Driving a Truck

Math Module

+ Reading Maps, Computing Distance, Figuring out Gas Mileage

Judy is a truck driver. She has driven trucks for only a few weeks and, so far, she loves her job. She enjoys the time she has alone, and the job pays well. She gets paid per mile when she drives long distances and by the hour when she drives short distances.

Judy went to truck driving school before she began this job. She is glad that she decided to go to school, because she learned a lot of math skills that help her on the job.

+ Focus

This math strand focuses on math skills related to driving a truck.

In this math strand, you'll be learning and/or reviewing the following math skills:

1) Reading maps
2) Reading tables
3) Multiplying decimals
4) Converting between miles and kilometer
5) Rounding decimals
6) Adding time segments
7) Converting between minutes and fractions of an hour
8) Gas mileage per tank
9) Gas mileage per gallon
10) Solving one and two-step word problems

Task One: Reading Maps

The map on the right shows Judy's usual truck route. Every week, she drives her truck round trip between Seattle and Spokane, covering a total of 580 miles. Driving one way between Seattle to Spokane is 290 miles.

Sometimes Judy doesn't drive directly from Seattle to Spokane. Instead, she stops at La Crosse on her way to Spokane.
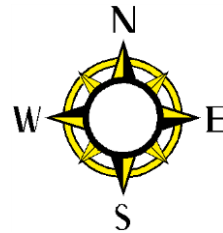
Washington State
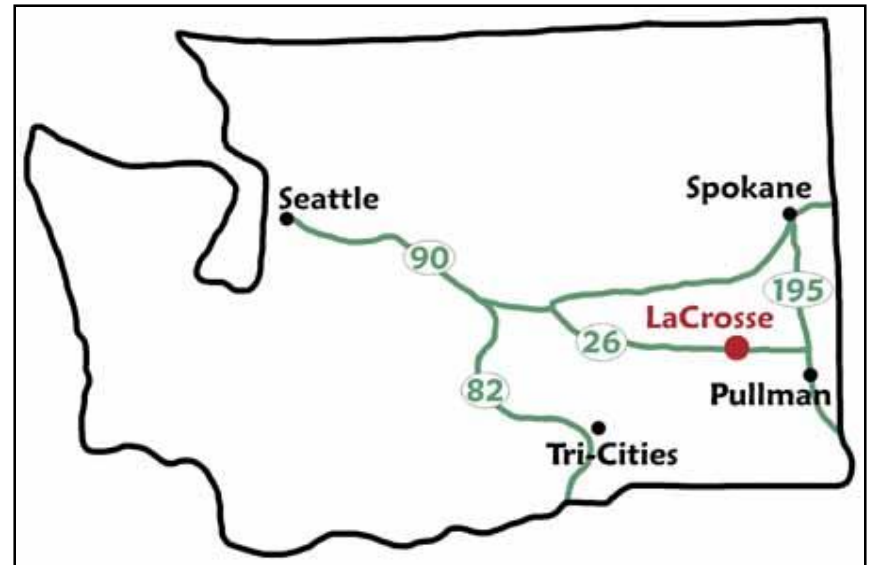
+ Consider

A: Look at the map and answer the questions

1) What highway does Judy take when she leaves Seattle to go to Spokane?

I-90

2) If it takes Judy 6 hours to drive to Spokane, and it's 290 miles to Spokane, is Judy driving closer to 40 miles per hour or closer to 50 miles per hour?

Closer to 50 miles per hour

3) When Judy stops at La Crosse on her way to Spokane, do you think her travel time increases or stays the same?

Increases

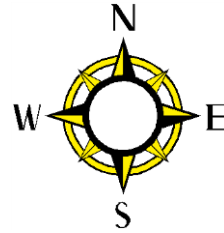4) If Judy is driving from La Crosse to Spokane, would she drive through Pullman?

No, she wouldn't

5) Is Tri-Cities southwest or southeast of Seattle?

Southeast

6) Does Highway 26 run south or north of I-90?

South

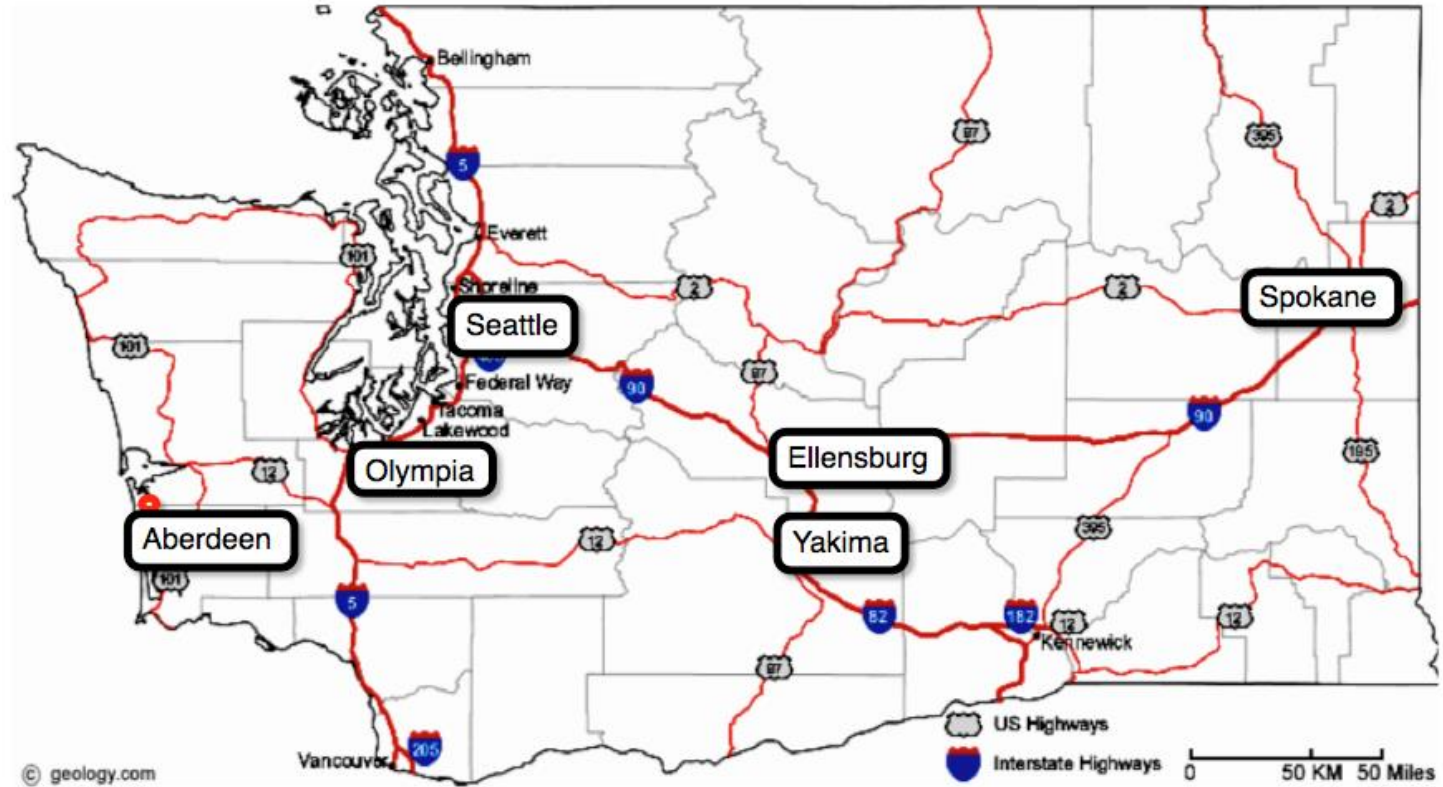7) When a person is driving east on I-90 turns onto I-82, are they going north or south?

South

+ Think About It!

How many miles are represente by this scal

50

+ Practice

B: Use the scale and select the correct answer. You'll have to use your eyes to measure the distances.

1) About how many miles is it from Seattle to Tacoma?
      a. 40   b. 70   c. 90

> a. 40

2) About how many miles is it from Spokane to Kennewick?
      a. 120   b. 90   c. 85

> a. 120

3) About how far is it from Yakima to Kennewick?
      a. 100   b. 40   c. 65

> c. 65

4) Estimate how many miles are between Everett and Spokane?
      a. 150   b. 210   c. 300

> b. 210

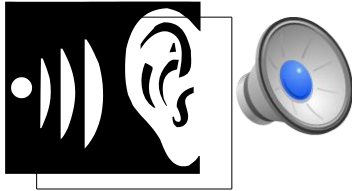5) Estimate how many miles are between Vancouver and Olympia? a. 270 b. 140   c. 100

> c. 100

6) About how far is it from Tacoma to Olympia?
      a. 15   b. 30   c. 65

> b. 30

Task Two: Distances Between Places

Listen to Judy and follow along as she explains how to read this table.

A table is a way to organize information. We use tables in the trucking business to figure out how many miles we have to drive to get from one place to another. Continue on to the next screen.

	Aberdeen	Ellensburg	Olympia	Seattle	Spokane	Yakima
Aberdeen	0	198	50	83	368	280
Ellensburg	198	0	149	110	174	36
Olympia	50	149	0	60	320	161
Seattle	83	110	60	0	280	142
Spokane	368	174	320	280	0	196
Yakima	280	36	161	142	196	0

+ Listen

To read this table, find the city you are starting from in the top row. Put your finger on the name of the city. Then find the name of the city where you are going in the column on the side. Move your finger down the row until it is even with the city in the column. You'll see the square that connects the two cities. In that square, you will see how many miles are between the two cities.

For example, I find Seattle in the top row. I put my finger there. I want to go to Spokane. I find Spokane on the side. I move my finger down until it is even with Spokane. I look at the box that my finger is in. It reads 280. Therefore, to go from Seattle to Spokane is 280 miles.

+ Practice

Practice A: Look at the table and answer the questions.

1) How far is it from Aberdeen to Olympia?   50 miles

2) How far is it from Ellensburg to Yakima?   36 miles

3) How far is it from Aberdeen to Spokane?   368 miles

4) How far is it from Yakima to Spokane?   196 miles

5) How far is it from Seattle to Ellensburg?   110 miles

+ Think About It!

How many times does a specific distance show up in the table?   (For example, how many times do you see that there are 280 miles between Yakima and Aberdeen?)

two times

+ Using Tables to Solve Distance Problems

When Judy gets a new truck route and isn't quite sure about the distance, she often asks her co-workers questions.

A: Read the questions Judy asked her co-workers, and use the table to answer them.

Distances between some cities in Washington State

	Aberdeen	Ellensburg	Olympia	Seattle	Spokane	Yakima
Aberdeen	0	198	50	83	368	280
Ellensburg	198	0	149	110	174	36
Olympia	50	149	0	60	320	161
Seattle	83	110	60	0	280	142
Spokane	368	174	320	280	0	196
Yakima	280	36	161	142	196	0

+ Practice

1) How much further is it from Aberdeen to Ellensburg than it is from Aberdeen to Olympia?

148 miles

2) How much further is it from Olympia to Seattle than it is from Olympia to Aberdeen?

10 miles

3) When I traveled from Spokane to Ellensburg and then from Ellensburg to Seattle, how many miles did I travel all together?

284 miles

4) When I traveled from Yakima to Ellensburg and then from Ellensburg to Spokane, how many miles did I travel in all?

210 miles

+ Practice

5) If I travel from Aberdeen to Ellensburg and then from Ellensburg to Spokane, how many miles combined do I travel?

372 miles

6) If I travel from Seattle to Aberdeen and then from Aberdeen to Olympia, how miles will I travel all together?

133 miles

7) I was going to drive from Spokane to Olympia, but I had to stop driving 100 miles from Spokane.   How many miles do I have left to drive?

220 miles

8) I was planning to drive from Seattle to Yakima, but my truck broke down 40 miles outside of Seattle.   How many miles am I from Yakima?

102 miles

+

Task Three: Keeping Track of Miles Driven

Like all truckers, Judy has to keep track of the number of miles she drives and report them to her company in a logbook.

Look at the following table. Notice how the first numbers under "miles driven" contain decimals such as 589.5. The 589.5 means that Judy drove exactly 589.5 miles, which is between 589 miles and 590 miles. Next, look at the numbers in the "miles driven, rounded to the nearest mile" column. They are whole numbers, such as 590. Judy gets the whole numbers by rounding the decimals in the "miles driven" column. Her supervisor wants her to see the number of miles she drives in whole numbers, not decimals.
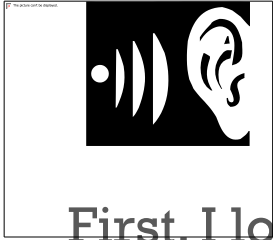
Log Book

Date	Miles driven	Miles driven, rounded to the nearest mile
4/21	589.5	590
4/22	400.5	401
4/23	360.9	361
4/24	130.2	130
4/25	280.48	280(.48 rounds down because it is less than half way between 280 and 281)
4/26	300.45	300 (same as above)
	Total Miles Driven (rounded):	**2,062**

Steps

**Listen to Judy explain how she rounds numbers and read along.**

First, I look at the number(s) after the decimal point.

If the digit (number) after the decimal point is 5 or above, I round up by increasing the number on the left of the decimal point by one, and I leave off the decimal point and all numbers to the right of the decimal point.

If the digit after the decimal point is 4 or less, I round down by keeping the whole number the same, and I leave off the decimal point and all numbers to the right of the decimal point. Continue on the next screen.

+ Steps
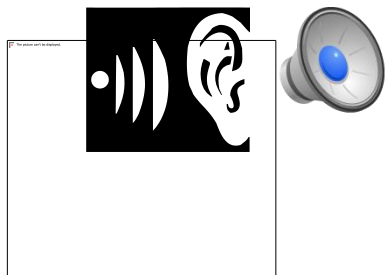
Note: One more thing---When you round to the whole number, you look only at the digit right after the decimal point.

To see what I mean, look at these two examples of rounding to the whole number when there are two numbers after the decimal point:

1) 7.45----7   (We only look to the 4 to decide whether we round up or round down. See the note above - 7.45 is less than half way between 7 and 8. We don't look at the 5.)

2) 9.49------9   (We only look to the 4 to decide whether we round up or round down. We don't look at the 9 that comes after the 4.)

+ Practice

A: Round these decimals to the whole number.

1) 5.46 | 5 |

2) 8.29 | 8 |

3) 9.51 | 10 |

4) 7.34 | 7 |

5) 8.47 | 8 |

6) 9.49 | 9 |

7) 29.93 | 30 |

8) 101.09 | 101 |

+ Practice

B: Look at the table and round decimal to the nearest whole number.

Driving Log

Date	Miles driven	Rounded miles driven
4/21	609.9	610
4/22	600.4	600
4/23	369.9	370
4/24	449.4	449
4/25	259.49	259
Total Miles Driven:		2,288

# **Task Three:** Converting Distances - Kilometers to Miles

You will likely see travel signs in kilometers when you drive outside the U.S. Judy sometimes has to drive up into Canada, and at first it confused her. For example, when a sign said she had 100 kilometers left to drive before reaching her destination, she didn't know how many miles that meant. She had to learn how to **convert** (change) kilometers to miles, because Judy is more familiar with measuring distances in miles.

Here is the formula to convert kilometers to miles.

1 kilometer= 0.62miles

(This means that, when you drive or walk 1 kilometer, you are driving or walking 0.62 miles.)

Note: You'll often see a zero before a decimal, like in the case of 0.62. That just means that the number is between 0 and 1.
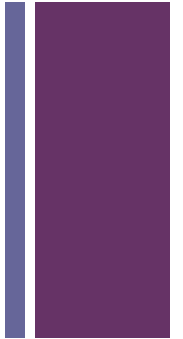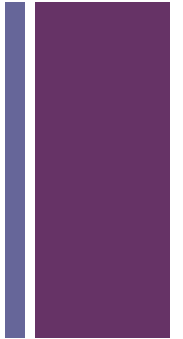
+ Think About It!

If you drive two kilometers, how many miles do you drive?

1.24 miles

Converting Kilometers to Miles: Multiplying Decimals

You can figure out how many miles you will be driving when the number of kilometers is known. Because 1 kilometer = 0.62 miles, to convert kilometers to miles, you multiply the number of kilometers by 0.62.

For example, when Judy was in Canada, she saw that she had to drive 350 more kilometers to get to the U.S. To figure out how many miles that was, here is the equation she set up.

350 kilometers x 0.62 = the number of miles to drive

Steps

**Listen to Judy as she explains to you how to multiply decimals and read along too.**

Steps to Multiplying Decimals:

1. To multiply decimals, ignore the decimal point, multiply as you normally do, and get an answer.

2. At the end of your answer, imagine a decimal point (.) because you will be moving that decimal point to the left.

3. Move the decimal point to the left by however many digits are after the decimal point(s) that appear in your equation. Continue on next screen.
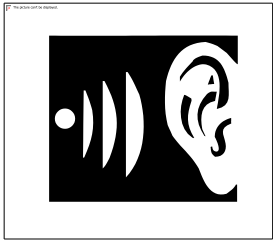
+ Examples

I want to change kilometers to miles. Look at these two examples:

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    30  (kilometers)              →                    30
x  0.62  (miles per kilometer)                       x 62
                                                       60
                                                   +1,800
                                                    1,860
```

Be careful, **this is not your answer.** You still need to insert a decimal point. Continue on next screen.

+ Examples

Recall the equation 30 x 0.62, there are two digits after the decimal point, the 6 and the 2. Look at your answer: 1,860. Imagine that there is a decimal point at the end of 1,860. Now, move that decimal point two places to the left.

1,860.

18.60

Your final answer is 18.60 (or just 18.6). Therefore, when I drive 30 kilometers, I am driving 18.6 miles.

+ Stop!

Note: When there is a zero at the end of a decimal, you can omit it. For example, in the case of 18.60, you can write just 18.6.

+ Example

Here is another example. In this case, when Judy's Canadian friend was driving in the U.S., the odometer in his truck showed that he had driven 350 kilometers. He wanted to figure out how many miles that was. Here is his arithmetic.

$$
\begin{array}{r}
350 \\
\text{x} \quad 0.62 \\
\hline
\end{array}
\qquad \longrightarrow \qquad
\begin{array}{r}
350 \\
\text{x } 62 \\
\hline
700 \\
+ \ 21{,}000 \\
\hline
21{,}700
\end{array}
$$

Then, he rewrote 21,700 with the decimal point in the correct place, and his final answer was 217 miles.

Think About It!

In the above exercise we can say that _____miles = _____ kilometers.

217 miles = 350 kilometers

+ Stop!

Note: If you are multiplying two decimals, multiply them like two numbers that don't have decimal points. Then you count how many digits there are after each both decimal points. Then you get the answer by inserting a decimal point that number of places from the end of the original product counting from the right.

For example: in the product 1.45 x 6.2 there are a total of three digits after the decimal points (the 4, the 5 and the 2). Therefore, in your final answer your decimal point will be three digits from the right.

1.45 x 6.2 ➜ 145 x 62 = 8990.
(Move the decimal point three times to the left.)

8.990   (You can drop the zero at the end, so your answer is 8.99)

+ Practice

A: Multiply decimals with whole numbers, or decimals with decimals. (These exercises won't relate to converting kilometers to miles.)

1) 1.5 x 4=   a. 60   b. 0.6   c. 6 | c. 6 |

2) 7.5 x 0.8 =   a. 600   b. 60   c. 6 | c. 6 |

3) 2.8 x 5 =   a. 14   b. 1.4   c. 140 | a. 14 |

4) 12.25 x 0.8 = a. 9.8   b. 0.98 c. 98 | a. 9.8 |

5) 15.55 x 5 =   a. 77.75 b. 777.5 c. 7.775 | a.77.75 |

6) 3.5 x 2.5 =   a. 0.875 b. 8.75 c. 87.5 | b. 8.75 |

7) 5.4 x 3.2 =   a. 172.8 b. 1.728 c. 17.28 | c. 17.28 |

8) 10 x 2.25=   a. 22.5 b. 0.225 c. 2.25 | a. 22.5 |

For more practice multiplying decimals click the numbers below

123

+

Practice

B: Read and solve the distance word problems.

1) Judy drove 250 kilometers. How many miles did she drive?

155

2) When Judy drives 10 kilometers, how many miles does she drive?

6.2

3) You walk 3 kilometers for exercise everyday. How many miles is that?

1.86

4) When Judy drives 2.5 kilometers, how many miles does she drive?

1.55

5) If a person has to drive 20 kilometers to the hospital, how many miles is that?

12.4

6) When Judy drives 5.5 kilometers, how many miles does she drive?

3.41

+ Task Four: Converting Distances-Miles to Kilometers

In the U.S., when people drive, they think about how many miles they have left to travel or how miles per hour they are going. However, most of the rest of the world uses kilometers instead of miles. One of Judy's friends is a Canadian trucker. When he drove in the U.S., he had to learn how to convert (change) miles into kilometers. When he saw road signs that said things such as "Seattle 90 miles", he converted 90 miles into kilometers so that he could understand the distance better in his own mind. The formula he used is:

1 mile=1.61 kilometer

That means when you drive or walk 1 mile, you are driving or walking 1.61 kilometers.

+ Converting Distances

When Judy's Canadian friend was in the U.S., the road sign showed he had 100 miles more to drive, he set up the following equation so that he could understand the distance in kilometers:

100 miles x 1.61 kilometers per mile = number of kilometers left to go.

How many kilometers does Judy's friend have left to go?

161 kilometers

+ Practice

A: Set up and solve the following problems.

1) Judy drove 250 miles. How many kilometers did she drive?

402.5

2) You walk two miles for exercise everyday. How many kilometers is that?

3.22

3) If a person has to drive eight miles to the hospital, how many kilometers is that?

12.88

4) If you are driving and you see a sign that says that the next rest area is in 15 miles, how many kilometers is that?

24.15

5) If Judy drove 25.2 miles, how many kilometers did she drive?

40.572

+

Practice

B: Fill Out the Table

1 kilometer =	? miles
1 mile =	? kilometers

1 kilometer =	0.62 miles
1 mile =	1.61 kilometers

+ Congratulations!

You have completed the first part of this math module. Continue on to part 2.