

Real Number Lineup

Compare fractions, decimals, square roots, and pi to put real numbers in order.

GRADE 8 • TEKS 8.2.D

8.2.D "order a set of real numbers arising from mathematical and real-world contexts."

NAME _____

DATE _____

COMPARE BEFORE YOU ORDER

Rewrite numbers in forms that are easy to compare, such as decimals or nearby benchmark values. For negative numbers, the number farther left on the number line is smaller. Use = when two expressions name the same value.

WORKED EXAMPLE

Order $\sqrt{(0.45)}$, $2/3$, and 0.68 from least to greatest.

1. Because $0.67^2 = 0.4489$ and $0.68^2 = 0.4624$, $\sqrt{(0.45)}$ is between 0.67 and 0.68 .
2. Rewrite $2/3$ as $0.666\dots$.
3. Compare $0.666\dots$, $\sqrt{(0.45)}$, and 0.680 .

Answer: $2/3 < \sqrt{(0.45)} < 0.68$

PRACTICE 6 problems

- 1** Order $-\sqrt{(3)}$, -1.7 , and $-5/3$ from least to greatest.

ANSWER _____

- 2** Order $3/8$, 0.38 , and $\sqrt{(1/4)}$ from least to greatest.

ANSWER _____

- 3** Order 2.4 , $\sqrt{(6)}$, and $12/5$ from least to greatest. Use = if needed.

ANSWER _____

- 4** Order $-\pi$, -3.2 , and $-10/3$ from least to greatest.

ANSWER _____

- 5** Order -0.6 , $-\sqrt{(1/2)}$, and $-2/3$ from least to greatest.

ANSWER _____

- 6** Order 4.47 , $\sqrt{(20)}$, and $9/2$ from least to greatest.

ANSWER _____

APPLY IT Show your work

- 1** Three runners record their times for a short video-game speedrun. Order the runners from the shortest time to the longest time.

SPEEDRUN TIMES

Runner	Time, minutes
Jada	$\sqrt{31}$
Malik	5.6
Ren	$45/8$

WORK SPACE

ANSWER _____

- 2** A student downloads three music files for a playlist. File A is 1.25 GB, File B is $\sqrt{2}$ GB, and File C is $7/5$ GB. Order the files from smallest to largest.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Without using decimal approximations for the square roots, order $-\sqrt{5}$, $-9/4$, -2.2 , 0 , 2.3 , and $\sqrt{49/9}$ from least to greatest. Explain how you compared the two negative square-root-related values and the two positive values.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Order $-\sqrt{3}$, -1.7 , and $-5/3$ from least to greatest.	$-\sqrt{3} < -1.7 < -5/3$
2	Order $3/8$, 0.38 , and $\sqrt{1/4}$ from least to greatest.	$3/8 < 0.38 < \sqrt{1/4}$
3	Order 2.4 , $\sqrt{6}$, and $12/5$ from least to greatest. Use $=$ if needed.	$2.4 = 12/5 < \sqrt{6}$
4	Order $-\pi$, -3.2 , and $-10/3$ from least to greatest.	$-10/3 < -3.2 < -\pi$
5	Order -0.6 , $-\sqrt{1/2}$, and $-2/3$ from least to greatest.	$-\sqrt{1/2} < -2/3 < -0.6$
6	Order 4.47 , $\sqrt{20}$, and $9/2$ from least to greatest.	$4.47 < \sqrt{20} < 9/2$

PART 2 • APPLY IT

1. **Jada, Malik, Ren** $\sqrt{31}$ is about 5.57, 5.6 is 5.60, and $45/8$ is 5.625. Therefore Jada has the shortest time, followed by Malik and Ren.
2. **File A, File C, File B** Rewrite $7/5$ as 1.4. Since $1.25 < 1.4 < \sqrt{2}$, the files are A, C, then B.

CHALLENGE

$-9/4 < -\sqrt{5} < -2.2 < 0 < 2.3 < \sqrt{49/9}$. Since $(9/4)^2 > 5$, $9/4 > \sqrt{5}$, so $-9/4 < -\sqrt{5}$. Since $(23/10)^2 < 49/9$, $2.3 < \sqrt{49/9}$.

Accept equivalent correct orders, including decimals or fractions that name the same value. In the challenge, accept any valid comparison using squared positive quantities and a correct reversal when comparing negatives.