

NUMBER LINE

Performance Standard 6A.F

Determine the approximate value of each marking on a number line using fraction and decimal notation accordingly:

- *Mathematical knowledge:* Compare and order fractions and decimals and find their position on a number line efficiently.
- *Strategic knowledge:* Use appropriate strategies to determine all the correct names for the markings on a number line.
- *Explanation:* Explain completely and clearly what was done and why it was done.

Procedures

1. *In order to demonstrate knowledge and use of numbers and their many representations in a broad range of theoretical and practical settings (6A)*, students should experience sufficient learning opportunities to develop the following:
 - Compare and order fractions and decimals efficiently and find their approximate position on a number line.
2. Provide each student a copy of the “Number Line” recording sheet marked somewhat like a ruler but with no numerical markings other than whole number segments. Have students review and discuss the task to be completed and how the rubric will be used to evaluate it.
3. Ask students to determine the approximate value of each mark on the number line using whatever strategy he/she thinks will provide a reasonable accurate number for that place. The student may not use a ruler or other measuring tool. Each mark should be labeled with a fraction and its decimal equivalent.
4. After they finish, have each student write about the strategy he/she used to determine the value of placement of each mark. (The student needs to use a strategy like folding or using the edge of another piece of paper, marking segments and comparing them to the segment on the number line. Whatever strategy is used, it should give a fairly accurate value for the marks. “Eyeballing” it and saying it looks to be about $\frac{1}{2}$ would be a less than accurate strategy. Some kind of proof needs to be present in the written part of the assessment.)

ANSWER KEY

Point A is about $\frac{1}{8}$ or 0.125	Point F is about $1\frac{1}{4}$ or 1.25
Point B is about $\frac{1}{4}$ or 0.25	Point G is about $1\frac{1}{2}$ or 1.5
Point C is about $\frac{1}{2}$ or 0.5	Point H is about $1\frac{5}{8}$ or 1.625
Point D is about $\frac{3}{4}$ or 0.75	

5. Evaluate student work using the rubric and its guide to determine the performance level. Each point must be labeled correctly with the fraction and decimal equivalents. The written explanation needs to include something to the effect of “Folding the mark labeled “1” on top of the mark labeled “0,” which is folding it in half, makes point C $\frac{1}{2}$. Folding point C to zero would be half of half, which is $\frac{1}{4}$, and so on.

Examples of Student Work follow

Time Requirements

- One class period

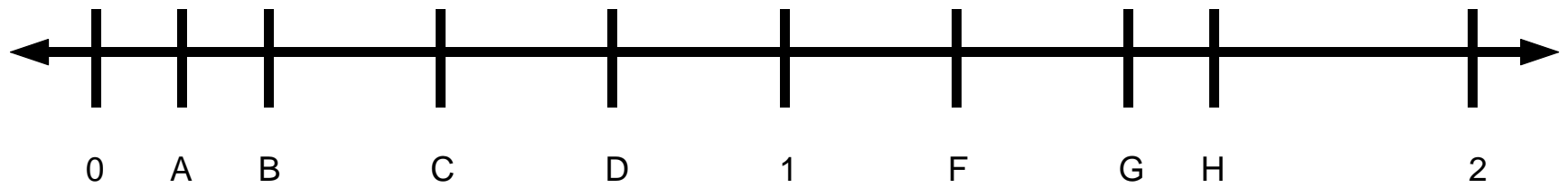
Resources

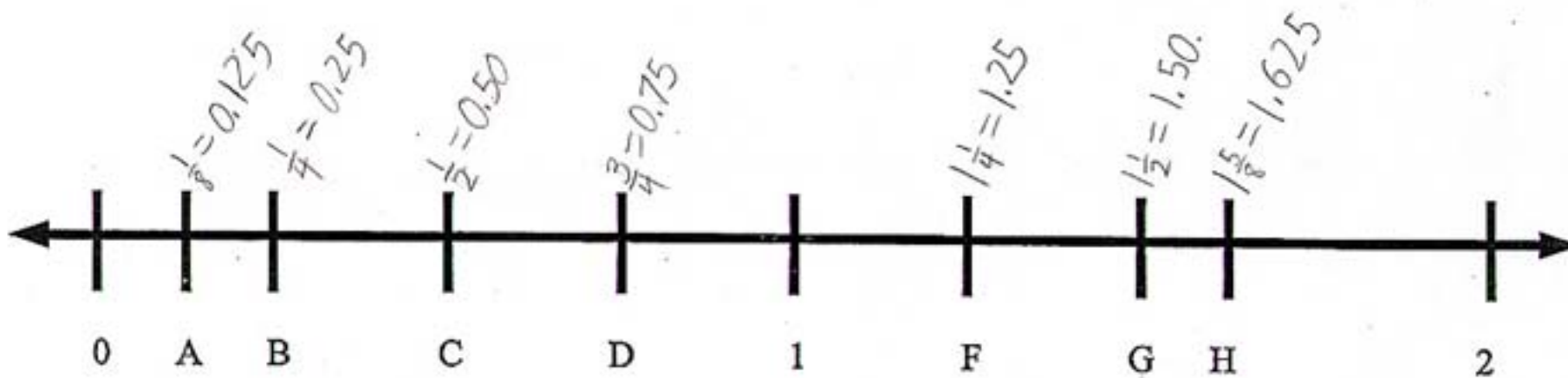
- Copies of the “Number Line” recording sheet
- No rulers or other measuring devices may be used
- Mathematics Rubric

NAME _____

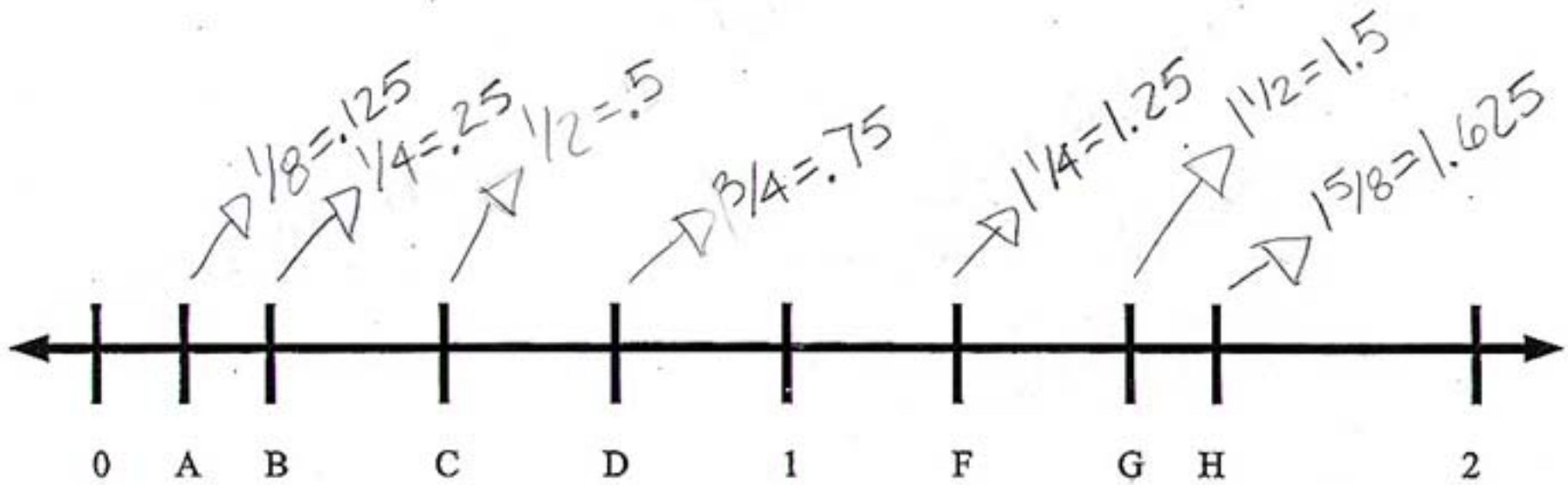
DATE _____

NUMBER LINE





It appeared to me that between 0 and 1 B, C, and D separated it into fourths, and A divided the first fourth in half which meant A was an eighth. Then between 1 and 2 it appeared that G separated it into a half and F was in between 1 and G make it a fourth which made the space between G and 2 was a half or two fourths so H had to be an eighth.



$$\sqrt{A} = \frac{1}{8} \text{ or } .125$$

$$\sqrt{B} = \frac{1}{4} \text{ or } .25$$

$$\sqrt{C} = \frac{1}{2} \text{ or } .5$$

$$\sqrt{D} = \frac{3}{4} \text{ or } .75$$

$$\sqrt{F} = \frac{1}{4} \text{ or } 1.25$$

$$\sqrt{G} = \frac{1}{2} \text{ or } 1.5$$

$$\sqrt{H} = \frac{15}{8} \text{ or } 1.625$$

Procedure

① I found C first. C is easy, because it is/looks right in between 0 & 1.

② I found G second. G is easy, because it is/looks right in between 1 & 2.

③ I found F next. F was a little harder. It is/looks right in between 1 & G. $G = 1\frac{1}{2}$ so I just took half of $\frac{1}{2}$ which equals $\frac{1}{4}$. So the answer is $\frac{1}{4}$ because it's right in the middle of 1 & $1\frac{1}{2}$.

④ Next, is D. D was just like F. D is right in between C ($\frac{1}{2}$) & 1. C ($\frac{1}{2}$) is equivalent to $\frac{2}{4}$. And half of $\frac{1}{2}$ is $\frac{1}{4}$. So since D is right in between half you add $\frac{1}{4}$ to $\frac{2}{4}$ ($\frac{2}{4}$ is equivalent to $\frac{1}{2}$) + you get $\frac{3}{4}$.

⑤ B is next. It is in between $0 \frac{3}{4}$ and $\frac{1}{2}$. Half of $\frac{1}{2}$ is $\frac{1}{4}$. And since it is right in between $0 \frac{3}{4}$ and $\frac{1}{4}$, the answer is $\frac{1}{4}$.

⑥ The next answer I found was A. A is/looks right in between $0 \frac{3}{4}$ and $\frac{1}{4}$. Half of $\frac{1}{4}$ is $\frac{1}{8}$. Since it's right in between $0 \frac{3}{4}$ and $\frac{1}{8}$, the answer is $\frac{1}{8}$.

⑦ Last, but not least, is H. If there was a $1 \frac{3}{4}$ mark, H would be right in between $1 \frac{1}{2}$ and $1 \frac{3}{4}$. $\frac{3}{4} - \frac{1}{2} = \frac{1}{4}$ is the distance between $1 \frac{1}{2}$ and $1 \frac{3}{4}$. And since H would be right in between $1 \frac{1}{2}$ and $1 \frac{3}{4}$ (since half of $\frac{1}{4}$ is $\frac{1}{8}$) then you add $\frac{1}{8}$ to the $\frac{1}{2}$ (which is equivalent to $\frac{4}{8}$) that would be $\frac{5}{8}$. Add on the 1, since it's between 1 and 2, your answer is $1 \frac{5}{8}$.