


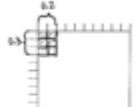
## Packet 8: Decimal Operations

Dear Parents/Guardians,

Students will perform operations with decimals using the standard algorithms. In grade 5, students explored addition and subtraction with decimals using manipulatives and visual representations. In this packet, students will explore models for decimal multiplication and division before learning the standard algorithm. For video tutorials on decimal operations using the standard algorithms, please see 'Additional Resources'.

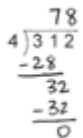
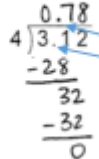
### Multiplication of Decimals using Various Models

Students will explore three models for multiplying decimals to build understanding of the standard algorithm.

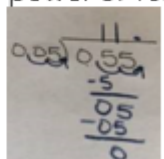
Repeated Addition	$3 \times 0.4$ This can be thought of as 3 groups of 0.4. $0.4 + 0.4 + 0.4 = 1.2$	 3 groups of 0.4 1.2
Area Model	$0.2 \times 0.3$ On the diagram to the right, the unit is divided up into 10-tenths. Each square inside the unit is equivalent to 1-hundredth, or 0.01.	 $0.2 \times 0.3 = 0.06$
Multiply as Fraction Equivalents	$0.2 \times 0.3$ 2-tenths multiplied by 3-tenths can be rewritten as: $\frac{2}{10} \times \frac{3}{10}$	$\frac{2}{10} \times \frac{3}{10} = \frac{6}{100}$ $\frac{6}{100} = 0.06$

### Quotients that Involve Decimals

Students will relate whole number division to division with decimals.

$312 \div 4$ 	$3.12 \div 4$  <p>Notice the decimal in the quotient (answer) goes directly above where it was in the dividend.</p>
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Students will explore two strategies for dividing decimals by decimals to build understanding of the standard algorithm.

Relate to Money	Standard Algorithm
$0.55 \div 0.05 = 11$ Think: How many nickels are in \$0.55? (11 nickels) Think: How many groups of 0.05 are in 0.55? (11)	$0.55 \div 0.05 = 11$ To show that we are multiplying by powers of 10, draw arrows to indicate the relocation of the decimal point. Since we multiplied by 100 (or $10 \times 10$ ), we relocate the decimal two places, one for each power of 10.
Equivalent Fractions $0.55 \div 0.05 = 11$ $\frac{0.55}{0.05} \times \frac{100}{100} = \frac{55}{5}$ $\frac{55}{5} = 11$	



**By the end of the packet, your student should know...**

How to add and subtract multi-digit decimals using the standard algorithms

How to multiply and divide decimals using various models

How to multiply and divide multi-digit decimals using the standard algorithms

### Additional Resources

Resource Guide, Part 1, pages 49-52

For videos on the standard algorithms for decimal operations:

<http://www.mathTV.com/>

Click, "Basic Mathematics"

Click, "Decimals"

Click, "Addition and Subtraction", "Multiplication", or "Division"