# Eureka Remediation Tool: Grade 8
# Module 1, Topic A

To become mathematically proficient, students **must** access on-grade-level content. This document aims to help teachers who use the Eureka curriculum to target remediation for students needing extra support before and **during** approaching on-grade-level work, creating opportunities for on-time remediation directly connected to the new learning.

## About this Topic

**Focus Standard:**

8.EE.A.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$.*

**Topic Overview per the Eureka Curriculum**

In Topic A, students begin by learning the precise definition of exponential notation where the exponent is restricted to being a positive integer. In Lessons 2 and 3, students discern the structure of exponents by relating multiplication and division of expressions with the same base to combining like terms using the distributive property and by relating multiplying three factors using the associative property to raising a power to a power.

Lesson 4 expands the definition of exponential notation to include what it means to raise a nonzero number to a zero power; students verify that the properties of exponents developed in Lessons 2 and 3 remain true. Properties of exponents are extended again in Lesson 5 when a positive integer, raised to a negative exponent, is defined. In Lesson 5, students accept the properties of exponents as true for all integer exponents and are shown the value of learning them; in other words, if the three properties of exponents are known, then facts about dividing numbers in exponential notation with the same base and raising fractions to a power are also known.

Topic A culminates in Lesson 6 when students work to prove the laws of exponents for all integer exponents. Throughout Topic A, students generate equivalent numerical expressions by applying properties of integer exponents, first with positive integer exponents, then with whole number exponents, and concluding with integer exponents in general.

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## Overview

Eureka Remediation Tools include:

1. a diagnostic assessment to help teachers determine the misunderstandings or gaps in mathematical knowledge related to a specific Topic in the Eureka curriculum
2. guidance for teachers to analyze student work on the diagnostic assessment
3. suggested materials for targeted remedial instruction

> Note: The use of this guidance is not intended to delay students' engagement with on-grade-level learning. On-grade-level learning should be the focus of instructional time and be treated as an opportunity for students to "finish" learning previous skills and deepen conceptual understanding.

## Diagnostic Assessment

The diagnostic assessment is designed to be administered to targeted students prior to beginning instruction on the given Topic. When appropriate, it is broken into parts (Part A, Part B, and so on); each part addresses a different prerequisite standard and contains three problems. If a student correctly answers at least 2 out of the 3 problems, it can be assumed that he/she is ready to engage with the new content of the Topic with little to no support needed prior to engaging with the Topic. The diagnostic assessment is designed in this way so that teachers can determine the "entry point" to remedial instruction and/or opportunities for unfinished learning within the context of the new learning. The entry points and opportunities for unfinished learning will vary between students.

## Guidance for Remediation

The Remediation Guidance is designed for teacher use. It is also broken into parts (Part A, Part B, and so on) and correlates to the parts on the diagnostic assessment. Each part contains the following:

1. **The focus standard**: The focus standards are strategically chosen to address prerequisite skills and are purposefully arranged in the order that students typically master the skills and knowledge.
2. **Why this is important for current grade level work**: This section describes how the work of the prerequisite standard relates to the standard(s) addressed in the Topic of instruction.
3. **Using the diagnostic assessment to identify gaps**: This section identifies common errors students make on the diagnostic assessment items.
4. **Remediation Resources for Targeted Instruction**: The resources pinpoint specific Eureka lessons and parts of lessons for teachers to use to address gaps in mathematical knowledge. Using Eureka materials to address remediation ensures alignment to the standards, consistency in approach to learning, and similarities in strategies for solving problems.

Part A: 6.EE.A.1

1. Write the expression in expanded form, and then evaluate.
   $7^2$

2. Write the expression in expanded form, and then evaluate.
   $\left(\dfrac{2}{3}\right)^4$

3. Write the expression in expanded form, and then evaluate.
   $(0.5)^3$

Solutions:

1. $7 \times 7 = 49$

2. $\frac{2}{3} \times \frac{2}{3} \times \frac{2}{3} \times \frac{2}{3} = \frac{16}{81}$

3. $0.5 \times 0.5 \times 0.5 = 0.125$

**Part A Focus: 6.EE.A.1.** Write and evaluate numerical expressions involving whole-number exponents.

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| **Why this is important for current grade level work:**<br>The properties of integer exponents can be discovered using expansion, and that is an integral part of the target Topic, beginning in Lesson 1. As such, it is critical that students have a solid understanding of whole number exponents prior to engaging with integer exponents. While being able to perform the necessary multiplication fluently and accurately, the most important look-for here is the students' ability to create the expanded form of each expression. The problems scaffold in difficulty, moving from whole numbers to fractions to decimals. | **Remediation Resources for Targeted Instruction:**<br><br>6th Grade, Module 4, Topic B, Lesson 5<br><br>Use the Classwork portion of the Lesson and a sampling of problems from the Problem Set focused on conceptual understanding. |

**Using the Diagnostic Assessment to identify gaps**:

**Problem 1:**
Students may know the answer is 49 without using expanded form; however, without seeing the expanded form, it is difficult to identify readiness for the target standard.

**Problem 2:**
Look for students who only raise the numerator to the fourth power. The use of expanded form should help students avoid this common mistake.

**Problem 3:**
Look for students who struggle with the placement of the decimal in the answer. It is possible that a student expands correctly and uses the digits 125 in their answer without correct placement of the decimal and still be considered ready for the target standard.