## Breaking Down a Mathematics Standard

### What is the domain/conceptual category/big idea?

- Number & Quantity

### Standards for Mathematical Practice

| MP.1 | Make sense of problems and persevere in solving them. |
| MP.2 | Reason abstractly and quantitatively. |
| MP.3 | Construct viable arguments and critique the reasoning of others. |
| MP.4 | Model with mathematics. |

| MP.5 | Use appropriate tools strategically. |
| MP.6 | Attend to precision. |
| MP.7 | Look for and make use of structure. |
| MP.8 | Look for and express regularity in repeated reasoning. |

### Cluster: What is the broader understanding that the standard plays a role in building?

- Extend the properties of exponents to rational exponents.

### Standards

- Identify the target of the standard:
  - Conceptual understanding
  - Procedural skill/fluency
  - Application

Consider how the target of the standard will have an impact on instruction and assessment. (For more information, refer to p. 7, 10 and 15 of KAS for Mathematics.)

**Conceptual Understanding:** understanding mathematical concepts, operations, and relations. More than knowing isolated facts and methods - students should make sense of why a mathematical idea is important and the kinds of contexts in which it is useful. Allows students to connect prior knowledge to new ideas and concepts.

- What key mathematics should students know and be able to do?
  - Extend properties of exponents to rational exponents.
  - Express radicals in terms of rational exponents.

### Clarifications

- What are the specific representations/strategies that will need to be considered when planning instruction?
  - Powers/roots can be expressed as a single rational exponent where the numerator is the power and the denominator is the root index — limit single roots to those that can be expressed as a rational exponent with a numerator of 1.

- What are the possible misconceptions that will need to be addressed during instruction?
  - Students may mix up powers & root indices.
  - Mistakenly treating exponents as multiplication/mistaken models of how exponents work.

### Attending to the Standards for Mathematical Practice

- How are students engaging in the mathematical practices as they learn this content? (For more information, refer to p. 12-15 of KAS for Mathematics.)
  - MP.2: Students make sense of quantities & their relationships in problem situations, knowing flexibly using different properties of operations & objects.
  - MP.7: Students discern a pattern/structure within expressions with rational exponents.

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**KAS:** KY.HS.N.1