

## TDL Math:

# Truck Driving Calculations



**Industry:** Transportation, Distribution, & Logistics (TDL)

**Content Area:** Mathematics

**Core Topics:** Using data tables, proportions, and formulas, solving multi-step word problems

**Objective:** Students will be able to use a mileage table, proportions, and the distance formula in order to solve truck driving and delivery problems.

**Materials included:**

Instructor's notes  
Scenario: Truck driver  
Student worksheets  
Quiz  
Answer Keys

**Industry Overview:**

According to the U.S. Department of Labor, employment in the heavy and tractor trailer truck driving industry is expected to grow approximately 11% between 2012 and 2022.\* The transportation, distribution, and logistics (TDL) industry is comprised of a vast array of jobs, ranging from dock workers and delivery drivers to warehouse managers and logisticians. Mathematics and literacy skills are essential for students who plan to pursue a career in this field. TDL employees, including truck drivers, must have the ability to perform accurate mathematical calculations in their daily work.

\* Source: Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2014-15 Edition*, Heavy and Tractor-trailer Truck Drivers, on the Internet at <http://www.bls.gov/ooh/transportation-and-material-moving/heavy-and-tractor-trailer-truck-drivers.htm>.

## Instructor's notes:

- The purpose of this module is to help students develop and apply math skills in a TDL workplace setting. The learning activities were designed to be incorporated throughout multiple instructional periods as math concepts are taught in a TDL context.
- After completing the module, students should be able to:
  - Use a mileage table to calculate mileage for delivery routes
  - Use proportions to compute driving time and driving rates
  - Use the distance formula to solve truck driving problems
- **Setting the stage:** Provide students with background information about the typical responsibilities of a truck driver. You may want to have students use the occupational outlook handbook, O\*NET and/or other relevant websites to research the job responsibilities, educational/training requirements, salary, etc. for truck driving positions that interest them. In addition, you could have students view videos depicting the typical work environment of a truck driver. (See links below)

Bureau of Labor Statistics – Occupational Outlook Handbook:

<http://www.bls.gov/ooh/>

Occupational Information Network (O\*NET)

<http://www.onetonline.org/link/summary/53-3032.00>

Truck Diving video:

<https://www.youtube.com/watch?v=0DA-fw7qP7o>

- **For Activity 1:** Explain how to use a mileage chart to calculate distance for a delivery route. Work the scenario example with the class. Have students work the practice problems independently. Provide additional practice as needed. Have students complete **Worksheet 1**.
- **For Activity 2:** Explain how to use proportions to calculate driving time and mph. Work the scenario examples with the class. Have students complete the practice problems independently. Provide additional practice as needed. Have students complete **Worksheet 2**.
- **For Activity 3:** Explain how to use the distance formula to compute distance, rate, and time. Work the scenario examples with the class. Have students complete the practice problems independently. Provide additional practice as needed. Have students complete **Worksheet 3**.
- **Assessment: Quiz – Trucking Driving Calculations**

## Workplace Scenario:

You are a professional truck driver for *BSP Warehouse & Distribution, Inc.* Your company provides storage and shipping services for several vendors throughout the Midwest. Although you occasionally make long distance deliveries, you usually drive routes within the state of Illinois. As a truck driver, you use a variety of math skills in order to accurately complete trucking logs and reports for your employer.

### Activity 1: Using a mileage table

One of your responsibilities as a truck driver is to complete route planning forms for your employer. To do this, you must calculate the driving distance of your deliveries each day. You often use a mileage table, such as the one shown below, to help you estimate the mileage of your delivery routes.

To use the mileage table, find the city you are starting from in the top row and place your finger on the name of the city. Next, find the city where you are traveling to on the left side of the table. Move your finger down the column of your starting city until it is even with your destination city on the left. The box where the two cities intersect is the number of miles between the two cities.

	Carbondale	Edwardsville	Effingham	Marion	Mt. Vernon	Salem
Carbondale	0	105	123	17	62	81
Edwardsville	105	0	86	122	82	70
Effingham	123	86	0	110	69	46
Marion	17	122	110	0	45	67
Mt. Vernon	62	82	69	45	0	23
Salem	81	70	46	67	23	0

**Example:** Suppose you are driving from Marion to Effingham. Find Marion in the top row and place your finger there. Next, find Effingham on the left side of the table. Move your finger down the Marion column until it is even with Effingham. The box reads 110. This means Marion and Effingham are approximately 110 miles apart.

### **Practice:**

If you drive from the distribution center in Edwardsville to Mt. Vernon, approximately how many miles will you travel?

You leave Mt. Vernon and drive to your next stop in Carbondale. How many miles are there between Mt. Vernon and Carbondale?

From Carbondale, you drive back to the distribution center in Edwardsville. How many miles is this?

How many total miles did you drive on your route today?

You are making deliveries in southern Illinois today. Use the mileage table to answer the following questions about your route.

	Carbondale	Edwardsville	Effingham	Marion	Mt. Vernon	Salem
Carbondale	0	105	123	17	62	81
Edwardsville	105	0	86	122	82	70
Effingham	123	86	0	110	69	46
Marion	17	122	110	0	45	67
Mt. Vernon	62	82	69	45	0	23
Salem	81	70	46	67	23	0

1. You leave the distribution center in Edwardsville and drive to your first stop in Effingham. How many miles are between Edwardsville and Effingham?
2. From Effingham, you drive to your next stop in Salem. How many miles is this?
3. You leave Salem and drive to Mt. Vernon. How far apart are Salem and Mt. Vernon?
4. Your next stop is Marion. How many miles are there between Mt. Vernon and Marion?
5. Add up the total miles you have driven since leaving Edwardsville this morning?
6. If you drove directly from Edwardsville to Marion, how many miles would that be?
7. You leave Marion and drive to your last stop in Carbondale. How many miles is this?
8. After delivering your last load in Carbondale, you drive back to the distribution center in Edwardsville. How many miles apart are Carbondale and Edwardsville?
9. How many total miles did you drive on your route today?
10. If you drive this route twice a week, how many miles would you drive?

## Activity 2: Using proportions to calculate driving time and rates

Another trip planning task you have as a truck driver is to compute the drive time for each leg of your delivery route. One method you use to calculate drive time and driving rates is a proportion. A proportion is two equal ratios. A ratio is a fraction that makes a comparison between two numbers.

**Example 1:** Suppose you are driving from Edwardsville to Mt. Vernon, a distance of 82 miles. If you average 60 miles per hour (mph), approximately how long will the trip take you?

Set up a proportion:  $\frac{60 \text{ miles}}{1 \text{ hr}} = \frac{82 \text{ miles}}{x \text{ hrs}}$  Cross multiply:  $60x = 82$

Divide both sides of the equation by 60 to solve for x:  $\frac{60x}{60} = \frac{82}{60}$   $x = 1.366 \rightarrow \underline{1.37 \text{ hours}}$

If you leave Edwardsville at 7:30 a.m., what time will you arrive in Mt. Vernon?

Convert the .37 hr to minutes by multiplying by 60:  $.37(60) = 22$  minutes; so trip time = 1 hr 22 min  
Add your trip time to your start time: 7:30 a.m. + 1 hr 22 min = 8:52 a.m.

**Practice 1:** At 9:45 a.m., you leave your stop in Mt. Vernon and drive to Marion, a distance of 45 miles. If you drive 55 mph, approximately how long will it take you to get from Mt. Vernon to Marion? What time will you arrive in Marion?

**Example 2:** Your 82 mile trip from Edwardsville to Mt. Vernon took less time than you estimated, a total of 1.2 hours. What was your mileage rate (mph) for this trip? Round your answer to the nearest whole number, if necessary.

Set up a proportion:  $\frac{82 \text{ miles}}{1.2 \text{ hr}} = \frac{x \text{ miles}}{1 \text{ hr}}$   $\rightarrow$  Cross multiply:  $1.2x = 82$

Divide both sides of the equation by 1.2 to solve for x:  $\frac{1.2x}{1.2} = \frac{82}{1.2}$   $\rightarrow 82 \div 1.2 = 68.3 \rightarrow \underline{68 \text{ mph}}$

**Practice 2:** Due to road construction, the 45 mile trip from Mt. Vernon to Marion took 1.1 hours. What was your average mph for this trip?

Use the mileage table and proportions to compute the times and rates for your delivery route.

	Carbondale	Edwardsville	Effingham	Marion	Mt. Vernon	Salem
Carbondale	0	105	123	17	62	81
Edwardsville	105	0	86	122	82	70
Effingham	123	86	0	110	69	46
Marion	17	122	110	0	45	67
Mt. Vernon	62	82	69	45	0	23
Salem	81	70	46	67	23	0

1. You leave the distribution center in Edwardsville at 7:30 a.m. and drive to your first stop in Effingham. If you average 60 mph, how long will the trip take you? Approximately what time do you expect to arrive in Effingham?
2. After unloading, you leave Effingham at 9:45 a.m. and arrive at your next stop in Mt. Vernon at 11 a.m. This leg of your route took 1 hour and 15 minutes. As a decimal, this is 1.25 hours. What was your average mph between Effingham and Mt. Vernon?
3. You leave Mt. Vernon at 11:30 a.m. and drive to your next stop in Carbondale. If you average 62 mph, how long will it take you to drive this leg of your route? Approximately what time do you expect to arrive in Carbondale?
4. It takes 45 minutes for the dock workers to unload your truck in Carbondale and then you take a 30 minute lunch break. What time will you leave Carbondale?
5. How many total miles have you driven since leaving Edwardsville this morning?
6. You leave Carbondale to return to the distribution center in Edwardsville. A detour adds 5 miles to your trip. How many miles will you drive on this leg of your route?
7. If you average 55 mph on your trip from Carbondale to Edwardsville, how long will it take you to reach your destination? Approximately what time will you arrive in Edwardsville?
8. If it takes you 30 minutes to check in and complete your daily reports, what time will you clock out at the end of your shift today?

### **Activity 3: Using the distance formula**

Another method you use to calculate distance, rate, and time for deliveries is to use the distance formula.

The distance formula is: **distance = rate x time**

#### **Example 1:**

If you average 60 mph, how long will it take you to drive 75 miles from the distribution center to your first delivery stop? If you leave at 7:30 a.m., what time will you arrive at your destination? Follow the steps to calculate your drive time and arrival time.

Step 1: Write the formula:  $d = rt$

Step 2: Plug in the known values. In this problem, you are given the distance and the rate (mph)  
 $75 = 60t$

Step 3: Solve for the unknown variable; in this case, it is the drive time (t), so you will divide both sides of the equation by 60 to solve for t:  $\frac{75}{60} = \frac{60t}{60} \rightarrow t = 75 \div 60 \rightarrow \text{drive time} = \underline{1.25 \text{ hours}}$

Step 4: Convert the decimal hours to minutes:  $.25 \times 60 = 15$ , so drive time is: 1 hr 15 min  
Arrival time: 7:30 a.m. + 1 hr 15 min = 8:45 a.m.

#### **Practice 1:**

If you leave a stop at 9:30 a.m. and drive 132 miles at a rate of 55 mph, what is your drive time for this trip? What time will you arrive at your destination?

#### **Example 2:**

If you drive 195 miles for 3 hours, what is your average rate of speed (mph) for this trip?

Step 1: Write the distance formula:  $d = rt$

Step 2: Plug in the known values:  $195 = 3r$

Step 3: Solve for r:  $\frac{195}{3} = \frac{3r}{3} \rightarrow r = 195 \div 3 \rightarrow \text{driving rate} = \underline{65 \text{ mph}}$

#### **Practice 2:**

If you drive 220 miles for 3.5 hours, what is your average rate of speed (mph) for this trip? Round your answer to the nearest whole number, if necessary.

**Use the distance formula:  $d = rt$  to calculate the distance, rates, and drive times for your routes this week.**

1. On Monday, you left the distribution center in Edwardsville at 8:00 a.m. and drove 160 miles to your delivery stop in Terre Haute, Indiana, arriving at 10:30 a.m. What was your average rate of speed for this trip?
2. If you leave Terre Haute, Indiana and drive for 1.5 hours at a rate of 66 mph to your next stop in Vandalia, Illinois. What is the distance you will drive on this leg of your route?
3. On Tuesday, you leave the distribution center in Edwardsville at 7:30 a.m. and drive 137 miles to your first stop in Quincy, Illinois. If you drive at a rate of 55 mph, how long will it take you to get there? Round to the nearest tenths place, if necessary.
4. Approximately what time will you arrive in Quincy?
5. If you leave Quincy at 10:45 a.m. and drive for 1.3 hours at a rate of 64 mph to your next stop in Jacksonville, Illinois. What is the distance you will drive on this leg of your route?
6. Approximately what time will you arrive in Jacksonville?
7. After delivering your load and taking a lunch break, you leave Jacksonville at 1:00 p.m. and drive 75 miles to the distribution center, arriving at 2:30 p.m. What was your average rate of speed for this trip?
8. On Wednesday, you leave the distribution center in Edwardsville at 8 a.m. and drive 105 miles to your first stop in Carbondale. If you drive at a rate of 60 mph, how long will it take you to get there? Write your answer in hours and minutes.
9. You leave your stop in Carbondale and drive to Metropolis. If you drive for 1.25 hours at a rate of 55 mph, how many miles did you drive? Round to the nearest tenths place, if necessary.
10. From Metropolis, you drive 175 miles back to the distribution center in Edwardsville. If the trip takes you 2 hours and 45 minutes, what was your rate of speed for this trip? Round to the nearest whole number, if necessary.

**Quiz: Truck driving calculations**

Name: \_\_\_\_\_

You will be making deliveries in central Illinois today. Use the mileage table and proportions to help you answer the following questions about your delivery route.

	Bloomington	Champaign	Decatur	Edwardsville	Peoria	Springfield
Bloomington	0	51	46	140	38	67
Champaign	51	0	49	158	91	86
Decatur	46	49	0	112	86	40
Edwardsville	140	158	112	0	146	75
Peoria	38	91	86	146	0	74
Springfield	67	86	40	75	74	0

1. You leave the distribution center in Edwardsville at 7:30 a.m. and drive to your first stop in Springfield. If you average 62 mph, how long will the trip take you? Approximately what time do you expect to arrive in Springfield?
2. After unloading, you leave Springfield at 9:15 a.m. and arrive at your next stop in Decatur at 10:00 a.m. This leg of your route took 45 minutes. As a decimal, this is .75 hours. What was your average mph between Springfield and Decatur? Round to the nearest whole number.
3. You leave Decatur at 10:45 a.m. and drive to your next stop in Champaign. If you average 60 mph, how long will it take you to drive this leg of your route? Approximately what time do you expect to arrive in Champaign?

**Use the mileage table and the distance formula to answer the following questions.**

4. After making your delivery and taking your lunch break, you leave Champaign at 12:30 p.m. and drive to Bloomington. If you drive 65 mph, how long will it take you to get there?
5. You drive for 30 minutes from Bloomington to Peoria. What was your average mph?
6. You leave Peoria at 2:00 p.m. to drive back to the distribution center in Edwardsville. If you average 65 mph, how long will the trip take you? Round to the hundredths place.
7. Approximately what time will you arrive in Edwardsville?
8. How many total miles did you drive on your route today?

## Practice Problems

## Answer Key

### Activity 1

Practice: Edwardsville to Mt. Vernon: 82 miles

Mt. Vernon to Carbondale: 62 miles

Carbondale to Edwardsville: 105 miles

Total route miles:  $82 + 62 + 105 = \underline{249 \text{ miles}}$

### Activity 2

Practice 1:

$$\frac{55 \text{ miles}}{1 \text{ hr}} = \frac{45 \text{ miles}}{x \text{ hr}} \rightarrow 55x = 45 \rightarrow \frac{55x}{55} = \frac{45}{55} \rightarrow x = 45 \div 55 = .82 \text{ hr} \rightarrow .82 \times 60 = \underline{49 \text{ minutes}}$$

Arrival time: 9:45 a.m. + 49 min = 10:34 a.m.

Practice 2:

$$\frac{45 \text{ miles}}{1.1 \text{ hr}} = \frac{x \text{ miles}}{1 \text{ hr}} \rightarrow 1.1x = 45 \rightarrow \frac{1.1x}{1.1} = \frac{45}{1.1} \rightarrow x = 45 \div 1.1 = 40.9 \rightarrow \underline{41 \text{ mph}}$$

### Activity 3

Practice 1:

$$\text{Drive time: } d = rt \rightarrow 132 = 55t \quad \frac{132}{55} = \frac{55t}{55} \rightarrow t = 132 \div 55 = \underline{2.4 \text{ hours}}$$

Arrival time:  $.4(60) = 24 \text{ minutes} \rightarrow 9:30 \text{ a.m.} + 2 \text{ hours } 24 \text{ minutes} = \underline{11:54 \text{ a.m.}}$

Practice 2:

$$d = rt \rightarrow 220 = 3.5r \rightarrow \frac{220}{3.5} = \frac{3.5r}{3.5} \rightarrow 220 \div 3.5 = 62.8 \rightarrow \underline{63 \text{ mph}}$$

You are making deliveries in southern Illinois today. Use the mileage table to answer the following questions about your route.

	Carbondale	Edwardsville	Effingham	Marion	Mt. Vernon	Salem
Carbondale	0	105	123	17	62	81
Edwardsville	105	0	86	122	82	70
Effingham	123	86	0	110	69	46
Marion	17	122	110	0	45	67
Mt. Vernon	62	82	69	45	0	23
Salem	81	70	46	67	23	0

- You leave the distribution center in Edwardsville and drive to your first stop in Effingham. How many miles are between Edwardsville and Effingham? 86 miles
- From Effingham, you drive to your next stop in Salem. How many miles is this? 46 miles
- You leave Salem and drive to Mt. Vernon. How far apart are Salem and Mt. Vernon? 23 miles
- Your next stop is Marion. How many miles are there between Mt. Vernon and Marion?  
45 miles
- Add up the total miles you have driven since leaving Edwardsville this morning?  
 $86 + 46 + 23 + 45 = \underline{200 \text{ miles}}$
- If you drove directly from Edwardsville to Marion, how many miles would that be? 122 miles
- You leave Marion and drive to your last stop in Carbondale. How many miles is this?  
17 miles
- After delivering your last load in Carbondale, you drive back to the distribution center in Edwardsville. How many miles apart are Carbondale and Edwardsville? 105 miles
- How many total miles did you drive on your route today?  
 $86 + 46 + 23 + 45 + 17 + 105 = \underline{322 \text{ miles}}$
- If you drive this route twice a week, how many miles would you drive?  
 $322 \times 2 = \underline{644 \text{ miles}}$

Use the mileage table and proportions to compute the time and rates for your route.

1. You leave the distribution center in Edwardsville at 7:30 a.m. and drive to your first stop in Effingham. If you average 60 mph, how long will the trip take you? Approximately what time do you expect to arrive in Effingham?

$$\text{Drive time: } \frac{60 \text{ miles}}{1 \text{ hr}} = \frac{86 \text{ miles}}{x \text{ hr}} \rightarrow 60x = 86 \rightarrow \frac{60x}{60} = \frac{86}{60} \rightarrow x = 86 \div 60 = \underline{1.43 \text{ hours}}$$

$$\text{Arrival time: } .43(60) = 25.8 \rightarrow 26 \text{ minutes} \rightarrow 7:30 \text{ a.m.} + 1 \text{ hour } 26 \text{ minutes} = \underline{8:56 \text{ a.m.}}$$

2. After unloading, you leave Effingham at 9:45 a.m. and arrive at your next stop in Mt. Vernon at 11 a.m. This leg of your route took 1 hour and 15 minutes. As a decimal, this is 1.25 hours. What was your average mph between Effingham and Mt. Vernon?

$$\frac{69 \text{ miles}}{1.25 \text{ hr}} = \frac{x \text{ miles}}{1 \text{ hr}} \rightarrow 1.25x = 69 \rightarrow \frac{1.25x}{1.25} = \frac{69}{1.25} \rightarrow 69 \div 1.25 = 55.2 \rightarrow \underline{55 \text{ mph}}$$

3. You leave Mt. Vernon at 11:30 a.m. and drive to your next stop in Carbondale. If you average 62 mph, how long will it take you to drive this leg of your route? Approximately what time do you expect to arrive in Carbondale?

$$\text{Drive time: } \frac{62 \text{ miles}}{1 \text{ hr}} = \frac{62 \text{ miles}}{x \text{ hr}} \rightarrow 62x = 62 \rightarrow \frac{62x}{62} = \frac{62}{62} = 62 \div 62 = \underline{1 \text{ hour}}$$

$$\text{Arrival time: } 11:30 \text{ a.m.} + 1 \text{ hour} = \underline{12:30 \text{ p.m.}}$$

4. It takes 45 minutes for the dock workers to unload your truck in Carbondale and then you take a 30 minute lunch break. What time will you depart Carbondale?

$$\text{Departure time: } 12:30 \text{ p.m.} + 45 \text{ min. unload time} + 30 \text{ min. lunch} = \underline{1:45 \text{ p.m.}}$$

5. How many total miles have you driven since leaving Edwardsville this morning?

$$86 + 69 + 62 = \underline{217 \text{ miles}}$$

6. You leave Carbondale to return to the distribution center in Edwardsville. A detour adds 5 miles to your trip. How many miles will you drive on this leg of your route?

$$105 + 5 = \underline{110 \text{ miles}}$$

7. If you average 55 mph on your trip from Carbondale to Edwardsville, how long will it take you to reach your destination? Approximately what time will you arrive in Edwardsville?

$$\text{Drive time: } \frac{55 \text{ miles}}{1 \text{ hr}} = \frac{110 \text{ miles}}{x \text{ hr}} \rightarrow 55x = 110 \rightarrow \frac{55x}{55} = \frac{110}{55} \rightarrow 110 \div 55 = \underline{2 \text{ hours}}$$

$$\text{Arrival time: } 1:45 \text{ p.m.} + 2 \text{ hours} = \underline{3:45 \text{ p.m.}}$$

8. If it takes you 30 minutes to check in and complete your daily reports, what time will you clock out at the end of your shift today?

$$3:45 \text{ p.m.} + 30 \text{ min.} = \underline{4:15 \text{ p.m.}}$$

Use the distance formula:  $d = rt$  to calculate the distance, rates, and drive times for your routes this week.

- On Monday, you left the distribution center in Edwardsville at 8:00 a.m. and drove 160 miles to your delivery stop in Terre Haute, Indiana, arriving at 10:30 a.m. What was your average rate of speed for this trip?  $d = rt \rightarrow 160 = 2.5r \rightarrow 160 \div 2.5 = \underline{64 \text{ mph}}$
- If you leave Terre Haute, Indiana and drive for 1.5 hours at a rate of 66 mph to your next stop in Vandalia, Illinois. What is the distance you will drive on this leg of your route?  
 $d = rt \rightarrow d = 66(1.5) = \underline{99 \text{ miles}}$
- On Tuesday, you leave the distribution center in Edwardsville at 7:30 a.m. and drive 137 miles to your first stop in Quincy, Illinois. If you drive at a rate of 55 mph, how long will it take you to get there? Round to the nearest tenths place, if necessary.  
 $d = rt \rightarrow 137 = 55t \rightarrow 137 \div 55 = 2.49 \rightarrow \underline{2.5 \text{ hours}}$
- Approximately what time will you arrive in Quincy?  
 $2.5 \text{ hours} \rightarrow \text{Convert } .5 \text{ hr to minutes: } .5 \times 60 = 30 \text{ min.} \rightarrow 7:30 + 2 \text{ hr } 30 \text{ min.} = \underline{10:00 \text{ a.m.}}$
- If you leave Quincy at 10:45 a.m. and drive for 1.3 hours at a rate of 64 mph to your next stop in Jacksonville, Illinois. What is the distance you will drive on this leg of your route?  
 $d = rt \rightarrow d = 64(1.3) = \underline{83.2 \text{ miles}}$
- Approximately what time will you arrive in Jacksonville?  
 $1.3 \text{ hours} \rightarrow \text{Convert } .3 \text{ hr to minutes: } .3 \times 60 = 18 \text{ min.} \rightarrow 10:45 + 1 \text{ hour } 18 \text{ min.} = \underline{12:03 \text{ p.m.}}$
- After delivering your load and taking a lunch break, you leave Jacksonville at 1:00 p.m. and drive 75 miles to the distribution center, arriving at 2:30 p.m. What was your average rate of speed for this trip?  
 $1 \text{ p.m. to } 2:30 \text{ p.m.} = 1.5 \text{ hours} \rightarrow d = rt \rightarrow 75 = 1.5r \rightarrow 75 \div 1.5 = \underline{50 \text{ mph}}$
- On Wednesday, you leave the distribution center in Edwardsville at 8 a.m. and drive 105 miles to your first stop in Carbondale. If you drive at a rate of 60 mph, how long will it take you to get there? Write your answer in hours and minutes.  
 $d = rt \rightarrow 105 = 60t \rightarrow 105 \div 60 = 1.75 \text{ hours} \rightarrow .75(60) = 45 \rightarrow \underline{1 \text{ hour } 45 \text{ min.}}$
- You leave your stop in Carbondale and drive to Metropolis. If you drive for 1.25 hours at a rate of 55 mph, how many miles did you drive? Round to the nearest tenths place, if necessary.  
 $d = rt \rightarrow d = 55(1.25) = 68.75 \rightarrow \underline{68.8 \text{ miles}}$
- From Metropolis, you drive 175 miles back to the distribution center in Edwardsville. If the trip takes you 2 hours and 45 minutes, what was your rate of speed for this trip? Round to the nearest whole number, if necessary.  
 $2 \text{ hours } 45 \text{ min.} = 2.75 \text{ hours} \rightarrow d = rt \rightarrow 175 = 2.75r \rightarrow 175 \div 2.75 = 63.6 \rightarrow \underline{64 \text{ mph}}$

## Quiz: Truck driving calculations

## Answer Key

You will be making deliveries in central Illinois today. Use the mileage table and proportions to help you answer the following questions about your route.

1. You leave the distribution center in Edwardsville at 7:30 a.m. and drive to your first stop in Springfield. If you average 62 mph, how long will the trip take you? Approximately what time do you expect to arrive in Springfield? Drive time:  $\frac{62 \text{ miles}}{1 \text{ hr}} = \frac{75 \text{ miles}}{x \text{ hr}} \rightarrow 62x = 75 \rightarrow \frac{62x}{62} = \frac{75}{62}$

$$75 \div 62 = \underline{1.21 \text{ hr}} \quad \text{Arrival time: } .21(60) = 12.6 \rightarrow 13 \text{ min.} \rightarrow 7:30 + 1 \text{ hr } 13 \text{ min} = \underline{8:43 \text{ a.m.}}$$

2. After unloading, you leave Springfield at 9:15 a.m. and arrive at your next stop in Decatur at 10:00 a.m. This leg of your route took 45 minutes. As a decimal, this is .75 hours. What was your average mph between Springfield and Decatur? Round to the nearest whole number.

$$\frac{40 \text{ miles}}{.75 \text{ hr}} = \frac{x \text{ miles}}{1 \text{ hr}} \rightarrow .75x = 40 \rightarrow \frac{.75x}{.75} = \frac{40}{.75} \rightarrow 53.3 \rightarrow \underline{53 \text{ mph}}$$

3. You leave Decatur at 10:45 a.m. and drive to your next stop in Champaign. If you average 60 mph, how long will it take you (in minutes) to drive this leg of your route? Approximately what time do you expect to arrive in Champaign? Drive time:  $\frac{60 \text{ miles}}{1 \text{ hr}} = \frac{49 \text{ miles}}{x \text{ hr}} \rightarrow 60x = 49 \rightarrow$

$$\frac{60x}{60} = \frac{49}{60} \rightarrow 49 \div 60 = .816 \rightarrow .82 \text{ hour} \rightarrow .82(60) = 49.2 \rightarrow \underline{49 \text{ minutes}}$$

$$\text{Arrival time: } 10:45 \text{ a.m.} + 49 \text{ minutes} = \underline{11:34 \text{ a.m.}}$$

Use the mileage table and the distance formula to answer the following questions.

4. After making your delivery and taking your lunch break, you leave Champaign at 12:30 p.m. and drive to Bloomington. If you drive 65 mph, how long will it take you (in minutes) to get there?  $d = rt \rightarrow 51 = 65t \rightarrow 51 \div 65 = .78 \rightarrow .78(60) = 46.8 \rightarrow \underline{47 \text{ minutes}}$

5. You drive for 30 minutes from Bloomington to Peoria. What was your average mph?

$$30 \text{ min} = .5 \text{ hr} \rightarrow d = rt \rightarrow 38 = .5r \rightarrow \underline{76 \text{ mph}}$$

6. You leave Peoria at 2:00 p.m. to drive back to the distribution center in Edwardsville. If you average 65 mph, how long will the trip take you? Round to the hundredths place.

$$d = rt \rightarrow 146 = 65t \rightarrow 146 \div 65 = 2.246 \rightarrow \underline{2.25 \text{ hours}}$$

7. Approximately what time will you arrive in Edwardsville?

$$.25(60) = 15 \text{ min} \rightarrow 2:00 \text{ p.m.} + 2 \text{ hrs } 15 \text{ min} = \underline{4:15 \text{ p.m.}}$$

8. How many total miles did you drive on your route today?

$$75 + 40 + 49 + 51 + 38 + 146 = \underline{399 \text{ miles}}$$