

WHERE DOES IT BELONG?

Performance Standard 6A.I

Place a variety of real numbers on a number line and explain the reasoning used.

- *Mathematical knowledge*: Place real numbers correctly on a number line using a consistent scale;
- *Strategic knowledge*: Interpret scientific notation, radicals and fractions to decimals;
- *Explanation*: Explain completely what was done and why it was done.

Procedures

1. Provide students with sufficient learning opportunities to develop the following in order to demonstrate knowledge and use of numbers and their many representations in a broad range of theoretical and practical settings:
 - Place real numbers on a number line.
2. Students are given a copy of the task and asked to place numbers on a number line and explain their reasoning. It is assumed that they have had experience with scientific notation, decimal approximations of radicals and pi and use of a scientific calculator.
3. A 4 in mathematical knowledge would require a completely correct placement of the numbers on the line. A 3 might be given for nearly correct due to an inconsistent scale on the line.
4. A 4 in strategic knowledge would require correct interpretation of the scientific notation, radicals and fractions to decimals.
5. A 4 in explanation would require a complete explanation of the reasoning for the placement of each number relative to each other and to zero.

Examples of Student Work follow

Time Requirements

- One class period

Resources

- Copies of the “Where Does It Belong” task sheet
- Access to a scientific calculator
- Mathematics Rubric

NAME _____ DATE _____

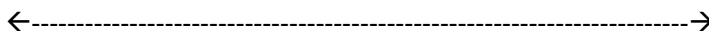
WHERE DOES IT BELONG?

Student Task Sheet

Place in the correct location and clearly label each of the following on a number line:

0, e , -1.7 , $-\sqrt{3}$, π , 3.14 , $11/12$, $4/15$, $\sqrt{6\frac{1}{4}}$, 0.000272×10^4 .

You may use a calculator to help you, but you must use the original numbers on the line. Be sure to indicate your scale on the number line in addition to the given numbers.

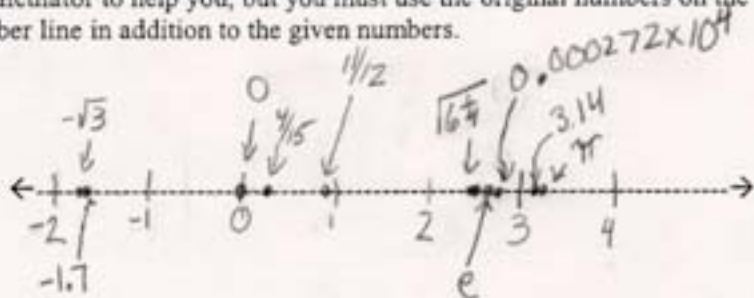


Write in words why you placed each number where you did describing any calculations you did to make your decision and explain why you did what you did.

Place in the correct location and clearly label each of the following on a number line:

2.72 , -1.73 , 3^{115} , $.92$, $.27$, 2.5 , 2.72
 e , π , -1.7 , $-\sqrt{3}$, π , 3.14 , $1+12$, $4+15$, $\sqrt{6\frac{1}{4}}$, 0.000272×10^4

You may use a calculator to help you, but you must use the original numbers on the line. Be sure to indicate your scale on the number line in addition to the given numbers.



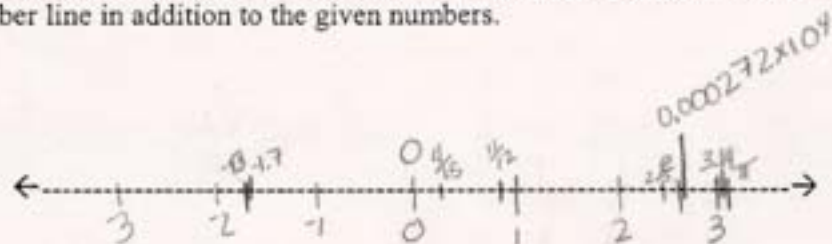
Write in words why you placed each number where you did describing any calculations you did to make your decision and explain why you did what you did.

To begin this problem, I calculated a decimal to two places for the entries in non-decimal form. Then, I counted ten dashes on the number line and put the numbers -2 through 4 on it at every tenth dash. Now, I placed $-\sqrt{3}$ in its approximate location according to its decimal. I put -1.7 just a hair to the right of $-\sqrt{3}$ because it is a small amount larger. 0 was easy to put on the line, because there was a zero already placed on the line from my scale. I put it at the value of 0. I placed $\frac{4}{5}$ at the approximation of $.27$ because $.27$ is $\frac{4}{15}$ decimal rounded to two places. I put $\frac{1}{2}$ at its approximation of $.92$. I placed $16\frac{1}{4}$ in the middle of 2 and 3 because it equals 2.5 . I put e next, because it equals about 2.72 . Now, I found out that 0.000272×10^4 equalled 2.72 , so I placed it after e . I did this because I rounded e up! Now I placed 3.14 at its approximate location after 3. Now, I placed π after 3.14 because I knew that it is just a little bit larger. Then, I went back and checked my work and found it correct so I am finished.

Place in the correct location and clearly label each of the following on a number line:

e , -1.7 , $-\sqrt{3}$, π , 3.14 , $1\frac{1}{2}$, $\frac{4}{15}$, $\sqrt{6\frac{1}{4}}$, 0.000272×10^4

You may use a calculator to help you, but you must use the original numbers on the line. Be sure to indicate your scale on the number line in addition to the given numbers.



Write in words why you placed each number where you did describing any calculations you did to make your decision and explain why you did what you did.

e equals approx. 2.7183, $-\sqrt{3}$ equals approx. -1.7321, π equals approx. 3.1416, $1\frac{1}{2}$ equals approx. 1.5, $\frac{4}{15}$ equals approx. .2667, $\sqrt{6\frac{1}{4}}$ equals 2.5, and 0.000272×10^4 equals 2.72. I placed the zero in the middle and measured 10 dashes to the next numbers. $-\sqrt{3}$ is slightly smaller than -1.7 so it is more to the left. I placed $\frac{4}{15}$ where .2667 would be and $1\frac{1}{2}$ where .9167 would be. $\sqrt{6\frac{1}{4}}$ is half way between 2 & 3. e is at approx. 2.7183 & 0.000272×10^4 is slightly to the right of e . 3.14 is slightly to the left of π .