



THIRD SPACE  
LEARNING

# Diagnostic Questions

Comparing Fractions, Decimals  
and Percentages | Number

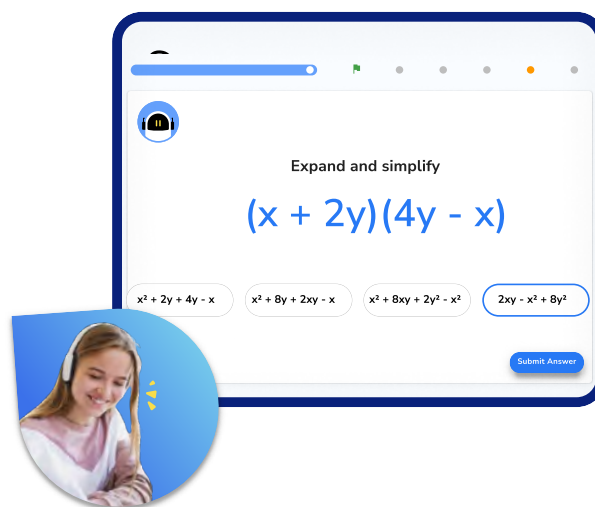
## This resource in a nutshell

Diagnostic questions are a quick and easy way of assessing your students' knowledge and understanding of a particular topic.

Students may be struggling with **Comparing fractions, decimals and percentages** for a number of different reasons. Diagnostic questions can help to identify the particular misconception that the student has and help to determine the specific support they will need in order to improve.

They are low stakes and support students developing metacognition around how their learning is progressing and what they need to do to improve further.

At Third Space Learning, we use diagnostic questions before and after online tutoring sessions to identify gaps and track progress, an example of this is shown above.



## How to use the questions in this resource

There are 22 multiple choice questions, each designed to assess each of the key skills required to master **comparing fractions, decimals and percentages**. Each question has **one correct answer** and **three carefully chosen incorrect answers** that are designed to identify and highlight fundamental misconceptions, including: **Written methods of division**, **Multiplying by powers of 10**, **Place value**, and **Ordering decimals**.

When answering these questions, students should be **encouraged to explain why they have chosen a particular answer**, and why the other three answers are incorrect. This can be done verbally in small groups, or written down on the worksheet or in their books.

This resource has been designed to be as **flexible** as possible with questions that can be easily chopped up and reordered, and come with a separate answer sheet that details all of the misconceptions highlighted in the answers.

## Diagnostic Questions: Comparing FDPs

1. Write as a decimal:

$$\frac{3}{4}$$

A) 0.34	B) 1.33
C) 0.75	D) 0.25

2. Write as a decimal:

$$\frac{5}{8}$$

A) 0.63	B) 0.58
C) 1.6	D) 0.625

3. Write as a fraction in its simplest form:

$$0.6$$

A) $\frac{3}{5}$	B) $\frac{2}{3}$
C) $\frac{3}{50}$	D) $\frac{6}{10}$

## Diagnostic Questions: Comparing FDPs

4. Write as a fraction in its simplest form:

**0.45**

A) $\frac{9}{25}$	B) $\frac{9}{20}$
C) $\frac{4}{5}$	D) $\frac{45}{100}$

5. Write as a percentage:

$\frac{7}{8}$

A) 0.875	B) 12.5%
C) 88%	D) 87.5%

6. Write as a percentage:

$\frac{27}{250}$

A) 0.108	B) 13.5%
C) 10.8%	D) 11%

## Diagnostic Questions: Comparing FDPs

7. Write as a fraction in its simplest form:

**38%**

A) $\frac{38}{100}$	B) $\frac{3}{8}$
C) $\frac{19}{50}$	D) $\frac{9}{25}$

8. Write as a fraction in its simplest form:

**23.5%**

A) $\frac{23}{100}$	B) $\frac{235}{1000}$
C) $\frac{47}{20}$	D) $\frac{47}{200}$

9. Write as a fraction in its simplest form:

**0.6%**

A) $\frac{3}{500}$	B) $\frac{3}{50}$
C) $\frac{1}{6}$	D) $\frac{6}{1000}$

## Diagnostic Questions: Comparing FDPs

10. Write as a percentage:

**0.083**

A) 83%	B) 8.3%
C) 0.83%	D) 8%

11. Write as a percentage:

**1.74**

A) 17.4%	B) 1.74%
C) 74%	D) 174%

12. Write as a decimal:

**67.5%**

A) 6.75	B) 0.0675
C) 0.675	D) 0.67

## Diagnostic Questions: Comparing FDPs

13. Write the recurring decimal as a fraction in the simplest form:

$0.\dot{6}$

A) $\frac{3}{5}$	B) $\frac{2}{3}$
C) $\frac{6}{10}$	D) $\frac{6}{9}$

14. Write the fraction as a recurring decimal:

$\frac{1}{6}$

A) 0.16	B) 0.166
C) 0.17	D) $0.1\dot{6}$

15. Write the recurring decimal as a fraction in the simplest form:

$0.\dot{2}\dot{7}$

A) $\frac{3}{11}$	B) $\frac{27}{100}$
C) $\frac{27}{99}$	D) $\frac{2}{9}$

## Diagnostic Questions: Comparing FDPs

16. Write the fraction as a recurring decimal:

$$\frac{2}{7}$$

A) 0.27	B) 0.285714
C) $0.\dot{2}8571\dot{4}$	D) 0.28...

17. Write the recurring decimal as a fraction:

$$0.0\dot{4}\dot{2}$$

A) $\frac{42}{990}$	B) $\frac{14}{330}$
C) $\frac{14}{33}$	D) $\frac{7}{165}$

18. Determine the number with greatest value:

$$0.685 \quad \frac{5}{8} \quad 68\% \quad \frac{11}{16}$$

A) 0.685	B) $\frac{5}{8}$
C) 68%	D) $\frac{11}{16}$

## Diagnostic Questions: Comparing FDPs

19. Giving your answer as a fraction, calculate:

$$0.18 + \frac{1}{3} + 42\%$$

A) $\frac{61}{3}$	B) $\frac{14}{15}$
C) $42\frac{77}{150}$	D) $\frac{61}{300}$

20. Choose the smallest proportion:

$$\frac{1}{8} \quad 11\% \quad \frac{7}{60} \quad 0.111$$

A) $\frac{1}{8}$	B) 11%
C) $\frac{7}{60}$	D) 0.111

21. Write in ascending order:

$$60\% \quad \frac{1}{2} \quad 0.3 \quad \frac{3}{4} \quad 0.4$$

A) 0.3, 0.4, $\frac{1}{2}$ , 60%, $\frac{3}{4}$	B) $\frac{3}{4}$ , 60%, $\frac{1}{2}$ , 0.4, 0.3
C) $\frac{1}{2}$ , $\frac{3}{4}$ , 0.3, 0.4, 60%	D) 60%, 0.4, 0.3, $\frac{3}{4}$ , $\frac{1}{2}$

## Diagnostic Questions: Comparing FDPs

22. Write in descending order:

$$42\% \quad \frac{4}{9} \quad 0.5 \quad \frac{3}{7}$$

A) 0.5, $\frac{3}{7}$ , $\frac{4}{9}$ , 42%	B) $\frac{3}{7}$ , 42%, $\frac{4}{9}$ , 0.5
C) 0.5, $\frac{4}{9}$ , $\frac{3}{7}$ , 42%	D) 42%, $\frac{4}{9}$ , $\frac{3}{7}$ , 0.5

## Diagnostic Questions: Comparing FDPs Answers

1. Write as a decimal:

$$\frac{3}{4}$$

A) 0.34 Student does not understand decimal representation of fractions

B) 1.33 Student divided denominator by numerator

C) 0.75 Correct answer

D) 0.25 Student found the decimal representation of one quarter

2. Write as a decimal:

$$\frac{5}{8}$$

A) 0.63 Student made errors carrying out division

B) 0.58 Student does not understand decimal representation of fractions

C) 1.6 Student divided denominator by numerator

D) 0.625 Correct answer

3. Write as a fraction in its simplest form:

$$0.6$$

A)  $\frac{3}{5}$  Correct answer

B)  $\frac{2}{3}$  Student used an incorrectly remembered conversion fact

C)  $\frac{3}{50}$  Student made an error understanding place value

D)  $\frac{6}{10}$  Student found correct fraction but did not simplify

## Diagnostic Questions: Comparing FDPs Answers

4. Write as a fraction in its simplest form:

**0.45**

A)  $\frac{9}{25}$  Student simplified the fraction incorrectly

B)  $\frac{9}{20}$  Correct answer

C)  $\frac{4}{5}$  Student does not understand decimal representation of fractions

D)  $\frac{45}{100}$  Student found correct fraction but did not simplify

5. Write as a percentage:

$\frac{7}{8}$

A) 0.875 Student found correct decimal representation but did not multiply by one hundred

B) 12.5% Student found percentage representation of one eighth

C) 88% Student unnecessarily rounded answer

D) 87.5% Correct answer

6. Write as a percentage:

$\frac{27}{250}$

A) 0.108 Student found correct decimal representation but did not multiply by one hundred

B) 13.5% Student treated denominator as 200, not 250

C) 10.8% Correct answer

D) 11% Student unnecessarily rounded answer

## Diagnostic Questions: Comparing FDPs Answers

7. Write as a fraction in its simplest form:

**38%**

- A)  $\frac{38}{100}$  Student found correct fraction but did not simplify
- B)  $\frac{3}{8}$  Student used tens and units to form numerator and denominator
- C)  $\frac{19}{50}$  Correct answer
- D)  $\frac{9}{25}$  Student simplified fraction incorrectly

8. Write as a fraction in its simplest form:

**23.5%**

- A)  $\frac{23}{100}$  Student did not use the decimal part of the given percentage
- B)  $\frac{235}{1000}$  Student found correct fraction but did not simplify
- C)  $\frac{47}{20}$  Student used place value incorrectly when setting up the fraction
- D)  $\frac{47}{200}$  Correct answer

9. Write as a fraction in its simplest form:

**0.6%**

- A)  $\frac{3}{500}$  Correct answer
- B)  $\frac{3}{50}$  Student made errors interpreting place value
- C)  $\frac{1}{6}$  Student used the digit 6 as a denominator without considering the meaning of a percentage
- D)  $\frac{6}{1000}$  Student found correct fraction but did not simplify

## Diagnostic Questions: Comparing FDPs Answers

10. Write as a percentage:

**0.083**

- A) 83% Student multiplied by 1000 instead of 100
- B) 8.3% Correct answer
- C) 0.83% Student multiplied by 10 instead of 100
- D) 8% Student found the integer part of the percentage then truncated

11. Write as a percentage:

**1.74**

- A) 17.4% Student multiplied by 10 instead of 100
- B) 1.74% Student thought decimal and percentage representations were the same
- C) 74% Student assumed percentages were less than 100
- D) 174% Correct answer

12. Write as a decimal:

**67.5%**

- A) 6.75 Student divided by 10 instead of 100
- B) 0.0675 Student divided by 1000 instead of 100
- C) 0.675 Correct answer
- D) 0.67 Student truncated the percentage before converting to a decimal

## Diagnostic Questions: Comparing FDPs Answers

13. Write the recurring decimal as a fraction in the simplest form:

$$0.\dot{6}$$

- A)  $\frac{3}{5}$  Student found the fraction representation of 0.6, then simplified
- B)  $\frac{2}{3}$  Correct answer
- C)  $\frac{6}{10}$  Student found the fraction representation of 0.6
- D)  $\frac{6}{9}$  Student found an equivalent fraction but did not simplify

14. Write the fraction as a recurring decimal:

$$\frac{1}{6}$$

- A) 0.16 Student didn't use notation to show the recurring part of the decimal
- B) 0.166 Student truncated the decimal to the thousandths
- C) 0.17 Student rounded the decimal representation to 2 decimal places
- D)  $0.1\dot{6}$  Correct answer

15. Write the recurring decimal as a fraction in the simplest form:

$$0.\dot{2}\dot{7}$$

- A)  $\frac{3}{11}$  Correct answer
- B)  $\frac{27}{100}$  Student found the decimal representation of 0.27
- C)  $\frac{27}{99}$  Student used a correct method but did not simplify the fraction
- D)  $\frac{2}{9}$  Student only considered the first digit in the recurring decimal

## Diagnostic Questions: Comparing FDPs Answers

16. Write the fraction as a recurring decimal:

$$\frac{2}{7}$$

A) 0.27 Student used numerator and denominator to form decimal

B) 0.285714 Student forgot to include recurring notation

C) 0.287514 Correct answer

D) 0.28... Student truncated at 2 decimal places but signified decimal continued

17. Write the recurring decimal as a fraction:

$$0.0\dot{4}\dot{2}$$

A)  $\frac{42}{990}$  Student used a correct method but did not simplify

B)  $\frac{14}{330}$  Student used a correct method but did not simplify

C)  $\frac{14}{33}$  Student did not consider the placeholder in the tenths column

D)  $\frac{7}{165}$  Correct answer

18. Determine the number with greatest value:

$$0.685 \quad \frac{5}{8} \quad 68\% \quad \frac{11}{16}$$

A) 0.685 Student looked at 685 without considering place value

B)  $\frac{5}{8}$  Student did not compare fractions effectively

C) 68% Student treated the percentage as a number instead of a proportion

D)  $\frac{11}{16}$  Correct answer

## Diagnostic Questions: Comparing FDPs Answers

19. Giving your answer as a fraction, calculate:

$$0.18 + \frac{1}{3} + 42\%$$

- A)  $\frac{61}{3}$  Student found the numerator by adding 18, 1 and 42
- B)  $\frac{14}{15}$  Correct answer
- C)  $42\frac{77}{150}$  Student treated 42% as an integer
- D)  $\frac{61}{300}$  Student found lowest common denominator but did not find correct equivalent fractions

20. Choose the smallest proportion:

$$\frac{1}{8} \quad 11\% \quad \frac{7}{60} \quad 0.111$$

- A)  $\frac{1}{8}$  Student did not convert to a decimal effectively
- B) 11% Correct answer
- C)  $\frac{7}{60}$  Student did not find recurring decimal representation correctly
- D) 0.111 Student considered 111 without looking at place value

21. Write in ascending order:

$$60\% \quad \frac{1}{2} \quad 0.3 \quad \frac{3}{4} \quad 0.4$$

- A) 0.3, 0.4,  $\frac{1}{2}$ , 60%,  $\frac{3}{4}$  Correct answer
- B)  $\frac{3}{4}$ , 60%,  $\frac{1}{2}$ , 0.4, 0.3 Student wrote in descending order
- C)  $\frac{1}{2}$ ,  $\frac{3}{4}$ , 0.3, 0.4, 60% Student converted to fractions but ordered by denominator instead of finding a common denominator
- D) 60%, 0.4, 0.3,  $\frac{3}{4}$ ,  $\frac{1}{2}$  Student converted to fractions but ordered by denominator and put in incorrect descending order

## Diagnostic Questions: Comparing FDPs Answers

22. Write in descending order:

$$42\% \quad \frac{4}{9} \quad 0.5 \quad \frac{3}{7}$$

A)  $0.5$ ,  $\frac{3}{7}$ ,  $\frac{4}{9}$ ,  $42\%$  Student converted to fractions but ordered by denominator and put in incorrect ascending order

B)  $\frac{3}{7}$ ,  $42\%$ ,  $\frac{4}{9}$ ,  $0.5$  Student converted to decimals and incorrectly compared decimals starting with 0.4 past the tenths column

C)  $0.5$ ,  $\frac{4}{9}$ ,  $\frac{3}{7}$ ,  $42\%$  Correct answer

D)  $42\%$ ,  $\frac{4}{9}$ ,  $\frac{3}{7}$ ,  $0.5$  Student wrote in ascending order

# Where to go next?

For more diagnostic questions, and GCSE maths revision resources and worksheets to support students in fixing any misconceptions take a look at the free Third Space Learning [GCSE maths revision](#) pages.

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