

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectations

GV1	<ul style="list-style-type: none"> Classify and construct polygons and angles
GV2	<ul style="list-style-type: none"> Sketch three-dimensional figures, and construct three-dimensional figures from drawings
GV3	<ul style="list-style-type: none"> Describe location in the first quadrant of a coordinate system, and rotate two-dimensional shapes

Year	GV1	GV2	GV3
Spring 2006	MC14 MC24	OR9	MC3 MC23 OR30
Spring 2007	MC13 OR9	MC21	MC14 MC20 OR30
Spring 2008	MC17 OR30	MC18	MC16 MC26 OR7
Spring 2009	MC17 MC18 OR7		MC16 MC26 OR30
Spring 2010	MC17 MC18	OR7	MC6 MC16 OR29
Spring 2011	MC30 OR28	MC23	MC3 MC13 OR10

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Year	Knowledge & Understanding	Problem Solving (Thinking)	Application
Spring 2009	MC17	MC18 MC26	MC16 OR7 OR30
Spring 2010	MC18	MC6 MC17 OR29	MC16 OR7
Spring 2011	MC23	MC13 MC30 OR10	MC3 OR28

GEOMETRY AND SPATIAL SENSE: Geometric Properties

Grade 4	Grade 5	Grade 6
Overall Expectation #1		
- Identify quadrilaterals and three-dimensional figures and classify them by their geometric properties, and compare various angles to benchmarks	- Identify and classify two-dimensional shapes by side and angle properties, and compare and sort three-dimensional figures	- Classify and construct polygons and angles
Specific Expectations		
- Draw the lines of symmetry of two-dimensional shapes, through investigation using a variety of tools and strategies		
- Identify and compare different types of quadrilaterals (i.e., rectangle, square, trapezoid, parallelogram, rhombus) and sort and classify them by their geometric properties		- Sort and classify quadrilaterals by geometric properties related to symmetry, angles, and sides, through investigation using a variety of tools and strategies
	- Distinguish among polygons, regular polygons, and other two-dimensional shapes	- Sort polygons according to the number of lines of symmetry and the order of rotational symmetry, through investigation using a variety of tools
- Identify and describe prisms and pyramids, and classify them by their geometric properties (i.e., shape of faces, number of edges, number of vertices), using concrete materials	- Distinguish among prisms, right prisms, pyramids, and other three-dimensional figures	
- Identify benchmark angles (i.e., straight angle, right angle, half a right angle), using a reference tool and compare other angles to these benchmarks	- Identify and classify acute, right, obtuse, and straight angles	
- Relate the names of the benchmark angles to their measures in degrees	- Measure and construct angles up to 90° , using a protractor	- Measure and construct angles up to 180° using a protractor, and classify them as acute, right, obtuse, or straight angles
	- Identify triangles (i.e., acute, right, obtuse, scalene, isosceles, equilateral), and classify them according to angle and side properties	
	- Construct triangles, using a variety of tools, given acute or right angles and side measurements	- Construct polygons using a variety of tools, given angle and side measurements

GEOMETRY AND SPATIAL SENSE: Geometric Relationships

Grade 4	Grade 5	Grade 6
Overall Expectation #2		
- Construct three-dimensional figures, using two-dimensional shapes	- Identify and construct nets of prisms and pyramids	- Sketch three-dimensional figures, and construct three-dimensional figures from drawings
Specific Expectations		
- Construct a three-dimensional figure from a picture or model of the figure, using connecting cubes		- Sketch, using a variety of tools, isometric perspectives and different views (i.e., top, side, front) of three dimensional figures built with interlocking cubes - Build three-dimensional models using connecting cubes, given isometric sketches or different views (i.e., top, side, front) of the structure
- Construct three-dimensional figures, using only congruent shapes		
- Construct skeletons of three-dimensional figures, using a variety of tools, and sketch the skeletons		
- Draw and describe nets of rectangular and triangular prisms	- Identify prisms and pyramids from their nets	
- Construct prisms and pyramids from given nets	- Construct nets of prisms and pyramids, using a variety of tools	

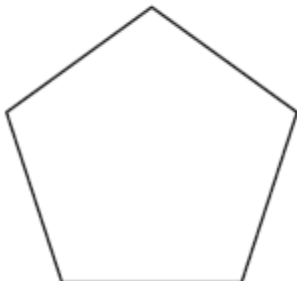
GEOMETRY AND SPATIAL SENSE: Location and Movement

Grade 4	Grade 5	Grade 6
Overall Expectation #3		
- Identify and describe the location of an object, using a grid map, and reflect two-dimensional shapes	- Identify and describe the location of an object, using the cardinal directions, and translate two-dimensional shapes	- Describe location in the first quadrant of a coordinate system, and rotate two-dimensional shapes
Specific Expectations		
- Identify and describe the general location of an object using a grid system	- Locate an object using the cardinal directions (i.e., north, south, east, west) and a coordinate system - Compare grid systems commonly used on maps (i.e., the use of numbers and letters to identify an area; the use of a coordinate system based on the cardinal directions to describe a specific location)	- Explain how a coordinate system represents location, and plot points in the first quadrant of a Cartesian coordinate plane
- Identify, perform, and describe reflections using a variety of tools	- Identify, perform, and describe translations, using a variety of tools	- Identify, perform, and describe, through investigation using a variety of tools, rotations of 180° and clockwise and counterclockwise rotations of 90°, with the centre of rotation inside or outside the shape
- Create and analyse symmetrical designs by reflecting a shape, or shapes, using a variety of tools, and identify the congruent shapes in the designs	- Create and analyse designs by translating and/or reflecting a shape, or shapes, using a variety of tools	- Create and analyse designs made by reflecting, translating, and/or rotating a shape, or shapes, by 90° or 180°

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #1
Spring 2006

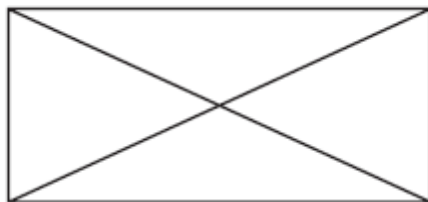
- 14** The regular pentagon shown below has 72° rotational symmetry.



How many 72° rotations will it take to return the vertices to their original positions?

- a 1
- b 2
- c 4
- d 5^*

- 24** A drawing of the back of an envelope is shown below.



Which statement best describes the back of the envelope?

- a eight isosceles triangles
- b four equilateral triangles
- c a rectangle with two diagonals *
- d a parallelogram surrounded by a rectangle

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #1

Spring 2007

13 Which diagram below shows an angle of 120° ?



Diagram 1



Diagram 2



Diagram 3



Diagram 4

- A Diagram 1
- B Diagram 2
- C Diagram 3
- D Diagram 4

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #1

Spring 2007

- 9** Using a ruler and protractor, draw a **right** trapezoid with a side measure of 5 cm. Measure and label all angles.

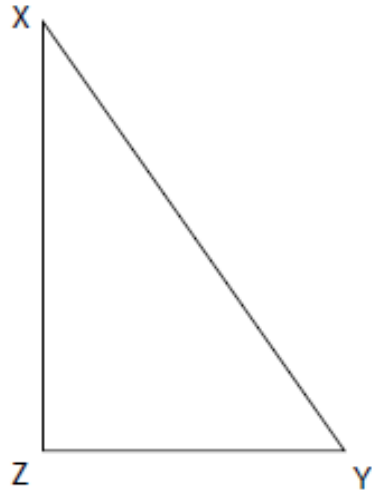
Show your work.

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #1

Spring 2008

- 17** Which is closest to the measure of angle X in $\triangle XYZ$? Use a protractor.



- a 35°
- b 55°
- c 90°
- d 145°

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #1
Spring 2008

- 30** Using a protractor and a ruler, construct a parallelogram with an angle measure of 115° and sides with lengths of 7 cm and 6 cm. Mark on the parallelogram the length of each side and the measure of all angles.

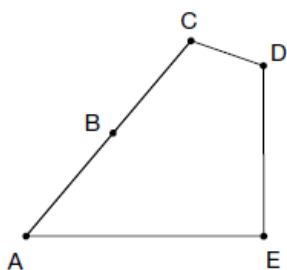
Show your work.

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #1

Spring 2009

- 17** Points A, B and C lie on a line in the polygon shown below.



Which table best classifies the angles of the polygon?

a

Angle	Type
A	Obtuse
B	Straight
C	Acute
D	Acute
E	Right

b

Angle	Type
A	Acute
B	Right
C	Obtuse
D	Obtuse
E	Straight

c

Angle	Type
A	Acute
B	Straight
C	Obtuse
D	Right
E	Right

d

Angle	Type
A	Acute
B	Straight
C	Obtuse
D	Obtuse
E	Right

- 18** A regular polygon is created with angles of 60° and sides of 4 cm in length. Which statement below describes this polygon?

- a triangle with perimeter of 12 cm
- b triangle with perimeter of 16 cm
- c rhombus with perimeter of 12 cm
- d rhombus with perimeter of 16 cm

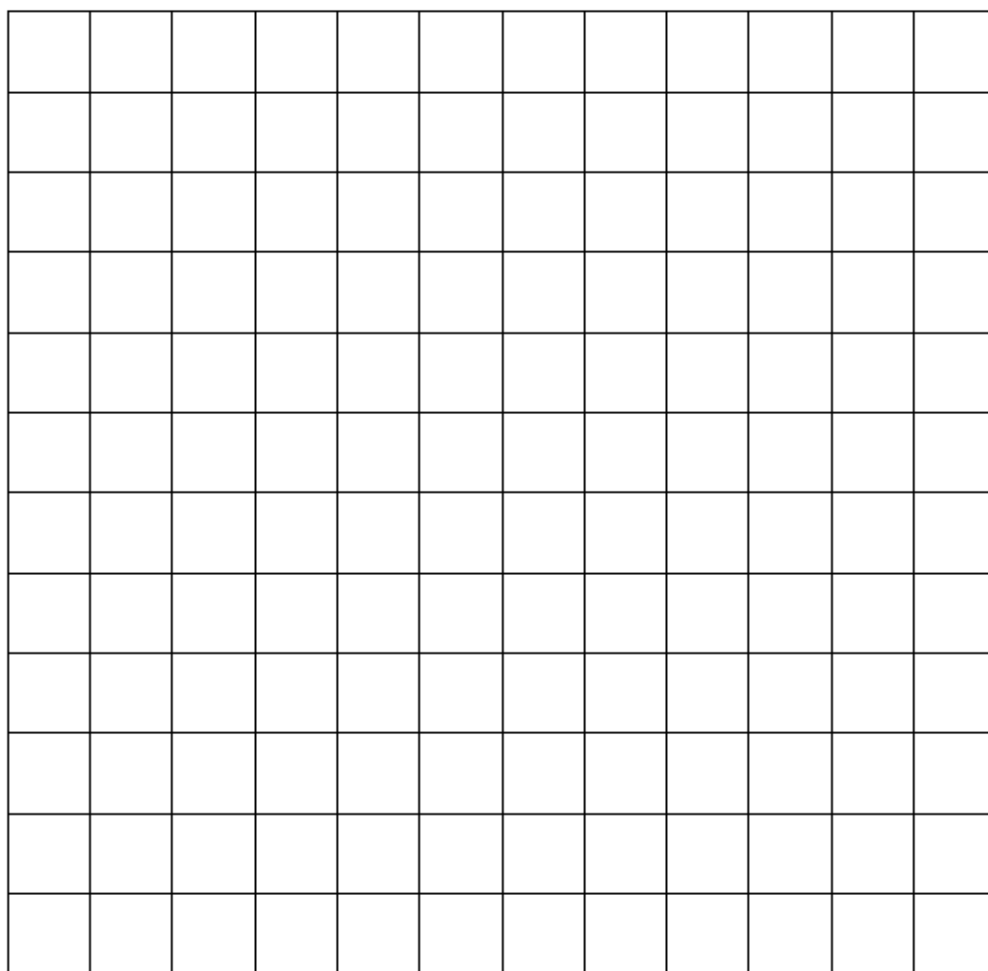
GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #1

Spring 2009

7 Construct a pentagon on the grid below that meets the following conditions.

- exactly 1 line of symmetry
- 2 obtuse angles
- 2 right angles
- 1 acute angle
- at least 1 side with a length of 3 units



Draw the line of symmetry on your pentagon.

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

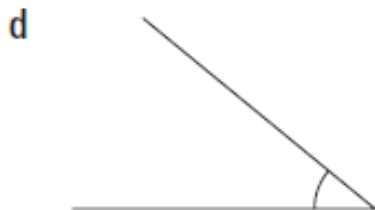
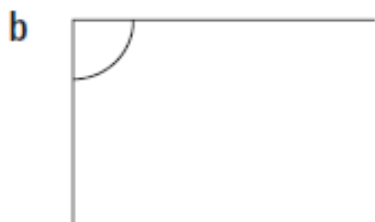
Overall Expectation #1

Spring 2010

17 A polygon has 4 sides. Two of the sides are parallel and two are not. What shape is the polygon?

- a square
- b rhombus
- c trapezoid
- d parallelogram

18 Which angle appears to measure 140° ?



GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #1

Spring 2011

30 Consider the shapes below.



Equilateral
triangle



Rectangle



Regular
pentagon



Parallelogram

Which list shows the shapes in order from
fewest to most lines of symmetry?

a



b



c



d



GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

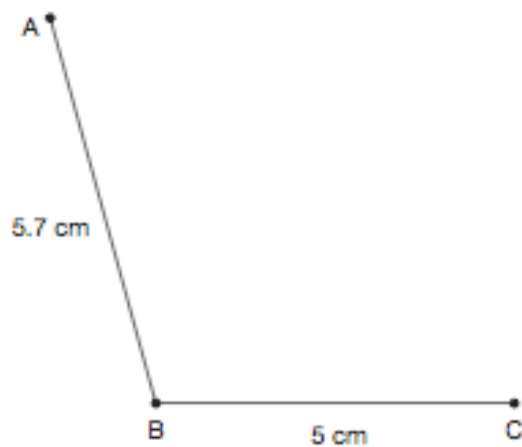
Overall Expectation #1

Spring 2011

28 Use the line segments AB and BC below to construct pentagon ABCDE with the following properties:

- a right angle at point C
- an angle that measures 110° at point A
- a side of 4.7 cm

Label all angles and sides with their measures.

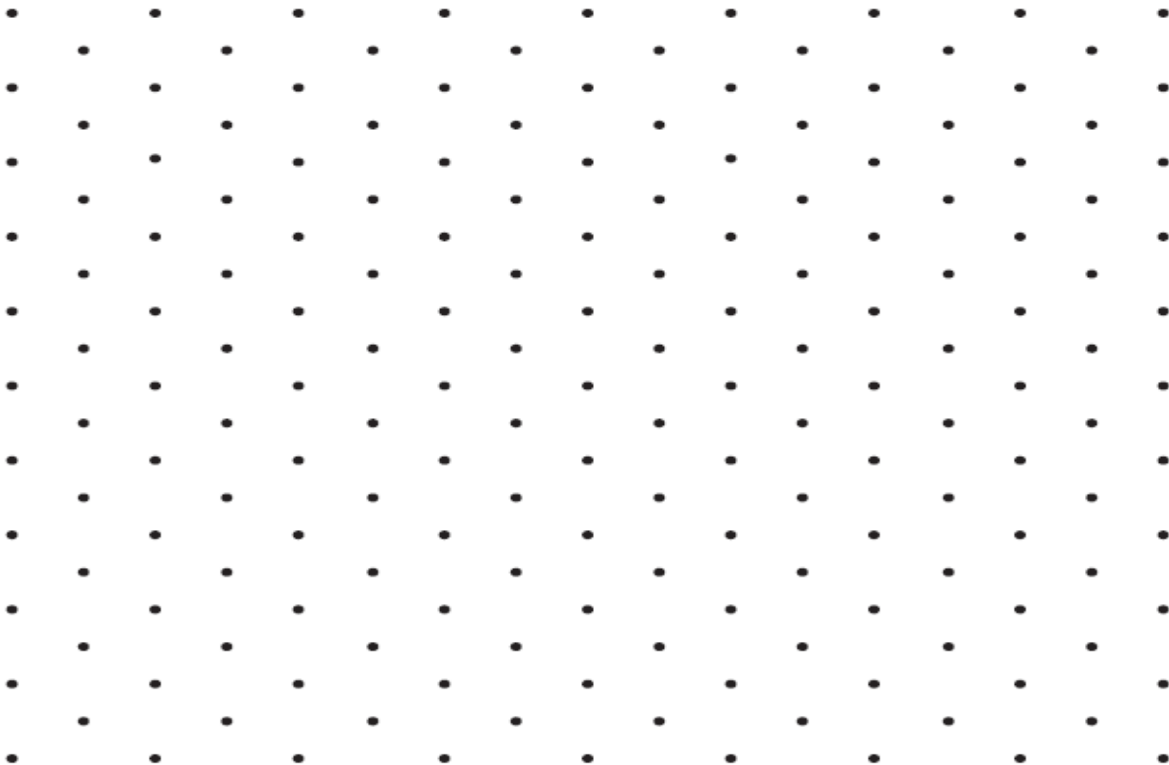
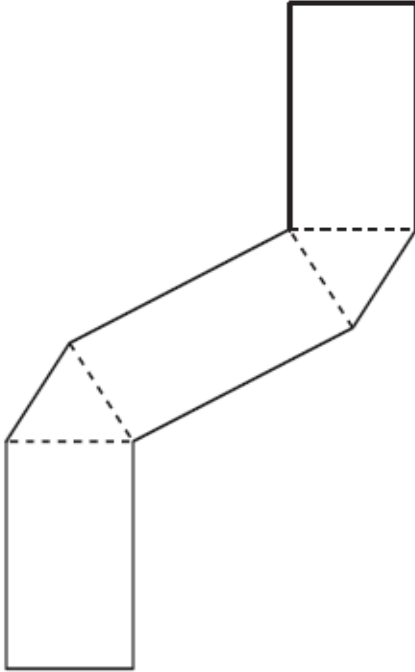


GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #2

Spring 2006

- 9** Draw the three-dimensional figure that will be created when the following net is folded. Show all vertices and edges.

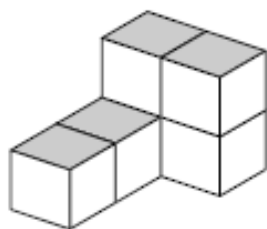


GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

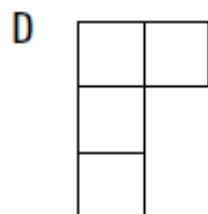
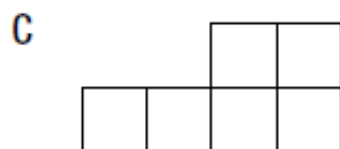
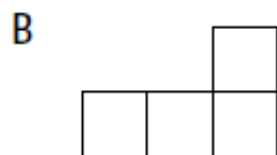
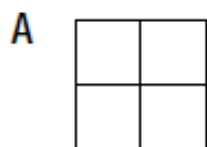
Overall Expectation #2

Spring 2007

- 21** The following structure is built with 6 identical cubes.



Which of the following views is **not** possible for this structure?

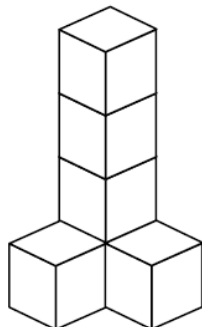


GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

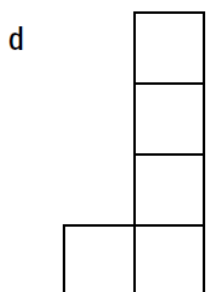
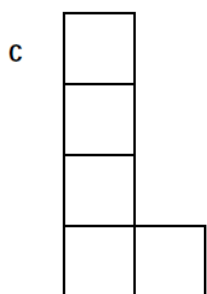
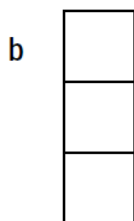
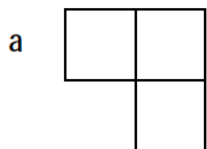
Overall Expectation #2

Spring 2008

- 18** The three-dimensional figure below has been built using cubes.



What is a top view of this figure?

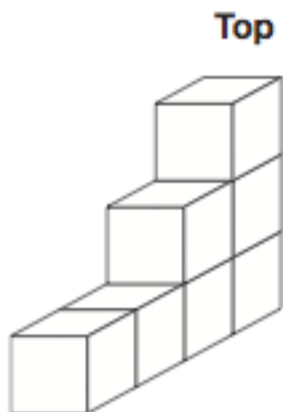


GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

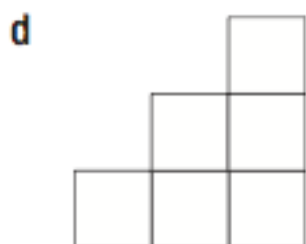
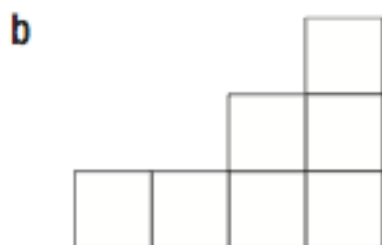
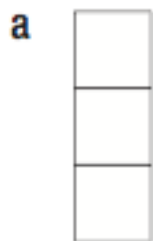
Overall Expectation #2

Spring 2011

- 23** The three-dimensional figure below was built using cubes.



What is the top view of this figure?

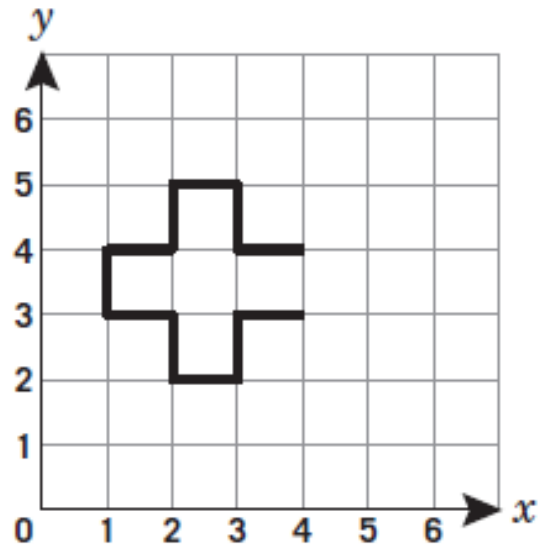


GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2006

- 3** Jacob draws most of an addition symbol on the Cartesian plane below.



Which two ordered pairs represent the location on the grid of the two points that should be connected to complete the addition symbol?

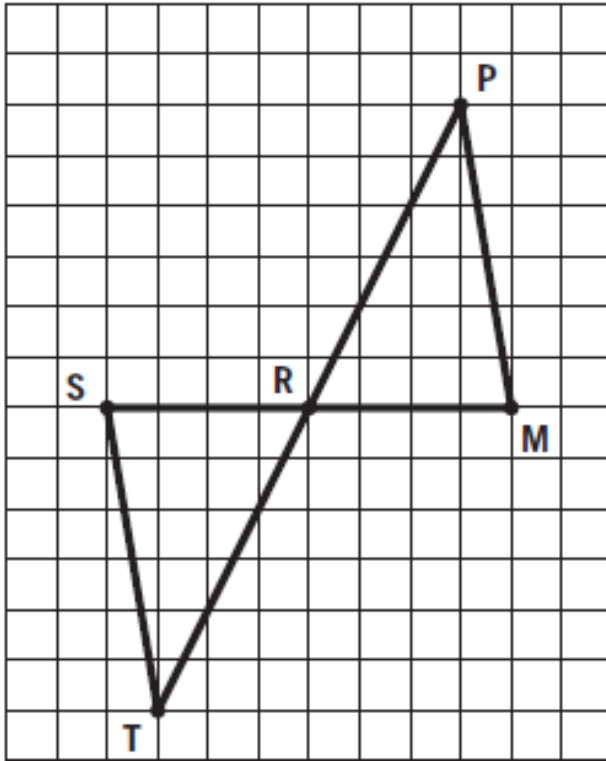
- a (3, 4) and (4, 4)
- b (4, 3) and (3, 3)
- c (3, 4) and (4, 3)
- d (4, 4) and (4, 3) *

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2006

23 Which answer best describes the transformation from $\triangle MPR$ to $\triangle RST$?



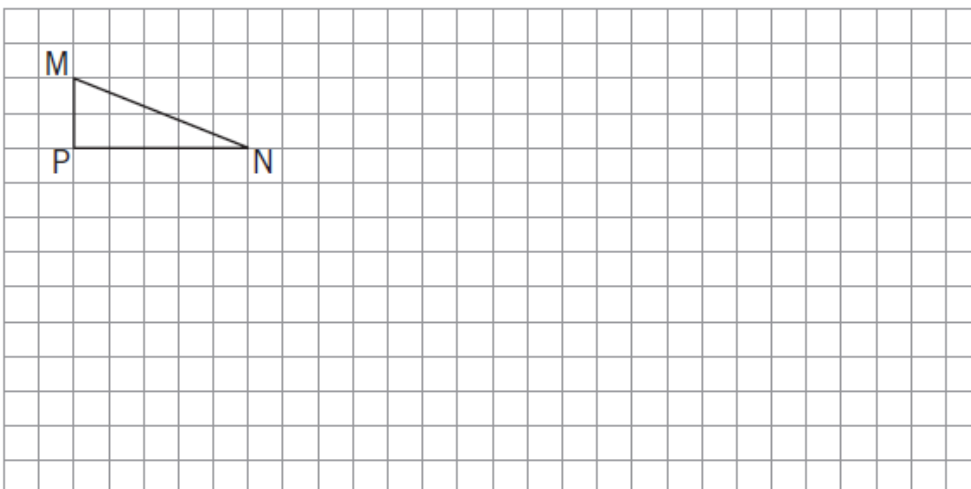
- a Reflect about Point R.
- b Rotate $\frac{1}{4}$ turn clockwise about Point M.
- c Reflect about \overline{RM} .
- d Rotate $\frac{1}{2}$ turn about Point R. *

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2006

- 30** Use two transformations of different types to move the triangle on the grid below to a new position. Show both transformations and label M, N and P on the new figure.



Explain your two transformations, using the correct name for each transformation.

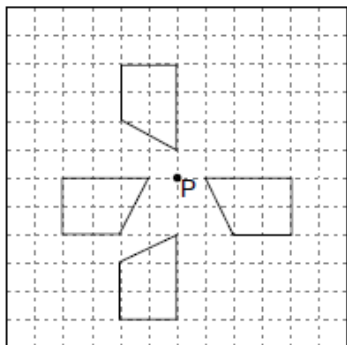
GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

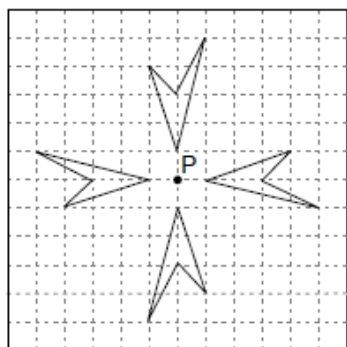
Spring 2007

14 Which drawing has 4 shapes showing 3 clockwise rotations of 90° about point P?

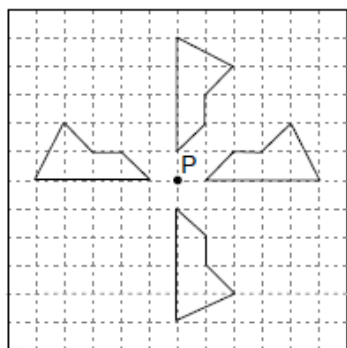
F



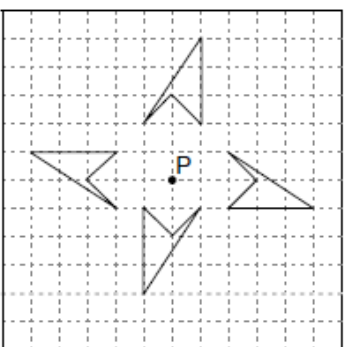
G



H



J

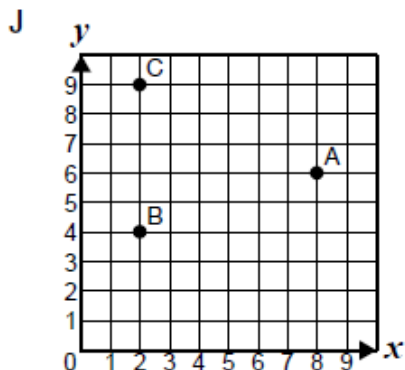
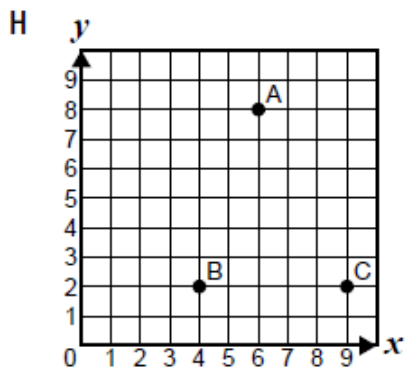
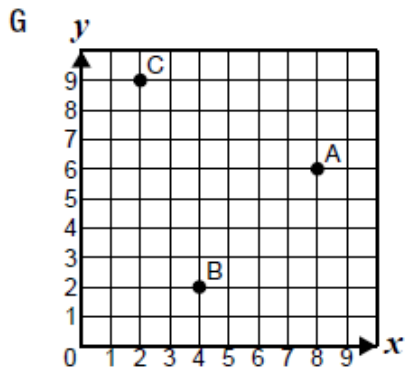
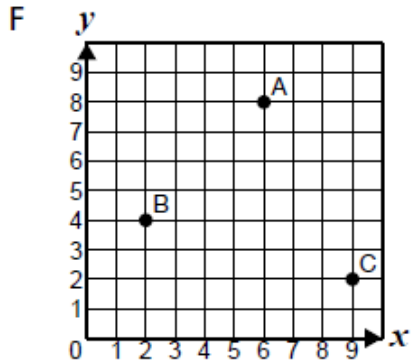


GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2007

20 Which of the following grids shows the correct plotting of the points A(6, 8), B(4, 2) and C(9, 2)?

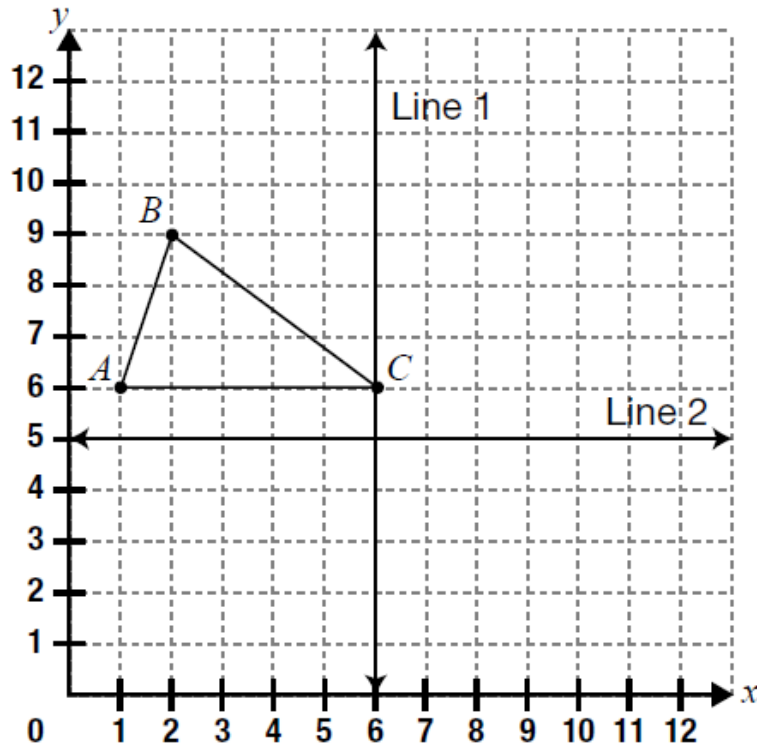


GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2007

- 30 The drawing below shows a grid with $\triangle ABC$, Line 1 and Line 2. On the grid, reflect $\triangle ABC$ across Line 1 and then reflect the new triangle across Line 2.



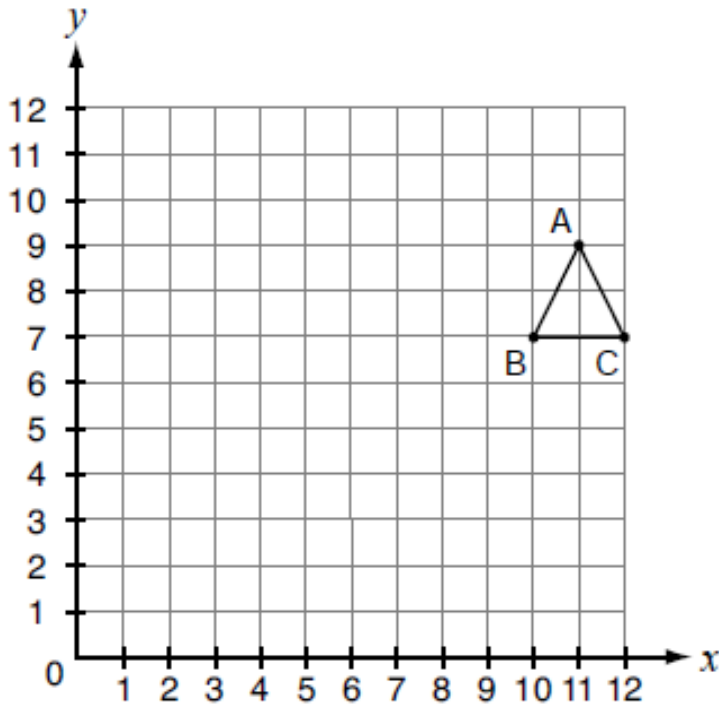
Describe a rotation that would have the same result as these two reflections.

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2008

16 Triangle ABC is graphed on the grid below.



Triangle ABC is translated 3 units to the left and 4 units down. What are the new coordinates of Point C?

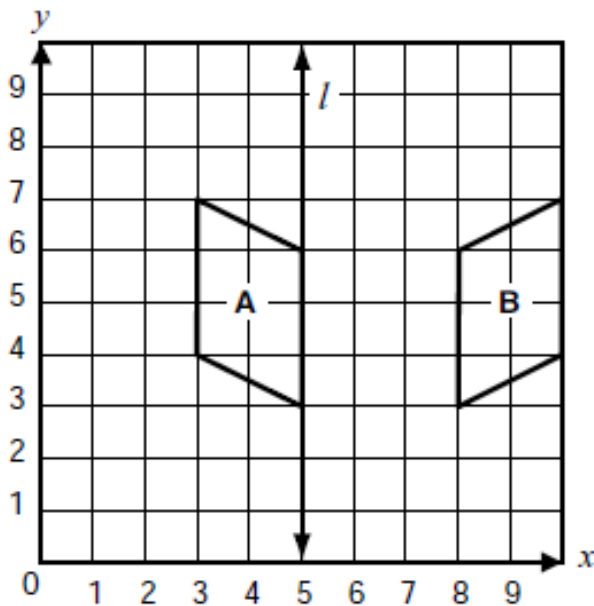
- a (3, 9)
- b (7, 3)
- c (8, 5)
- d (9, 3)

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2008

26 Look at the figures below.



Which of the following describes how Parallelogram A was moved to create Parallelogram B?

- a a reflection over line l
- b a translation 3 units to the right
- c a translation 3 units to the left, then a reflection over line l
- d a translation 3 units to the right, then a reflection over line l

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

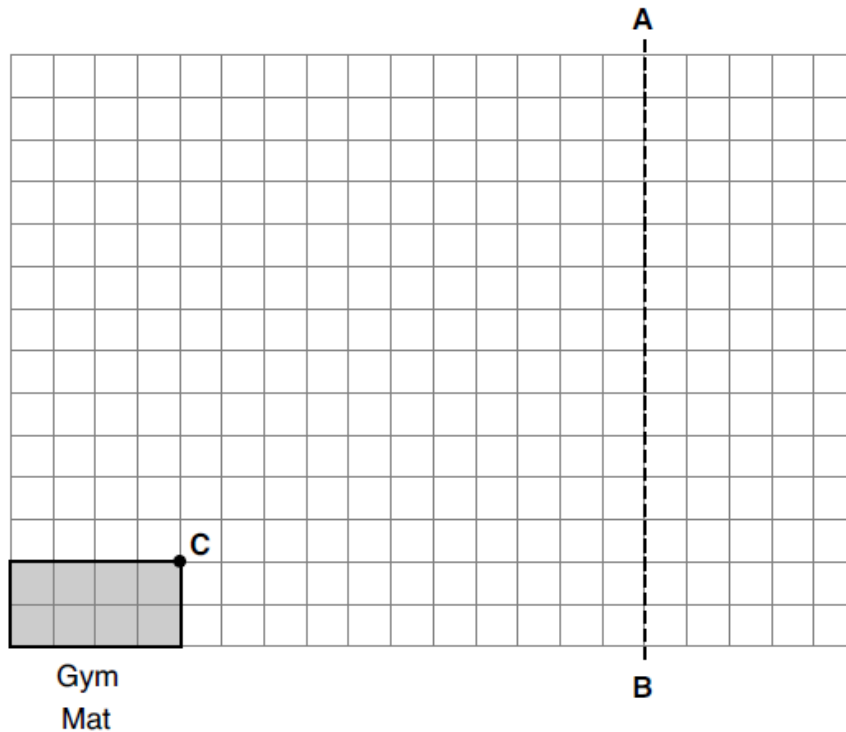
Spring 2008

7 Mr. Lee moves a gym mat using the following four transformations.

1. Rotate the gym mat 90° clockwise about Point C.
2. Translate the gym mat 8 units to the right.
3. Translate the gym mat 6 units up.
4. Reflect the gym mat over line AB.

On the grid below, show the new location of the gym mat after Mr. Lee makes the four transformations.

Show all your work.



GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2009

16 Look at the ladybug below.



The ladybug is rotated three times in the following order.

- 90° counter-clockwise
- 180° clockwise
- 180° clockwise

Which of the following best illustrates the ladybug's position after the three rotations?

a



b



c



d

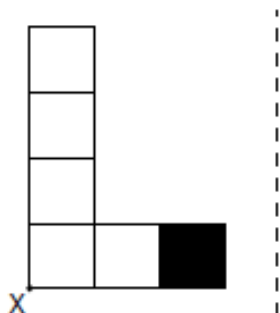


GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

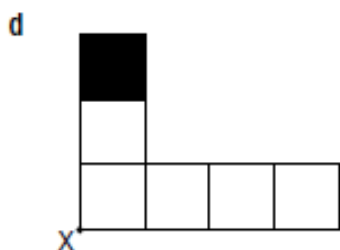
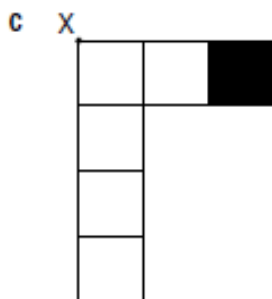
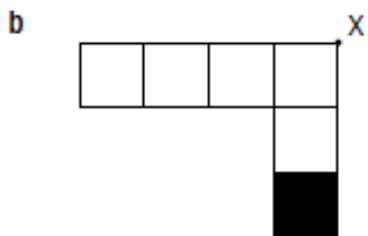
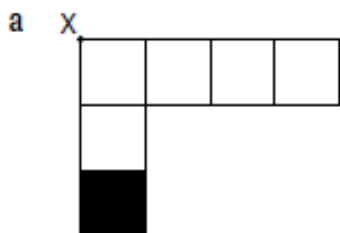
Overall Expectation #3

Spring 2009

- 26** The shape below is reflected across the dotted line and then rotated 90° clockwise about point X.



Which of the following shows the shape after the two transformations?



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Overall Expectation #3

Spring 2009

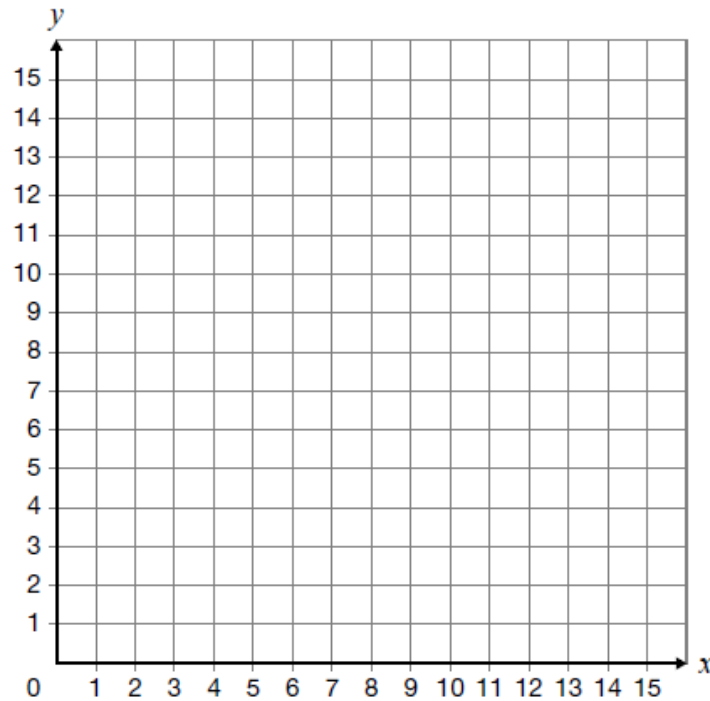
30 Plot and label the following points to form parallelogram PQRS on the grid below.

P (9, 12)

Q (9, 8)

R (7, 6)

S (7, 10)



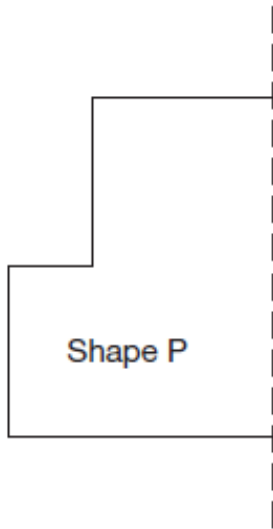
Rotate parallelogram PQRS 90° counter-clockwise about point R. Draw the new parallelogram on the grid above.

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

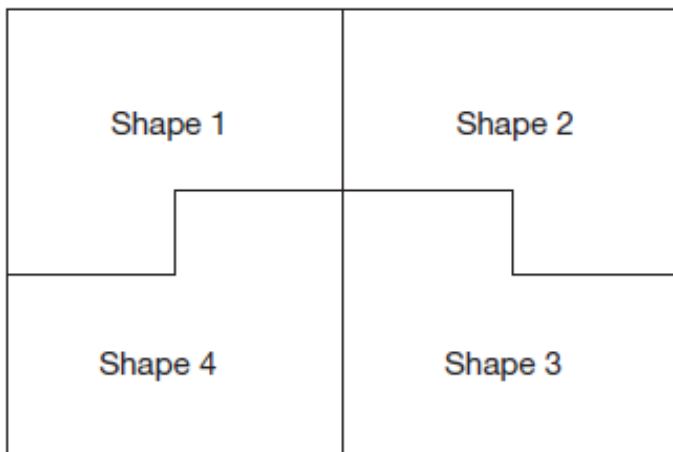
Overall Expectation #3

Spring 2010

- 6** Shape P is reflected across the dotted line and then rotated 90° clockwise.



Which shape in the diagram below is an image of Shape P after these two transformations?



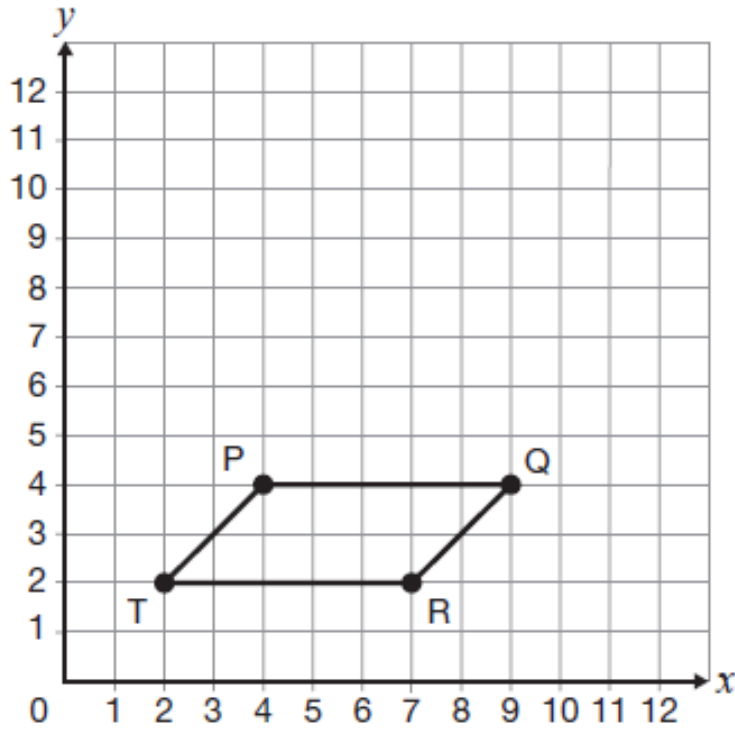
- a Shape 1
- b Shape 2
- c Shape 3
- d Shape 4

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2010

- 16** Polygon PQRT is rotated 90° clockwise about Point Q. What are the new coordinates of Point R after this rotation?



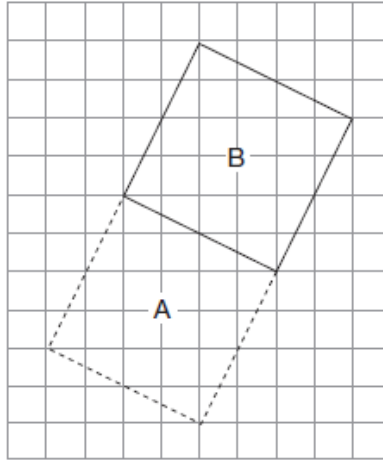
- a (6, 7)
- b (7, 6)
- c (11, 2)
- d (11, 6)

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2010

29 The diagram below shows a square that was moved by a transformation from position A to position B.



Describe three different ways to move the square from position A to position B. Each way should use a different type of transformation. Remember to include the mirror lines or the centre of rotation on the grid.

Complete the following chart.

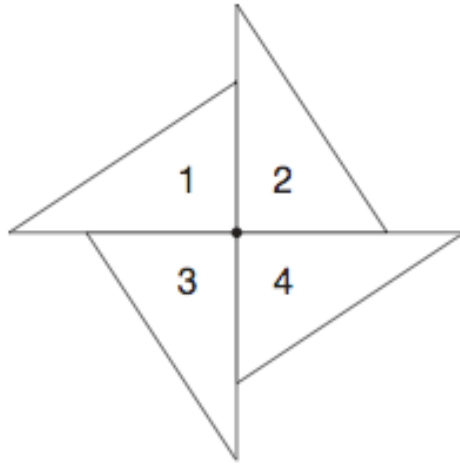
Type of Transformation	Description

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2011

3 Look at Triangle 2 in the following design.



Which triangle shows Triangle 2 after a rotation of 180° about the centre point?

- a Triangle 1
- b Triangle 2
- c Triangle 3
- d Triangle 4

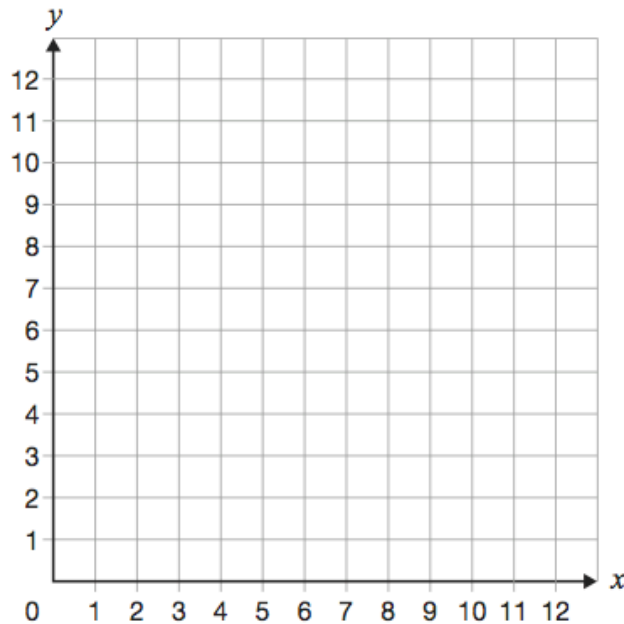
GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2011

- 10** Liam creates a shape using the ordered pairs A(1, 4), B(1, 8), C(4, 8) and D(6, 4).

Draw Liam's shape on the grid below.



Draw a shape on the grid that is congruent to Liam's. Start with the ordered pairs E(7, 6) and F(7, 1).

Write the coordinates of your shape's other 2 vertices.

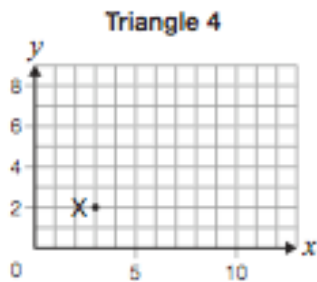
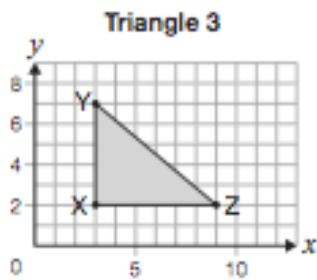
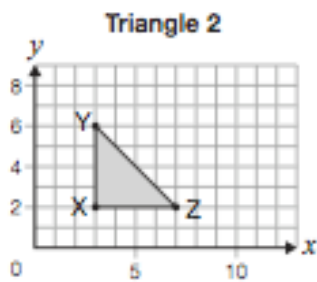
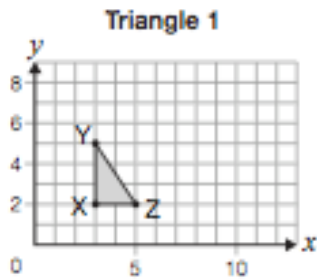
(____,____) (____,____)

GRADE SIX EQAO QUESTIONS: Geometry and Spatial Sense

Overall Expectation #3

Spring 2011

- 13 The following graphs show the pattern for a triangle that grows in size.



If the pattern continues, what will be the coordinates of Y and Z for Triangle 4?

- a Y(8, 3) Z(2, 10)
- b Y(3, 8) Z(10, 2)
- c Y(3, 8) Z(11, 2)
- d Y(8, 3) Z(2, 11)