Supporting Year 6 Teachers and Pupils

KS2 Mathematics Tests

Decimals

Norfolk County Council

Decimals

One of the topics identified through our analysis, to contribute to several marks in the KS2 tests is ‘Decimals’. This topic encompasses a wide range of objectives, so for the purposes of supporting your targeted teaching and revision we have narrowed these down to a small number of crucial objectives.

- Order numbers with up to 3.d.p in context
- Addition of a 2.d.p number to a 3.d.p number
- Subtraction of a one digit 2.d.p number from a one/two digit whole number
- Multiplication of a one digit 1.d.p number by a two-digit whole number.
- Division of a one digit 2.d.p number by 10 or 100

To support your focused teaching on revisiting, reshaping, and challenging your pupils learning on this already taught content. We have provided a range of misconceptions which may need to be addressed for your pupils to progress their learning in this topic.

One

Misconception: 4.582 is larger than 4.78

Problem: The digits after the decimal point have been read as if they are whole numbers e.g., ‘four point five hundred and eighty two’ and ‘four point seventy eight.’ This shows a lack of understanding of the relative value of the successive groupings of ten in the place value system to the right of the decimal point. Some pupils also believe that numbers are larger if there are more digits after the decimal point.

Solution: Use a place holder to ensure numbers being compared have the same number of digits after the decimal point e.g., 4.582 compared to 4.78**0**. Ensure pupils are considering the tenths, hundredths and thousandths digits when comparing, rather than just the hundredths and thousandths which may be an overgeneralisation from comparing integer numbers. Decimal place value counters, a Gattegno chart and dienes blocks can be used to support the visualisation and understanding of comparison of decimal numbers with differing number of digits after the decimal point.

Two

Misconception: Double 0.73 is equal to 0.146

Problem: The numbers have been doubled but the pupil has failed to consider the place value properties of decimal numbers. The rule for doubling integer numbers has been overgeneralised to decimal numbers. The pupil has not realised that 0.146 comprises of one tenth, four hundredths and six thousandths which is smaller than seven tenths and three hundredths.

Solution: Explain and model using two beadstrings (assuming that the whole beadstring is worth 1, therefore each bead is worth 0.01) to demonstrate two lots of 0.73 will combine to a number greater than one whole. Using a representation such as an empty number line can also be used to show 0.73 + 0.73 crossing over 1 to show pupils the total is greater than 1. Place value counters, a Gattegno chart and dienes blocks can be used to support the visualisation and understanding of doubling decimal numbers.

Three

Misconception: 23.07 rounded to the nearest ten is 30

Problem: An incorrect rounding strategy has been applied. The hundredths digit has been used to determine whether to round up or down, rather than considering the tenths digit too. Pupils may have generalised that the final digit of the number dictates the rounding.

Solution: Using a representation such as a number line can support pupils' understanding of which way a decimal number is rounded based on the position of the number on the number line. Ensure pupils experience rounding decimal numbers to the nearest 1, 10, 100 and 1000 to consolidate their understanding of the rules of rounding decimal numbers. A Gattegno chart, place value counters and a counting stick can also be used to support the visualisation and understanding of rounding decimal numbers.

Four

Misconception: Incorrect place value understanding of digits to complete a decimal calculation e.g., 5.43 + 2.215 = 7.258

Problem: The digits after the decimal point have been read as whole numbers e.g., '215' and '43' resulting in an incorrect addition.

Solution: Encourage pupils to insert a place holder to ensure both numbers within the calculation have the same number of digits after the decimal point. Presenting the calculation as 5.430 + 2.215 reduces the likelihood that pupils will incorrectly add the digits after the decimal point. Place value counters, a Gattegno chart, and a number line can also be used to support the visualisation and understanding of adding decimal numbers with a different number of digits after the decimal point.

Five

Misconception: 4.3 x 12 = 48.36

Problem: The digits after the decimal point has been multiplied as if they are whole numbers, without understanding the place value implications.

Solution: Use a manipulative such as decimal place value counters to demonstrate twelve lots of 4, twelve lots of 0.3 and the subsequent exchanging required. Although time consuming the first time, showing this process using manipulatives supports pupils to build a conceptual understanding of what is happening within the calculation. A Number line, Dienes blocks and decimal strips can also be used to support the visualisation and understanding of multiplying one digit decimal numbers by whole numbers.

I've got some questions... No problem, we're here to help.

Rose Keating and Sarah Penfold, Mathematics Advisers, and our experienced team are here to help you provide the best Mathematics education possible. We will be happy to answer your questions and/or discuss your bespoke needs.

Please contact us:

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