Standards: NS 4.3.4; NS 5.2.2; NS 6.2.3 Objective: Use an open number line as a tool for division

Warm Up and Debrief

Ask: What is division? Have students *Think-Pair-Share*. Record their ideas. (equal sharing, repeated subtraction, splitting apart, etc.)

How can we model 8÷2? Draw an array with dimensions of 2 and 4



We know one of the dimensions must be two. The whole array represents the dividend.

Ask: How can we use this model to show division as repeated subtraction? Circle sets of 2.



$$8-2=6$$

 $6-2=4$
 $4-2=2$
 $2-2=0$

The circled sets in the array model 2 being subtracted from 8. It is subtracted 4 times. We can show $8\div 2$ on a number line as well.



You Try: Make an array and number line to model 12÷4 as repeated subtraction.



However, recording repeated hops is very tedious when the dividend is a larger number.

Draw an open number line.

Instead of subtracting the divisor in increments of 1, subtract multiples of the divisor. Add the number of multiples to get the quotient.







Compare your number line with a neighbor.

Division on a number line allows students to use the math facts and multiples they have mastered. Different students will make different choices. Sharing their reasoning and making choices about which multiples to use will strengthen their number sense.

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Larger Numbers: 132 \div 6
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You Try: 477 ÷ 9



Have two volunteers record their work on the board. Have each one explain their work. Ask table groups to discuss how the examples were alike and different.

Remainders or Fractions: 7420 ÷ 8







0



0

Double Digit Divisors: 4318 ÷ 34



	36 × 1	36 × 20) 36	×20	36 ×100	36 ×	100
←				•	\checkmark	
	$\begin{array}{c} 0 & 36 \\ \underline{-36} \\ 0 \end{array}$	756 <u>-720</u> <u>36</u>	1	476 <u>720</u> 756	5076 <u>-3600</u> 1476	8676 <u>-3600</u> 5076
8676		36 8676]			
-3600	(36×100)	-3600	100	100 + 100 +	20 + 20 + 1	= 241
5076 -3600	(36×100)	3600	100			$\therefore 8676 \div 36 = 241$
1476		1476	100			
-720	(36×20)	-720	20			
756 -720	(36×20)	756	20			
36		/20	20			
-36	(36×1)	36 26	1			
0						

Division on a Number Line

Exit Card:

Find the quotient by dividing on a number line and check by dividing another way.

605÷11



Here are some possible student choices for checking with a second method.

$\begin{array}{c c}11 & 605 \\ -330 & 30\end{array}$	$\frac{605}{11}$	55 11 605
275	$=\frac{300+305}{100}$	-55↓
-220 20	11	55
55	275+330	-55
-55 5/	- 11	0
0	55+220+330	
	- 11	
	$=\frac{55}{11}+\frac{220}{11}+\frac{330}{11}$	
	= 5 + 20 + 30	
	= 55	

Multiple Division Algorithms



Warm-Up

CST/CAHSEE: Gr. 4 NS 3.4	N Review: Grade 5 NS 2.4
458 ÷ 4 = A 102 B 114 R2 C 117	simplify $\frac{4}{9} \cdot \frac{3}{20}$
D 139 R2 Solve 2 ways.	Write a new expression, using fractions, which will have the same product as the factors above.
Current: Grade 6 NS 2.3	Other: Grade 7 AF 4.2
There are 190 guests at a wedding. What is the least number of circular tables needed to seat all the guests if each table seats exactly 8 people?	Marisa's car gets an average of 28 miles per gallon of gas. She plans to drive 200 miles today and 220 miles tomorrow. How many gallons of gas should she expect to use in all?
Does an answer with a remainder or fraction make sense for this question?	Make a function table to help someone find the answer.
Why or why not?	