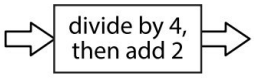
8th Grade Math Unit 5 Study Guide

How to use:

- ❏ Solve a sample problem aligned to each lesson
- ❏ If you get stuck, look at the Lesson Summary for the lesson to help guide your thinking linked **here**
- ❏ Check your answer against the answer key linked **here**
- ❏ Practice explaining how you solved the problem and why your process makes sense!

Lesson 1

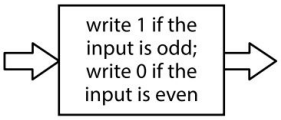
Given the rule:



Complete the table for the function rule for the following input values:

input	0	2	4	6	8	10
output						

Here is an input-output rule:



Complete the table for the input-output rule:

input	-3	-2	-1	0	1	2	3
output							

Lesson 2

A group of students is timed while sprinting 100 meters. Each student's speed can be found by dividing 100 m by their time. Is each statement true or false? Explain your reasoning.

a. Speed is a function of time.

b. Time is a function of distance.

c. Speed is a function of number of students racing.

d. Time is a function of speed.

Lesson 3

Brown rice costs \$2 per pound, and beans cost \$1.60 per pound. Lin has \$10 to spend on these items to make a large meal of beans and rice for a potluck dinner. Let b be the number of pounds of beans Lin buys and r be the number of pounds of rice she buys when she spends all her money on this meal.

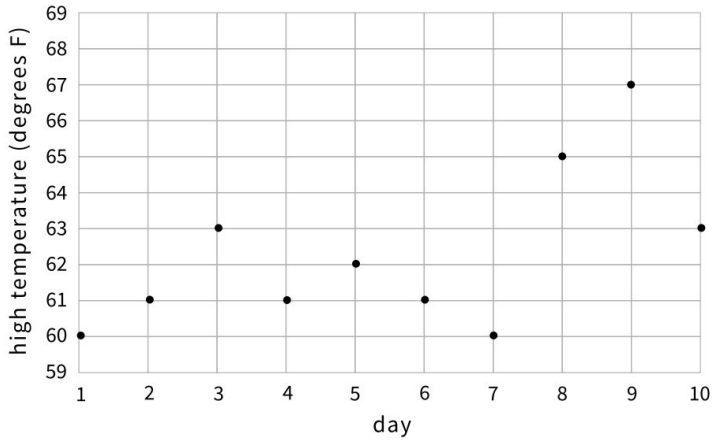
a. Write an equation relating the two variables.

b. Rearrange the equation so b is the independent variable.

c. Rearrange the equation so r is the independent variable.

Lesson 4

The graph and the table show the high temperatures in a city over a 10-day period.



day	1	2	3	4	5	6	7	8	9	10
temperature (degrees F)	60	61	63	61	62	61	60	65	67	63

a. What was the high temperature on Day 7?

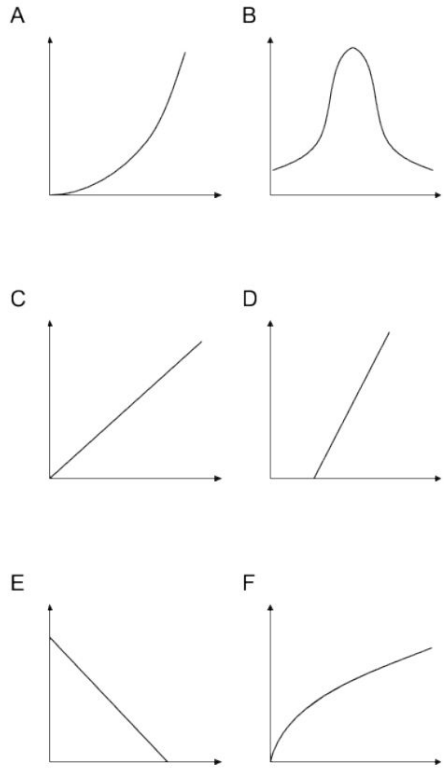
b. On which days was the high temperature 61 degrees?

c. Is the high temperature a function of the day? Explain how you know.

d. Is the day a function of the high temperature? Explain how you know.

Lesson 5

Match each diagram to the function described, then label the axes appropriately

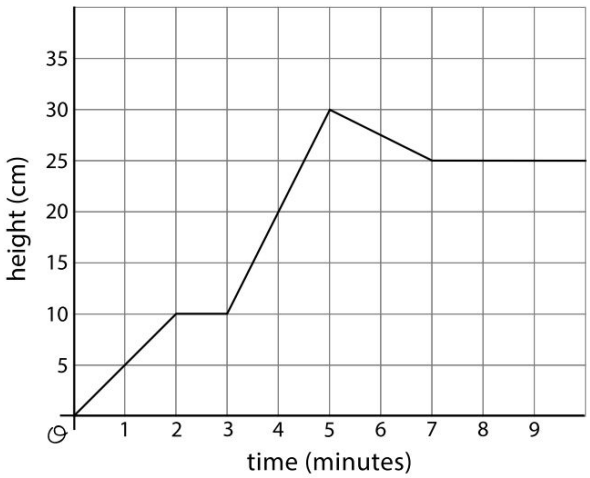


1. The function inputs the age of an oak tree a and outputs a prediction of the height of the tree h.
2. The function inputs the edge length e of a cube and outputs the volume v.
3. The function inputs the distance traveled d and predicts the amount of fuel left in the tank f.
4. The function inputs the height h of a triangle with base 12 and outputs the area a.
5. The function inputs the time of day t and predicts the temperature T.
6. The function inputs the time of day t and predicts the number of cars washed at a student car wash c.

Lesson 6

Jada fills her aquarium with water.

The graph shows the height of the water, in cm, in the aquarium as a function of time in minutes. Invent a story of how Jada fills the aquarium that fits the graph.



Lesson 7

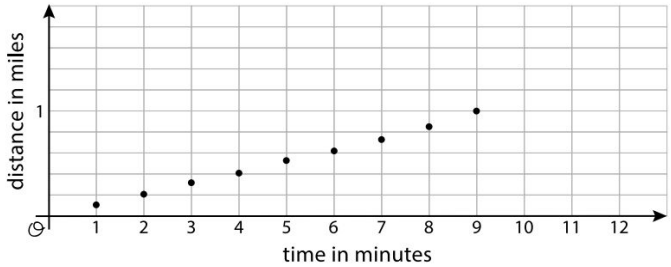
Elena and Lin are training for a race. Elena runs her mile a constant speed of 7.5 miles per hour.

Lin's times are recorded every minute:

time (minutes)	1	2	3	4	5	6	7	8	9
distance (miles)	0.11	0.21	0.32	0.41	0.53	0.62	0.73	0.85	1

a. Who finished their mile first?

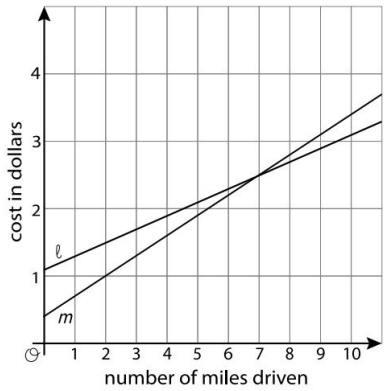
b. This is a graph of Lin's progress. Draw a graph to represent Elena's mile on the same axes.



c. For these models, is distance a function of time? Is time a function of distance? Explain how you know.

Lesson 8

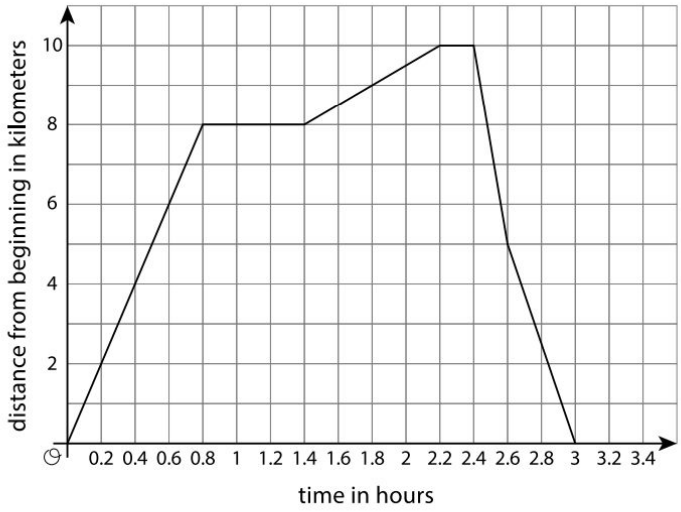
Two car services offer to pick you up and take you to your destination. Service A charges 40 cents to pick you up and 30 cents for each mile of your trip. Service B charges $1.10 to pick you up and charges c cents for each mile of your trip.



a. Match the services to the Lines ℓ and m.

b. For Service B, is the additional charge per mile greater or less than 30 cents per mile of the trip? Explain your reasoning.

Lesson 10



This graph shows a trip on a bike trail. The trail has markers every 0.5 km showing the distance from the beginning of the trail.

a. When was the bike rider going the fastest?

b. When was the bike rider going the slowest?

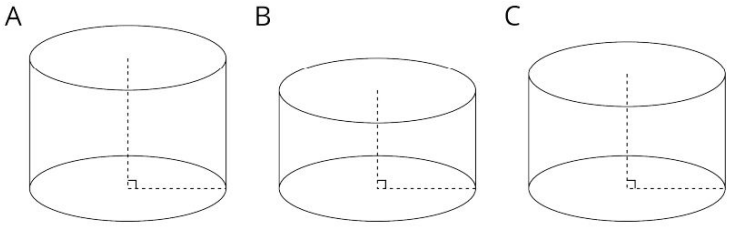
c. During what times was the rider going away from the beginning of the trail?

d. During what times was the rider going back towards the beginning of the trail?

e. During what times did the rider stop?

Lesson 11

Cylinder A, B, and C have the same radius but different heights. Put the cylinders in order of their volume from least to greatest.



Lesson 12

a. Sketch a cube and label its side length as 4 cm (this will be Cube A).

b. Sketch a cube with sides that are twice as long as Cube A and label its side length (this will be Cube B).

c. Find the volumes of Cube A and Cube B.

Lesson 13	Three cylinders have a height of 8 cm. Cylinder 1 has a radius of 1 cm. Cylinder 2 has a radius of 2 cm. Cylinder 3 has a radius of 3 cm. Find the volume of each cylinder.
Lesson 14	. A cylinder has volume 45π and radius 3. What is its height?
Lesson 15	. A cylinder and cone have the same height and radius. The height of each is 5 cm, and the radius is 2 cm. Calculate the volume of the cylinder and the cone.

Lesson 16

A cone has volume 3π.

a. If the cone's radius is 1, what is its height?

b. If the cone's radius is 2, what is its height?

c. If the cone's radius is 5, what is its height?

d. If the cone's radius is $\frac{1}{2}$, what is its height?

e. If the cone's radius in r, then what is the height?

Lesson 17

A cylinder has a volume of 48π cm^3 and height h. Complete this table for volume of cylinders with the same radius but different heights.

height (cm)	volume (cm^3)
h	48π
$2h$	
$5h$	
$\frac{h}{2}$	
$\frac{h}{5}$	

Lesson 18

There are many cylinders with a height of 18 meters. Let r represent the radius in meters and V represent the volume in cubic meters.

a. Write an equation that represents the volume V as a function of the radius r.

b. Complete this table, giving three possible examples.

r	V
1	

c. If the radius of a cylinder is doubled, does the volume double? Explain how you know.

d. Is the graph of this function a line? Explain how you know.

Lesson 19	A hemisphere fits snugly inside a cylinder with a radius of 6 cm. A cone fits snugly inside the same hemisphere. a. What is the volume of the cylinder? b. What is the volume of the cone? c. Estimate the volume of the hemisphere by calculating the average of the volumes of the cylinder and cone.
Lesson 20	Match the description of each sphere to its correct volume. A. Sphere A: radius of 4 cm B. Sphere B: diameter of 6 cm C. Sphere C: radius of 8 cm D. Sphere D: radius of 6 cm 1. 288π cm^3 2. $\frac{256}{3}\pi$ cm^3 3. 36π cm^3 4. $\frac{2048}{3}\pi$ cm^3
Lesson 21	Calculate the volume of the following shapes with the given information. For the first three questions, give each answer both in terms of π and by using 3.14 to approximate π. Make sure to include units. a. Sphere with a diameter of 6 inches b. Cylinder with a height of 6 inches and a diameter of 6 inches c. Cone with a height of 6 inches and a radius of 3 inches d. How are these three volumes related?