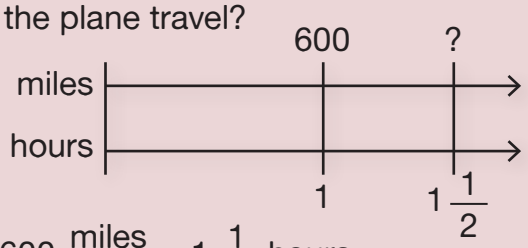
Unit 13 Reference Page

Speed, Time, and Distance

13.5

Speed is a special type of unit rate that compares distance to one unit of time.

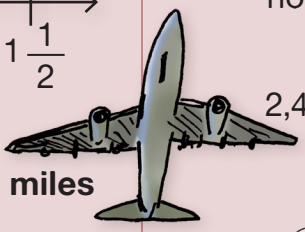
Ex. The airplane travels at a speed of 600 miles per hour. If the plane flies for $1\frac{1}{2}$ hours, how many miles does the plane travel?



$600 \frac{\text{miles}}{\text{hour}} \times 1\frac{1}{2} \text{ hours}$

$600 \frac{\text{miles}}{\text{hour}} \times \frac{3}{2} \text{ hours} = \mathbf{900 \text{ miles}}$

speed × time = distance



Ex. The airplane travels at a speed of 600 miles per hour. How long does it take the plane to travel 2,400 miles?

$2{,}400 \text{ miles} \div 600 \frac{\text{miles}}{\text{hour}} = \mathbf{4 \text{ hours}}$

distance ÷ speed = time

Solve Speed Word Problems

13.6

Ex. Thomas runs for $\frac{1}{2}$ of an hour at a speed of 6 miles per hour. Then, he walks the same distance home at a speed of 3 miles per hour. How long does it take him to walk home?

$6 \frac{\text{miles}}{\text{hour}} \times \frac{1}{2} \text{ hour} = 3 \text{ miles}$

$3 \text{ miles} \div 3 \frac{\text{miles}}{\text{hour}} = \mathbf{1 \text{ hour}}$

Ex. What is Thomas' average speed for the whole trip?

Total distance: 3 mi. + 3 mi. = 6 mi.

Total time: $\frac{1}{2}$ hr. + 1 hr. = $1\frac{1}{2}$ hr.

Average speed: $\frac{6 \text{ miles}}{1\frac{1}{2} \text{ hours}}$

$6 \div 1\frac{1}{2} \longrightarrow 6 \div \frac{3}{2}$

$6 \times \frac{2}{3} = \frac{12}{3} = \mathbf{4 \frac{\text{miles}}{\text{hour}}}$

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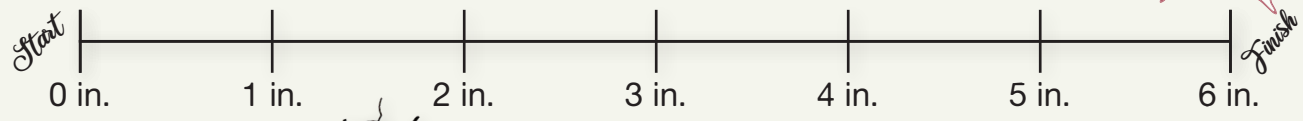
Lesson Activities

A



The ladybug travels 6 inches in 6 seconds.

_____ inches per second

The snail travels 6 inches in 12 seconds.

_____ inches per second

The ant travels 6 inches in 3 seconds.

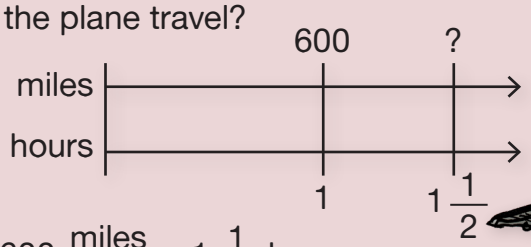
_____ inches per second

B

Speed, Time, and Distance

Speed is a special type of unit rate that compares distance to one unit of time.

Ex. The airplane travels at a speed of 600 miles per hour. If the plane flies for $1\frac{1}{2}$ hours, how many miles does the plane travel?

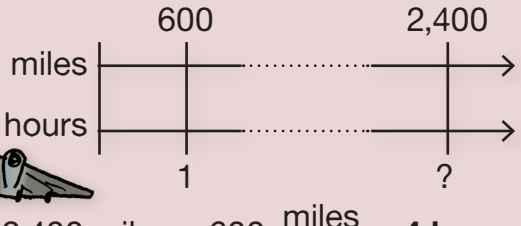


$600 \frac{\text{miles}}{\text{hour}} \times 1\frac{1}{2}$ hours

$600 \frac{\text{miles}}{\text{hour}} \times \frac{3}{2}$ ~~hours~~ = **900 miles**

speed × time = distance

Ex. The airplane travels at a speed of 600 miles per hour. How long does it take the plane to travel 2,400 miles?



2,400 miles ÷ 600 $\frac{\text{miles}}{\text{hour}}$ = **4 hours**

distance ÷ speed = time

C

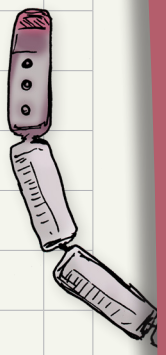
Running Log

	Speed (miles per hour)	Time (hours)	Distance (miles)
Monday	6	$2\frac{1}{2}$	
Tuesday	6		18
Thursday		4	22
Saturday	8		10

Practice

Complete the chart. Use mental math or write your equations in the work space.

Type of Transportaion	Speed (miles per hour)	Time (hours)	Distance (miles)
Airplane	550	2	
Train		6	300
Car	40	$1\frac{3}{4}$	
Canoe	3		4
Skateboard	8	$\frac{1}{2}$	
Bike		$2\frac{1}{2}$	30



Solve. Write the equations you use.

The cheetah runs 50 meters in 2 seconds. What is the cheetah's speed in meters per second?

How far can the cheetah run in 5 seconds?

How long does it take the cheetah to run 100 meters?

The olympic sprinter can run 100 meters in approximately 10 seconds. What is the sprinter's approximate speed in meters per second?

How far can the sprinter run in 5 seconds?

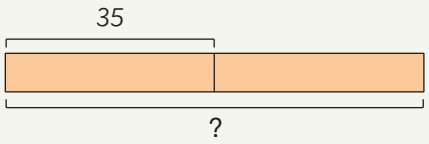
Which is faster, the cheetah or the olympic sprinter?

Review

Write 10, 100, or 1,000 to complete the blanks.

357 ÷ _____ = 3.57	32.6 ÷ _____ = 3.26	6 ÷ _____ = 0.06
604 ÷ _____ = 60.4	19.07 ÷ _____ = 0.1907	4 ÷ _____ = 0.004
195 ÷ _____ = 0.195	80.5 ÷ _____ = 0.0805	8 ÷ _____ = 0.8

Use the bar models to complete. Draw lines to split each bar to match the percentage.



50% of _____ = 35

75% of _____ = 24

$66\frac{2}{3}$% of _____ = 30

Complete the chart.

Words	Symbols	Value
absolute value of –5	$\lvert -5 \rvert$	
absolute value of 3.7		
absolute value of 0		
opposite of 6	–(6)	
opposite of –2.5		

Find the mean and the median of the children's heights. Write your equations in the work space. Express your answers with 2 decimal digits.

Mean: _____ Median: _____

Lesson Activities

A

speed × time = distance

distance ÷ time = _____

distance ÷ speed = _____

B

Solve Speed Word Problems

Ex. Thomas runs for $\frac{1}{2}$ of an hour at a speed of 6 miles per hour. Then, he walks the same distance home at a speed of 3 miles per hour. How long does it take him to walk home?

6 mi./hr. → $\frac{1}{2}$ hr.

3 mi./hr. ← ? hr.

$6 \frac{\text{miles}}{\text{hour}} \times \frac{1}{2}$ hour = 3 miles

3 miles ÷ $3 \frac{\text{miles}}{\text{hour}}$ = **1 hour**

Ex. What is Thomas' average speed for the whole trip?

Total distance: 3 mi. + 3 mi. = 6 mi.

Total time: $\frac{1}{2}$ hr. + 1 hr. = $1\frac{1}{2}$ hr.

Average speed: $\frac{6 \text{ miles}}{1\frac{1}{2} \text{ hours}}$

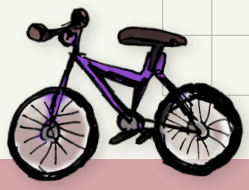
$6 \div 1\frac{1}{2} \rightarrow 6 \div \frac{3}{2}$

$6 \times \frac{2}{3} = \frac{12}{3} = \mathbf{4} \ \frac{\textbf{miles}}{\textbf{hour}}$

Marianne rode her bike at a speed of 30 kilometers per hour for 1 hour. Then, she biked the same distance home. How far did Marianne bike in all?

It took Marianne $1\frac{1}{2}$ hours to bike home. What was her average speed for the return trip?

What was Marianne's average speed for the whole trip?



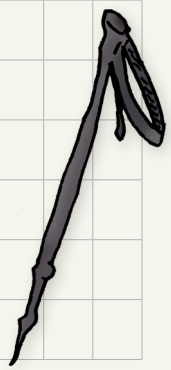
Practice

Solve. Write the equations you use.

Lauren and her family hike 10 miles from the rim of the Grand Canyon to the bottom of the canyon. It takes them 6 hours. What is their average speed?

The next day, Lauren and her family hike from the bottom of the canyon back to the rim. It takes them 8 hours. What is their average speed that day?

What is their average speed for the entire round-trip hike?



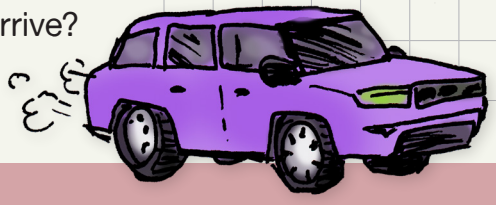
Jacob bikes for $\frac{3}{4}$ of an hour at a speed of 20 miles per hour. Then, he slows down to a speed of 10 miles per hour and bikes for $\frac{1}{2}$ of an hour longer. How far does he bike in all?

What is his average speed for the whole trip?

Hailey's family and Amber's family both drive 100 miles to the soccer tournament. Hailey's family drives at a speed of 60 miles per hour. How many hours does it take Hailey's family to get to the soccer tournmanet?

Amber's family drives at a speed of 50 miles per hour. How many hours does it take Amber's family to get to the soccer tournament?

Which family gets to the tournament more quickly? How much earlier do they arrive?



Review

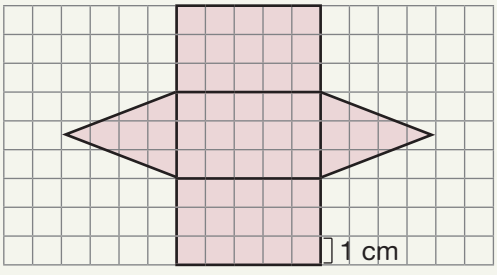
Match.

$\frac{4}{100}$	4%	0.3
$\frac{3}{10}$	5%	0.04
$\frac{2}{5}$	30%	0.4
$\frac{1}{2}$	40%	0.05
$\frac{5}{100}$	50%	0.5

Evaluate each expression for $n = 4$.

$(n - 2)^2$	$(n - 3)^2$	$(n - 4)^2$
$\frac{n + 2}{4}$	$\frac{n + 3}{4}$	$\frac{n + 4}{4}$

Use the net to find the surface area of the triangular prism.



Unit Wrap-Up

Find the unit rate. Then, use the unit rate to answer the other questions.

The factory produces 80 yo-yos in 10 minutes. How many yo-yos does it produce per minute?

How many yo-yos does the factory produce in 60 minutes?

How long does it take the factory to produce 1,600 yo-yos?

Violet uses a hose to fill a 5-gallon bucket. It takes her $\frac{1}{2}$ min. to completely fill the bucket. At what rate does the water flow out of the hose (in gallons per minute)?

How long does it take the hose to fill a 120 gallon kiddie pool?

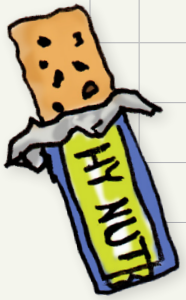
Violet's little brother accidentally leaves the hose running for 4 minutes. How many gallons of water does he waste?

Solve. Write the equations you use.
Use the multiplication table to help with the long division.

A box of 6 granola bars costs $3.72. What is the unit price of each granola bar?

A box of 12 granola bars costs $5.64. What is the unit price of each granola bar?

Andrew wants to buy 24 granola bars to bring to baseball practice. What is the cheapest way to buy 24 granola bars? How much does it cost?

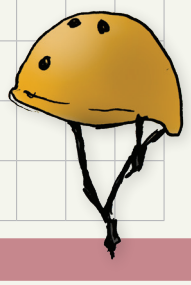


	1	2	3	4	5	6	7	8	9
× 12	12	24	36	48	60	72	84	96	108

Unit Wrap-Up

Jonas is a professional bicyclist. Some days he sprints short distances. Other days, he bikes longer distances at slower speeds. Use mental math or written equations to complete his workout log.

	Speed (miles per hour)	Time (hours)	Distance (miles)
Monday	23	3	
Wednesday	28	$2\frac{1}{4}$	
Friday		5	100
Saturday	30		20
Sunday		$\frac{1}{5}$	7



Solve. Write the equations you use.

Simon's family drives 150 miles to an amusement park. The trip takes them 3 hours. What is their speed?

On the way home, they drive at a speed of 60 miles per hour. How long does the trip home take them?

Cora runs at a speed of 8 miles per hour for $\frac{1}{2}$ hr. Then, she slows down and jogs at a speed of 6 miles per hour for $1\frac{1}{2}$ hours. What distance does she travel in all?

What is her average speed for the whole trip?