

Rational and Irrational Numbers Explained

Grade 8 math · Test · Standards: 8.NS.A.1, 8.NS.A.2

Name: _____ Date: _____ Class: _____

This test has 8 questions worth 20 points in total and should take about 45 minutes. Show your work for every question. Calculators are not needed. Write fractions in lowest terms and give square-root estimates as decimals.

Standards: 8.NS.A.1, 8.NS.A.2 · **Level:** Grade 8

Time: 45 minutes · 8 questions · Total: 20 points · Calculator: as allowed by your teacher

Question 1 Sort the numbers (3 points)

Classify each number as rational or irrational. ($\frac{1}{2}$ point each)

- a. -5.25
- b. $\sqrt{72}$
- c. $\sqrt{169}$
- d. $0.909090\dots$
- e. 2π
- f. $\sqrt[9]{16}$

Question 2 Decimals and fractions (3 points)

Write each as a fraction in lowest terms.

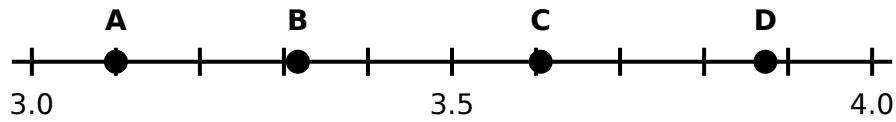
- a. 0.6125 (1 point)
- b. $0.135135135\dots$ (2 points)

Question 3 Estimating a root (2 points)

Locate $\sqrt{61}$ between whole numbers, then round it to one decimal place.

Question 4 Points on a number line (3 points)

Four points, A through D, sit on this number line. Three of them are the locations of $\sqrt{11}$, $\sqrt{13}$ and $\sqrt{15}$. Identify each and justify with squares.



Number line from 3 to 4.

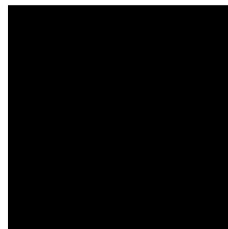
Question 5 Order the numbers (2 points)

Order from least to greatest and justify: $\sqrt{23}$, 4.8, $4\frac{7}{9}$, 4.79.

Question 6 The mural (3 points)

A square mural has an area of 90 square feet.

- The side lies between which pair of neighboring whole numbers? (1 point)
- Estimate the side in feet, rounded to one decimal place. (1 point)
- Is the side exactly 9.5 feet? Explain. (1 point)



side = s

Square mural.

Question 7 Always irrational? (2 points)

Arlo claims that the product of two irrational numbers is always irrational. Give one example that shows his claim is false, and show the calculation.

Question 8 A late-starting repeat (2 points)

Write 0.2777... as a fraction in lowest terms.