## Source: ACT Aspire Exemplar Mathematics Test Questions

**Possible progression of tasks**: When selecting or creating a task, include a question that addresses each Level. Your tasks may include a Level 1, Level 2 and Level 3 or Level 2 or Level 2 with a Level 3 or Level 1 with Level 3. For example, using Progression #6, students may be asked to provide a computation, explain why a step in the procedure is necessary then reference the computation in one's prose (explanation) to clarify an argument. Note: This document is not designed to guarantee that actual test questions will progress in this way. It is designed to help you create and select tasks that will give your students an opportunity to practice each skill in a progressive manner.

	Level 1 (based on the grade level)	Level 1 or Level 2	Level 2 or Level 3
1	Provide an example	Provide a counterexample to a conditional statement <u>Note</u> : A counterexample is an example that proves that the statement is not true or not true all of the time.	<ul> <li>Provide a counterexample and verify that the conditional conclusion does not hold for the example.</li> <li>Provide a counterexample and verify that the conditional hypotheses do hold for the example, while the conditional conclusion does not.</li> </ul>
2	State a definition, theorem, formula and axiom		Indicate an error and use a mathematical concept (definition, theorem or axiom) to explain why an error occurred
3	State a relationship between two or more objects	<ul> <li>Explain a pattern using words, algebraic expressions or numeric operations OR generate a sequence from a rule</li> <li>Use a pattern or sequence to support a statement or conclusion</li> </ul>	Introduce a pattern or sequence and use it to support a statement or conclusion
4	State a property or classification of an object		<ul> <li>State that an object belongs (or does not belong) to a class, state at least one of the common characteristics of the class, and state that the object has (or does not have) those characteristics.</li> <li>State what is required to be a member of a class, verify that an object meets all of those requirements, and then state that the object belongs to that class.</li> </ul>
5	State one or more steps in a procedure	<ul> <li>Indicate an error occurred</li> <li>Explain why a step in a procedure is necessary</li> </ul>	Indicate an error and use a mathematical concept (definition, theorem or axiom) to explain why an error occurred

	Level 1	Level 1 or Level 2	Level 2 or Level 3
	(based on the grade level)	(based on the grade level)	(based on the grade level)
6	Provide a computation	Explain why a step in a procedure is necessary	<ul> <li>Provide a computation and reference the computation in one's prose (argument) to clarify an argument</li> </ul>
7	Provide a visual representation	Draw and label a visual representation that illustrates a mathematical concept, property or relationship	<ul> <li>Draw and label a visual representation that illustrates a mathematical concept, property or relationship and use the labeling in one's prose (argument) to clarify an argument</li> </ul>
8	Use a specific statement to draw a conclusion or provide specific support for a statement	Use two or more specific statements to draw a conclusion	<ul> <li>Use a specific statement and a general statement to draw a conclusion.</li> <li>Use two or more specific statements to draw a conclusion and provide specific support for at least one of the statements.</li> </ul>
9	<b>Note for Level 2 and Level 3</b> : An example of a conditional statement: If a fraction is improper then its value is greater than one. The <u>converse</u> is interchanging the hypothesis and conclusion. If the value of a fraction is greater than one then it is an improper fraction. The <u>inverse</u> is negating the both the hypothesis and conclusion. If a fraction is not improper then its value is not greater than one.	Make a conditional statement (If – then or When – then)	<ul> <li>Conclude from a conditional statement</li> <li>Conclude from a conditional statement and verify that the statement's hypotheses hold.</li> <li>State that the converse or inverse of a conditional statement is true because the original statement is true.*</li> <li>Understand that a statement can be true and its converse or inverse can be false</li> </ul>
10		Use a general statement to draw a conclusion or provide a general support for a statement	Use two general statements to draw a conclusion
11	Note for Level 2 and Level 3: A claim is statement that is true. For example, $4 \times 5 =$ 20 or the solution to $-3x - 2 = 4$ is $x = -2$ or $4 \times \frac{2}{3} = \frac{8}{3}$ .	Use a claim to draw a conclusion and provide specific support for the claim.	<ul> <li>Use a claim to draw a conclusion and provide general support for the claim.</li> <li>Use two or more claims to draw a conclusion and provide support for at least one claim—at least one claim or support must be general.</li> </ul>
12			<ul> <li>Use proof by example</li> <li>Use cases in a proof</li> <li>Use indirect proof (i.e. proof by contradiction)</li> </ul>