UNIT TEST #006 | Australian Curriculum Mathematics | UTM7T3U6

ACACIA TUTORING

Angles, Shapes, and Transformations

7 Unit Test

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Instructions: Read all questions carefully to ensure you understand what is being asked. When completing your official tests / exams, your grade will be based upon your: **understanding, fluency, reasoning, and problem solving,** so ensure you show all lines of working and draw accurate, labelled diagrams where necessary. (ACiQ|9.0 Mathematics standard elaborations found on final page (general assessment marking standards)). [Practise tests are marked out of a score of 10]. For multiple choice questions, tick or fill in the circle next to the corresponding letter under the question.

Check your work if you have time. *Remember:* you don't have to start at question one, it's always best to firstly look through the test, highlight the easy looking questions and complete them first, then secondly, go back through and work on the harder questions. Good luck! And remember to breathe!

$$\sum = \frac{\quad}{10} = \quad \%$$

Part 1: Multiple Choice (2 marks)

Question 1:

a) Which type of triangle has all sides of different lengths?

A. Equilateral **B.** Isosceles **C.** Scalene **D.** Right

◯ **A** ◯ **B** ◯ **C** ◯ **D**

Space for 1a...

b) What is the sum of the interior angles of a quadrilateral?

A. 180° **B.** 360° **C.** 540° **D.** 720°

◯ **A** ◯ **B** ◯ **C** ◯ **D**

Space for 1b...

Question 2:

a) Which transformation slides an object from one place to another without changing its shape or size?

A. Reflection **B.** Rotation **C.** Translation **D.** Dilation

◯ **A** ◯ **B** ◯ **C** ◯ **D**

Space for Q2a...

b) When you flip a shape over a line, what transformation are you performing?

A. Rotation **B.** Reflection **C.** Translation **D.** Scaling

◯ **A** ◯ **B** ◯ **C** ◯ **D**

Space for 2b...

Part 2: Short Answer (4 marks)

Question 3:

a) List the properties of a rhombus.

b) Calculate the size of each interior angle of a regular hexagon.

Question 4:

a) Describe what happens to a point $(3, 2)$ when it undergoes a translation of 2 units right and 3 units down.

b) If a triangle is reflected across the x-axis, how would the coordinates $A(4, -2)$ of one of its vertices change?

Part 3: Problem Solving (4 marks)

Question 5:

a) In a triangle, one angle is 45° and another is 60° . What is the measure of the third angle?

b) If one angle in a parallelogram is 120° , what are the measures of the other three angles?

Question 6:

a) A square is drawn on a coordinate plane with vertices at $(1, 1)$, $(1, 4)$, $(4, 4)$, and $(4, 1)$. Describe the transformation if the square is rotated 90 degrees counterclockwise around the origin, and also graph this transformation.

b) Explain how the shape of the letter 'T' would change if it were reflected over a vertical line (y-axis) followed by a translation of 5 units to the right, and also graph these two transformations.

Solutions

1a. (0.5 marks)

C. Scalene - A scalene triangle has all sides of different lengths.

b. (0.5 marks)

B. 360°- The sum of interior angles in any quadrilateral is always 360° .

2a. (0.5 marks)

C. Translation - Translation involves moving an object without altering its shape or orientation.

b. (0.5 marks)

B. Reflection - Reflection mirrors a shape across a line.

3a. (1 mark)

All sides are of equal length.
Opposite angles are equal.
Diagonals bisect each other at right angles.
Diagonals bisect the angles of the rhombus.

b. (1 mark)

A regular hexagon has 6 sides.

The sum of interior angles for an n-sided polygon is $(n-2)$ \times 180° .

For a hexagon: $(6-2)\times 180^\circ = 720^\circ$.

Each interior angle in a regular hexagon is:

$$\frac{720^\circ}{6} = 120^\circ .$$

4a. (1 mark)

New coordinates after translation:

$$(3+2,\ 2-3)$$
$$= (5,-1) .$$

b. (1 mark)

Remember for a reflection in the x-axis, the x-coordinate stays the same, but the y-coordinate changes sign:

$$A(4,-2) \rightarrow A'(4,2) .$$

5a. (0.5 marks)

The sum of the interior angles of a triangle is 180° .

Therefore, the third angle is:

$$180^\circ - 45^\circ - 60^\circ$$
$$= 75^\circ .$$

b. (0.5 marks)

In a parallelogram, opposite angles are equal, and consecutive angles are supplementary - (add up to 180°).

If one angle is 120°, the adjacent angle would be $180^\circ - 120^\circ = 60^\circ$.

Thus, the angles are:

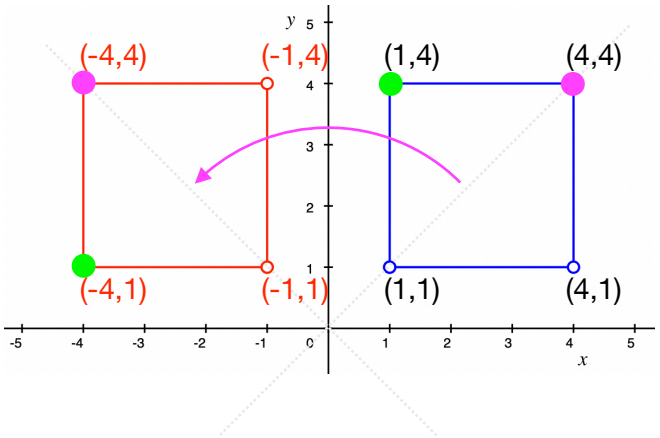
$120^\circ,\ 60^\circ,\ 120^\circ,\ 60^\circ$.

6a. (1.5 marks)

For a 90° counterclockwise rotation, about the origin:

$$(x, y) \rightarrow (-y, x)$$

$$(1, 1) \rightarrow (-1, 1).$$
$$(1, 4) \rightarrow (-4, 1).$$
$$(4, 4) \rightarrow (-4, 4).$$
$$(4, 1) \rightarrow (-1, 4).$$



Rotaion Coordinate Rules (around the origin)

90° counterclockwise or 270° clockwise
$(x, y) \rightarrow (-y, x)$

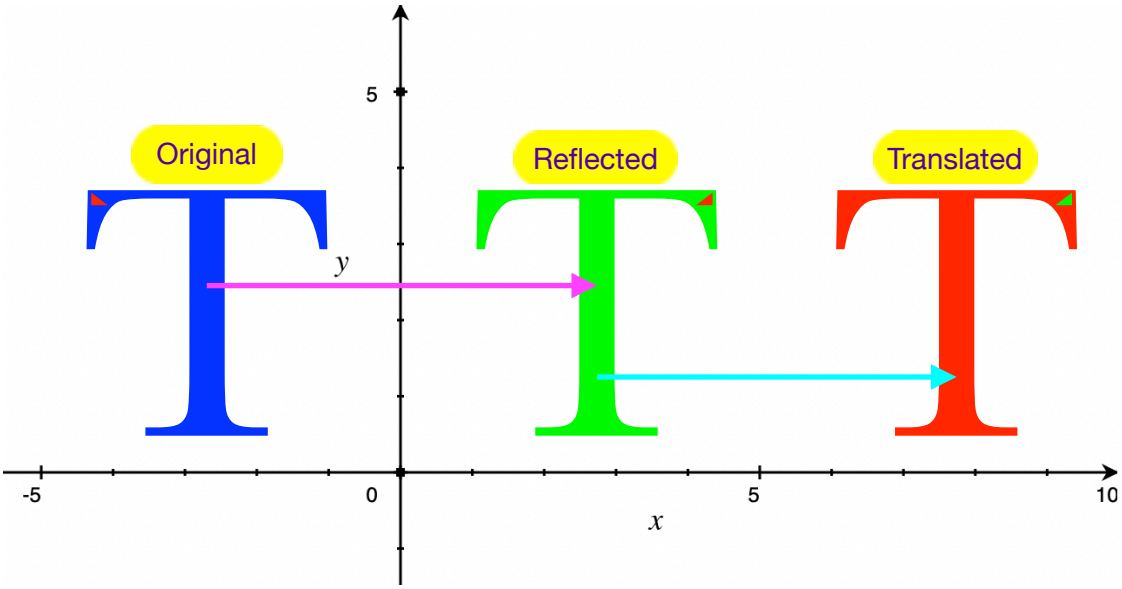
180° clockwise or 180° counterclockwise
$(x, y) \rightarrow (-x, -y)$

90° clockwise or 270° counterclockwise
$(x, y) \rightarrow (y, -x)$

b. (1.5 marks)

Reflecting 'T' over the y-axis would make it a mirror image, flipping it horizontally; *note that the triangle in the top left corner of the blue 'T', is flipped over to the right side on the green 'T'* i.e. we are looking at the back of the blue 'T'.

Then, translating it [the green 'T'] 5 units to the right would move this mirrored 'T' 5 units in the positive x-direction (to the right), giving the red 'T'.



$$\sum = \frac{}{10} = \quad \%$$

General Assessment Marking Standards

Remember: When your official tests are marked, they won't be a score out of 10, they will be a grade (A,B,C,D,E) based on the following standards:

ACiQ | v9.0

Year 7 Mathematics standard elaborations

		A	B	C	D	E
		The folio of student work contains evidence of the following:				
Mathematical proficiencies	**Understanding**	accurate and consistent identification, representation, description and connection of mathematical concepts and relationships in complex unfamiliar, complex familiar, and simple familiar situations	accurate identification, representation, description and connection of mathematical concepts and relationships in complex familiar and simple familiar situations	identification, representation, description and connection of mathematical concepts and relationships in simple familiar situations	partial identification, representation and description of mathematical concepts and relationships in some simple familiar situations	fragmented identification, representation and description of mathematical concepts and relationships in isolated and obvious situations
	Fluency	choice, use and application of comprehensive facts, definitions, and procedures to find solutions in complex unfamiliar, complex familiar, and simple familiar situations	choice, use and application of effective facts, definitions, and procedures to find solutions in complex familiar and simple familiar situations	choice, use and application of facts, definitions, and procedures to find solutions in simple familiar situations	choice and use of partial facts, definitions, and procedures to find solutions in some simple familiar situations	choice and use of fragmented facts, definitions and procedures to find solutions in isolated and obvious situations
	Reasoning	comprehensive explanation of mathematical thinking, strategies used, and conclusions reached in complex unfamiliar, complex familiar, and simple familiar situations	detailed explanation of mathematical thinking, strategies used, and conclusions reached in complex familiar and simple familiar situations	explanation of mathematical thinking, strategies used, and conclusions reached in simple familiar situations	partial explanation of mathematical thinking, strategies used, and conclusions reached in some simple familiar situations	fragmented explanation of mathematical thinking, strategies used, and conclusions reached in isolated and obvious situations
	Problem-solving	purposeful use of problem-solving approaches to find solutions to problems.	effective use of problem-solving approaches to find solutions to problems.	use of problem-solving approaches to find solutions to problems.	partial use of problem-solving approaches to make progress towards finding solutions to problems.	fragmented use of problem-solving approaches to make progress towards finding solutions to problems.

Key	shading emphasises the qualities that discriminate between the A–E descriptors

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