Lesson 9: Decimal Expansions of Fractions, Part 1

Classwork

Opening Exercises 1–2

1. a. We know that the fraction can be written as a finite decimal because its denominator is a product of ’s.

Which power of will allow us to easily write the fraction as a decimal? Explain.

* 1. Write the equivalent fraction using the power of 10.

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**Example 1**

Write the decimal expansion of the fraction .

**Example 2**

Write the decimal expansion of the fraction .

**Example 3**

Write the decimal expansion of the fraction .

**Example 4**

Write the decimal expansion of the fraction .

Exercises 3–5

1. a. Choose a power of ten to use to convert this fraction to a decimal: . Explain your choice.
   1. Determine the decimal expansion of and verify you are correct using a calculator.
2. Write the decimal expansion of . Verify you are correct using a calculator.
3. Write the decimal expansion of . Verify you are correct using a calculator.

Problem Set

Lesson Summary

Multiplying a fraction’s numerator and denominator by the same power of 10 to determine its decimal expansion is similar to including extra zeroes to the right of a decimal when using the long division algorithm. The method of multiplying by a power of 10 reduces the work to whole number division.

Example: We know that the fraction has an infinite decimal expansion because the denominator is not a product of ’s and/or ’s. Its decimal expansion is found by the following procedure:

|  |  |
| --- | --- |
|  | Multiply numerator and denominator by  Rewrite the numerator as a product of a number multiplied by the denominator  Rewrite the first term as a sum of fractions with the same denominator  Simplify  Use the distributive property  Simplify  Simplify the first term using what you know about place value |

Notice that the value of the remainder, , is quite small and does not add much value to the number. Therefore, is a good estimate of the value of the infinite decimal for the fraction .

1. a. Choose a power of ten to convert this fraction to a decimal: . Explain your choice.
   1. Determine the decimal expansion of and verify you are correct using a calculator.
2. Write the decimal expansion of . Verify you are correct using a calculator.
3. Write the decimal expansion of . Verify you are correct using a calculator.
4. Tamer wrote the decimal expansion of as , but when he checked it on a calculator it was Identify his error and explain what he did wrong.

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1. Given that . Explain why is a good estimate of .