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Unit 5, Lesson 11

Dividing Rational Numbers

Let's divide signed numbers.

11.1 Tell Me Your SignConsider the equation: $-27x = -35$

Without computing:

1. Is the solution to this equation positive or negative?
2. Are either of these two numbers solutions to the equation?

$$\frac{35}{27}$$

$$-\frac{35}{27}$$

11.2 Multiplication and Division

1. Find the missing values in the equations
 - a. $-3 \cdot 4 = ?$
 - b. $-3 \cdot ? = 12$
 - c. $3 \cdot ? = 12$



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d. $? \cdot -4 = 12$

e. $? \cdot 4 = -12$

2. Rewrite the unknown factor problems as division problems.
3. Complete the sentences. Be prepared to explain your reasoning.
- a. The sign of a positive number divided by a positive number is always:
 - b. The sign of a positive number divided by a negative number is always:
 - c. The sign of a negative number divided by a positive number is always:
 - d. The sign of a negative number divided by a negative number is always:
4. Han and Clare walk towards each other at a constant rate, meet up, and then continue past each other in opposite directions. We will call the position where they meet up 0 feet and the time when they meet up 0 seconds.
- Han's velocity is 4 feet per second.
 - Clare's velocity is -5 feet per second.

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a. Where is each person 10 seconds before they meet up?

b. When is each person at the position -10 feet from the meeting place?

Are you ready for more?

It is possible to make a new number system using *only* the numbers 0, 1, 2, and 3. We will write the symbols for multiplying in this system like this: $1 \otimes 2 = 2$. The table shows some of the products.

\otimes	0	1	2	3
0	0	0	0	0
1		1	2	3
2			0	2
3				

- In this system, $1 \otimes 3 = 3$ and $2 \otimes 3 = 2$. How can you see that in the table?
- What do you think $2 \otimes 1$ is?
- What about $3 \otimes 3$?
- What do you think the solution to $3 \otimes n = 2$ is?
- What about $2 \otimes n = 3$?

11.3 Drilling Down

Interactive digital version available

a.openup.org/ms-math/en/s/ccss-7-5-11-3



A water well drilling rig has dug to a height of -60 feet after one full day of continuous use.

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1. Assuming the rig drilled at a constant rate, what was the height of the drill after 15 hours?

2. If the rig has been running constantly and is currently at a height of -147.5 feet, for how long has the rig been running?



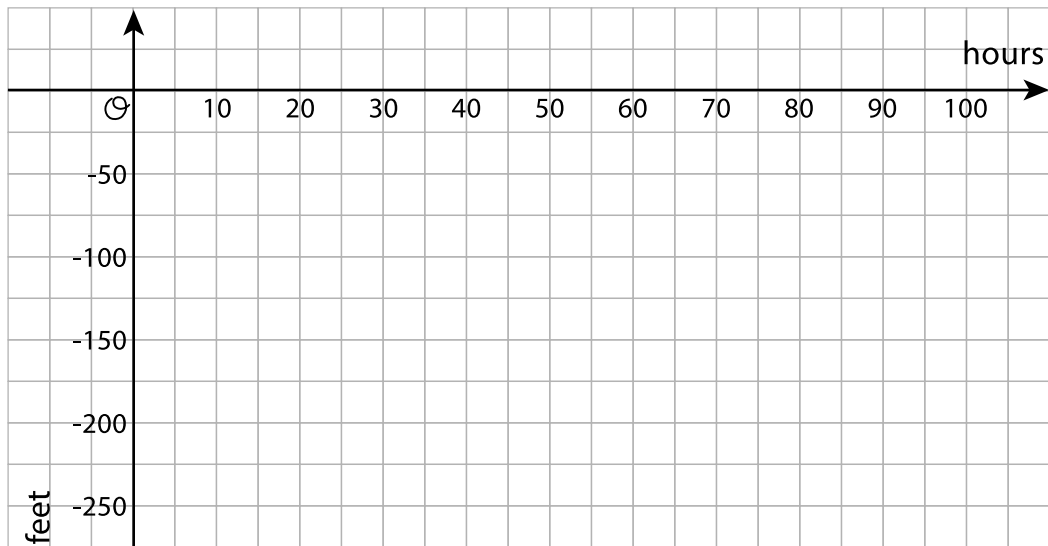
“US Navy
 090226-N-9584H-018
 Construction
 Electrician
 Constructionman
 Greg Langdon,
 assigned to Naval
 Mobile
 Construction
 Battalion (NMCB)
 1, installs a new
 section of drill
 steel during a
 water well drilling
 operation” by Mass
 Communication
 Specialist Seaman
 Ernesto Hernandez
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3. Use the coordinate grid to show the drill's progress.



4. At this rate, how many hours will it take until the drill reaches -250 feet?

Lesson 11 Summary

Any division problem is actually a multiplication problem:

- $6 \div 2 = 3$ because $2 \cdot 3 = 6$
- $6 \div -2 = -3$ because $-2 \cdot -3 = 6$
- $-6 \div 2 = -3$ because $2 \cdot -3 = -6$
- $-6 \div -2 = 3$ because $-2 \cdot 3 = -6$

Because we know how to multiply signed numbers, that means we know how to divide them.

- The sign of a positive number divided by a negative number is always negative.
- The sign of a negative number divided by a positive number is always negative.
- The sign of a negative number divided by a negative number is always positive.