Know that there are numbers that are not rational, and approximate them by rational numbers (Standards 8.NS.1–3)	
Standard 8.NS.1: Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers, show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.	
Concepts and Skills to Master	
• Know that real numbers that are not rational are irrational. • Understand that finite decimal expansions of irrational numbers are approximations. • Show that rational numbers have decimal expansions that repeat eventually. • Convert a decimal expansion, which repeats eventually, into a rational number.	
Related Standards: Current Course	Related Standards: Future Courses
8.NS.2, 8.NS.3, 8.G.7, 8.G.8	II.A.REI.4, II.N.RN.3, II.N.CN.1, II.G.SRT.8, II.G.GPE.4, III.A.REI.2, III.A.APR.7

Support for Teachers

Critical Background Knowledge (Access Background Knowledge)
• Apply and extend previous understandings of numbers to the system of rational numbers (6.NS.5 – 8) • Convert rational numbers to decimals using long division (terminating and repeating) (7.NS.2d)
Academic Vocabulary
Decimal expansion, repeating decimal, terminating decimal, rational, irrational, square root, √, π
Resources:
Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5180#71414

Know that there are numbers that are not rational, and approximate them by rational numbers (Standards 8.NS.1–3)	
Standard 8.NS.2: Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*	
Concepts and Skills to Master	
• Compare and order irrational numbers. • Place irrational numbers on a number line. • Use approximations of irrational numbers to estimate the value of expressions.	
Related Standards: Current Course	Related Standards: Future Courses
8.NS.1, 8.NS.3, 8.EE.2, 8.G.6, 8.G.7, 8.G.8, 8.G.9	I.N.Q.3, I.G.GPE.7, II.N.RN.3, II.A.REI.4, II.G.SRT.8, II.G.GPE.4, III.A.REI.2

Support for Teachers

Critical Background Knowledge (Access Background Knowledge)
• Use number line diagrams (4.NF.6, 4.MD.2) and graph points on the coordinate axes (5.G.1) • Extend number line diagrams and coordinate axes to represent rational numbers in the plane with negative coordinates (6.NS.6)
Academic Vocabulary
rational, irrational, decimal expansion, square root, √,π, truncating, rounding
Resources:
Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5180#71414

Know that there are numbers that are not rational, and approximate them by rational numbers (Standards 8.NS.1–3)	
Standard 8.NS.3: Understand how to perform operations and simplify radicals with emphasis on square roots.	
Concepts and Skills to Master	
• Simplify radicals (ie $\frac{\sqrt{12}}{\sqrt{3}}, \sqrt{8}, \sqrt{16}, \sqrt[3]{27}$) • Perform operations and collect like terms (ie $\sqrt{6}\left(\sqrt{15}+\sqrt{6}\right), \quad \sqrt{27}-\sqrt{12}, \quad 2\sqrt{6}+6\sqrt{6}$)	
Related Standards: Current Course	Related Standards: Future Courses
8.NS.1, 8.NS.2, 8.EE.2, 8.G.7, 8.G.8, 8.G.9	I.G.GPE.7, II.N.RN.2, II.N.RN.3, II.A.REI.4, II.G.SRT.8, II.G.GPE.4, IIIH.N.CN.5, IIIH.N.CN.6, P.N.CN.5, P.N.CN.6

Support for Teachers

Critical Background Knowledge (Access Background Knowledge)
• Apply and extend previous understandings of numbers to the system of rational numbers (6.NS.5 – 8) • Write expressions involving whole number exponents (6.EE.1)
Academic Vocabulary
rational, irrational, square root, √
Resources:
Curriculum Resources: http://www.uen.org/core/core.do?courseNum=5180#71414