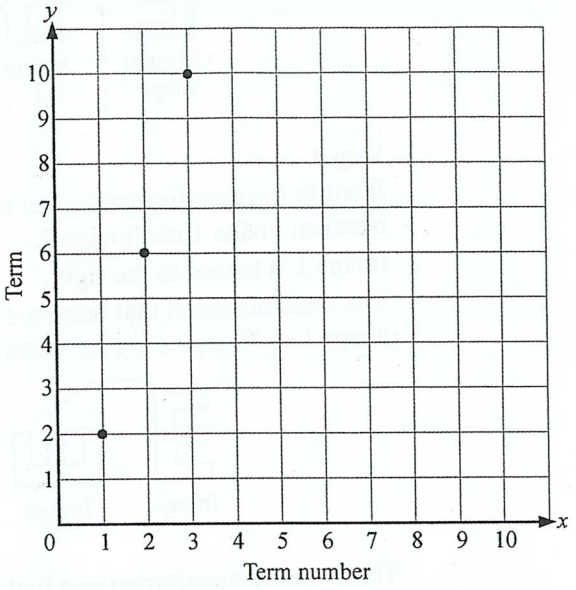
Step 3
Plot (2, 6) by following these directions:

- Start at 0, and move to the right on the x-axis until you reach 2.
- Move vertically until you reach the line that the 6 from the y-axis is on.
- Make a dot where the two lines intersect.

Step 4
Plot (3, 10) by following these directions:

- Start at 0, and move to the right on the x-axis until you reach 3.
- Move vertically until you reach the line that the 10 from the y-axis is on.
- Make a dot where the two lines intersect.

This graph shows the coordinates for the data in the table of values plotted correctly.



18. D

Step 1
Since the figure in position A is one square from the flip line, when it is flipped it must also be one square from the flip line. This would put the right angle coordinates at (6, 5).

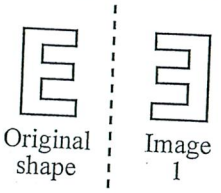
Step 2
When the figure then slides one square to the right, the right angle coordinates become (7, 5).

Step 3
When the figure slides down two squares, the right angle coordinates are (7, 3), exactly where the right angle is shown on the graph for position B.

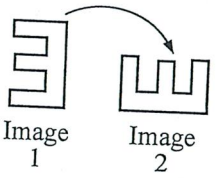
The transformation that flips the figure vertically, slides it right one, then slides it down two will move the figure from position A to B.

19. D

Step 1
Identify the transformation that occurred between the original image and image 1.
Image 1 is a mirror, or opposite, image of the original image.
The transformation that occurred between the original image and image 1 is a reflection.



Step 2
Identify the transformation that occurred between image 1 and image 2.
Image 1 is turned to the right.
The transformation that occurred between image 1 and image 2 is a 90° clockwise rotation.



The series of transformations that occurred between the original image, image 1, and image 2 are a reflection and then a 90° clockwise rotation.

20. WR

Step 1
Perform the inverse transformation.
Trace the rotated image, and rotate in the opposite direction stated in the question.
The question said the rectangle moved counterclockwise. Rotate the traced image in the opposite direction, or clockwise.
Make sure the traced shape is directly on top of the image. Place the pencil on (5, 4). Turn the tracing paper 90°, or a $\frac{1}{4}$ turn to the right.

Step 2
Draw the rotated image on the Cartesian plane
Plot and label each new point to indicate that i
is the original shape. Then, connect the points
with line segments.