



Directions: Decide whether the each number is equivalent to:

$$\frac{2}{5}$$

Circle yes or no:	Explain your thinking
A) <p style="text-align: center;">2.5</p> <p style="text-align: center;">Yes No</p>	
B) <p style="text-align: center;">25%</p> <p style="text-align: center;">Yes No</p>	
C) <p style="text-align: center;">0.4</p> <p style="text-align: center;">Yes No</p>	
D) <p style="text-align: center;">0.25</p> <p style="text-align: center;">Yes No</p>	

Directions: Decide whether the each number is equivalent to:

$$\frac{2}{5}$$

Circle true or false:	Explain your thinking
<p>E)</p> <p style="text-align: center;">40%</p> <p>Yes No</p>	
<p>F)</p> <p style="text-align: center;">2.5%</p> <p>Yes No</p>	
<p>G)</p> <p style="text-align: center;">0.04</p> <p>Yes No</p>	
<p>H)</p> <p style="text-align: center;">4%</p> <p>True False</p>	

Resource for Analysis of Probe #11: Number Equivalence

I. Understandings and Successful Approaches

Correct Answers:

- A. No, 2.5 is not equivalent to $\frac{2}{5}$ E. Yes, 40% is equivalent to $\frac{2}{5}$
B. No, 25% is not equivalent to $\frac{2}{5}$ F. No, 2.5% is not equivalent to $\frac{2}{5}$
C. Yes, 0.4 is equivalent to $\frac{2}{5}$ G. No, 0.04 is not equivalent to $\frac{2}{5}$
D. No, 0.25 is not equivalent to $\frac{2}{5}$ H. No, 4% is not equivalent to $\frac{2}{5}$

Students who choose these correct answers and have explanations that support their choices are applying one or more successful understandings and strategies including:

- Making the connection between a fraction and its decimal and percent equivalents
- Understanding of how to translate fractions into decimals and percents
- Ability to justify the equivalence by using multiple ways, including use of visual models and reasoning about the size of a fraction as a base ten decimal or as a percent.

II. Potential Common Misunderstandings/Misconceptions to Look For

A mixture of correct and incorrect choices may reveal a variety of misunderstandings related to finding the decimal and percent equivalents.

1. "Incorrect Direct Substitution" Misconception

Answer Patterns Vary

- Students with this misconception directly substitute the fraction bar (vinculum) with a decimal point or % symbol using the same numbers.

Example 1: The student associates the % sign with the fraction bar.

B)

25%

Yes No

cause 25% can be made in to $\frac{2}{5}$ by turning it around and you could reduce it to $\frac{2}{5}$!

Example 2: The student associates the decimal point with the fraction bar.

A)

2.5

Yes No

because they are the same thing just in a different order

Example 3: The student associates the decimal point and the % sign with the fraction bar.

F)

2.5%

Yes No

the 5 is 100% and the 2 would stand for 25%

The 5 is 100% and the 2 would stand for 25%.

2. Other Difficulties: Students may use a variety of other incorrect approaches, including:

- Associating equivalence with having factors or multiples. For example, students may test for equivalence by seeing if a value can be divided evenly by both factors, 2 and 5.

Example 4: The student associates equivalence with factors. The answer of "yes" is correct but the student's explanation does not provide evidence of understanding why 40% is equivalent to $\frac{2}{5}$.

E)	
40%	
<input checked="" type="radio"/> Yes	No
	Because 2 and 5 go into it evenly.