

Number Line Detectives

Compare mixed forms with smart benchmarks.

GRADE 8 • MA.8.NSO.1.2

MA.8.NSO.1.2 "Plot, order and compare rational and irrational numbers, represented in various forms."

NAME _____

DATE _____

COMPARE BY VALUE

To compare numbers written in different forms, rewrite rational numbers as decimals or use fraction and place-value reasoning. Locate a square root by finding whole-number squares on either side of its radicand, then place all the values on a number line.

WORKED EXAMPLE

Order $13/23$, 2.7 , and $\sqrt{50}$ from least to greatest.

- $13/23$ is less than 1 because 13 is less than 23.
- 2.7 is between 2 and 3.
- $\sqrt{50}$ is between 7 and 8 because $49 < 50 < 64$.
- So the fraction is least, then the decimal, then the square root.

Answer: $13/23 < 2.7 < \sqrt{50}$

PRACTICE 6 problems

- 1** Order $-\sqrt{2}$, $-5/6$, and -0.8 from least to greatest.

ANSWER _____

- 2** Write $<$, $>$, or $=$ to make the statement true:
 0.58 ____ $7/12$

ANSWER _____

- 3** Classify each number as rational or irrational: $\sqrt{121}$, $\pi/6$.

ANSWER _____

- 4** Which irrational number is between 2.2 and 2.3? Choose from $\sqrt{5}$, $9/4$, and $23/10$.

ANSWER _____

- 5** Order $1/200$, 0.006 , and 6.2×10^{-3} from least to greatest.

ANSWER _____

- 6** Plot $-1/4$, $\sqrt{3}$, and 1.9 on a number line. Then list them from left to right.

ANSWER _____

APPLY IT Show your work

- 1** A student programs a robot to stop at three sensor distances, in meters: 1.41, $\sqrt{2}$, and $10/7$. Order the distances from least to greatest.

WORK SPACE

ANSWER _____

- 2** A skateboard park lists the heights of three ramps as $1\frac{3}{5}$ meters, $\sqrt{3}$ meters, and 1.72 meters. Which ramp is tallest? List all three heights from shortest to tallest.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Without using decimal approximations, order $\sqrt{18}$, $17/4$, and $\sqrt{19}$ from least to greatest. Explain your reasoning using squares.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Order $-\sqrt{2}$, $-5/6$, and -0.8 from least to greatest.	$-\sqrt{2} < -5/6 < -0.8$
2	Write $<$, $>$, or $=$ to make the statement true: 0.58 ___ $7/12$	$0.58 < 7/12$
3	Classify each number as rational or irrational: $\sqrt{121}$, $\pi/6$.	$\sqrt{121}$ is rational. $\pi/6$ is irrational.
4	Which irrational number is between 2.2 and 2.3? Choose from $\sqrt{5}$, $9/4$, and $23/10$.	$\sqrt{5}$
5	Order $1/200$, 0.006 , and 6.2×10^{-3} from least to greatest.	$1/200 < 0.006 < 6.2 \times 10^{-3}$
6	Plot $-1/4$, $\sqrt{3}$, and 1.9 on a number line. Then list them from left to right.	$-1/4, \sqrt{3}, 1.9$

PART 2 • APPLY IT

- $1.41 < \sqrt{2} < 10/7$** Since 1.41^2 is less than 2, 1.41 is less than $\sqrt{2}$. Since 2 is less than $(10/7)^2$, $\sqrt{2}$ is less than $10/7$.
- The $\sqrt{3}$ -meter ramp is tallest. $1 \frac{3}{5} < 1.72 < \sqrt{3}$.** Rewrite $1 \frac{3}{5}$ as 1.6. Since 1.72^2 is less than 3, 1.72 is less than $\sqrt{3}$.

CHALLENGE

$\sqrt{18} < 17/4 < \sqrt{19}$, because $(17/4)^2 = 289/16$ and $18 < 289/16 < 19$.

Accept equivalent order statements and correctly placed points on a number line. For square-root comparisons, accept reasoning based on nearby perfect squares or valid squared comparisons.