LESSON MAKER PRO

# Numbers in Context

*Compare exact values without a calculator.*

**HIGH SCHOOL · MT.CORE.NUM.REAL.3**

**MT.CORE.NUM.REAL.3** "Define, manipulate, interpret, and compare real numbers presented through different representations, including both rational and irrational numbers, and apply comparisons in context..."

NAME _____ DATE _____

## COMPARE BY SQUARING

A rational number can be written as a fraction of integers; an irrational number cannot. To compare two nonnegative numbers, you can square both and compare the results. For two negative numbers, the one with the greater positive magnitude is smaller.

**WORKED EXAMPLE**

Which is greater, sqrt(35) or 59/10?

1. Both numbers are positive, so compare their squares.
2. $(\text{sqrt}(35))^2 = 35$, and $(59/10)^2 = 3481/100$.
3. $35 = 3500/100$, and $3500/100 > 3481/100$.

**Answer: sqrt(35) > 59/10**

## PRACTICE 6 problems

**1** Write < or >: sqrt(50) ___ 7

**ANSWER** _____

**2** Write < or >: sqrt(18) ___ 9/2

**ANSWER** _____

**3** Write < or >: -sqrt(20) ___ -9/2

**ANSWER** _____

**4** Order 11/4, sqrt(8), and 2.8 from least to greatest.

**ANSWER** _____

**5** Simplify sqrt(72), then compare it with 8 using < or >.

**ANSWER** _____

**6** Classify sqrt(48) and 29/4 as rational or irrational, then compare them using < or >.

**ANSWER** _____

## APPLY IT Show your work

**1** Students planning a walk for a Confederated Salish and Kootenai Tribes youth event mark two straight-line segments on a map. One measures sqrt(26) km, and the other measures 51/10 km. Which segment is longer, and by how much? Give the exact difference.

WORK SPACE

**ANSWER** _____

**2** For a planned youth art show in Crow Agency, a square mosaic tile has an area of 45 square inches. A second tile has a side length of 27/4 inches. Which tile has the longer side, and by how much? Give the exact difference.

WORK SPACE

**ANSWER** _____

## CHALLENGE One step up

Without using decimals, order -sqrt(27), -26/5, and -sqrt(28) from least to greatest. Explain your reasoning using squares.

WORK SPACE AND ANSWER

**ANSWER KEY** # Numbers in Context



## PART 1 · PRACTICE

| # | PROBLEM | ANSWER |
|---|---|---|
| 1 | Write < or >: sqrt(50) ___ 7 | **>** |
| 2 | Write < or >: sqrt(18) ___ 9/2 | **<** |
| 3 | Write < or >: -sqrt(20) ___ -9/2 | **>** |
| 4 | Order 11/4, sqrt(8), and 2.8 from least to greatest. | **11/4 < 2.8 < sqrt(8)** |
| 5 | Simplify sqrt(72), then compare it with 8 using < or >. | **sqrt(72) = 6sqrt(2); 6sqrt(2) > 8** |
| 6 | Classify sqrt(48) and 29/4 as rational or irrational, then compare them using < or >. | **sqrt(48) is irrational; 29/4 is rational. sqrt(48) < 29/4** |

## PART 2 · APPLY IT

1. **The 51/10 km segment is longer by 51/10 - sqrt(26) km.** Both lengths are positive, and $(51/10)^2$ = 2601/100 > 26. Subtract the shorter length from the longer length.
2. **The second tile has the longer side by 27/4 - 3sqrt(5) inches.** The first tile's side is sqrt(45) = 3sqrt(5) inches. Since $(27/4)^2$ = 729/16 > 45, subtract 3sqrt(5) from 27/4.

## CHALLENGE

**-sqrt(28) < -26/5 < -sqrt(27). Since 27 < $(26/5)^2$ = 676/25 < 28, the positive values are ordered sqrt(27) < 26/5 < sqrt(28). Negating them reverses the order.**

Accept equivalent exact forms, including sqrt(45) in place of 3sqrt(5). Do not accept rounded decimal differences where an exact difference is requested.