Chapter 16

Name _____

Temperature and Time

Show What You Know

Time to the Half Hour Read the clock. Write the time.

1. 

_____

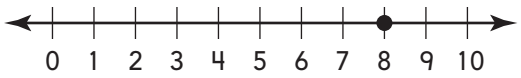
2. 

_____

3. 

_____

Number Line Find the value.

4. 

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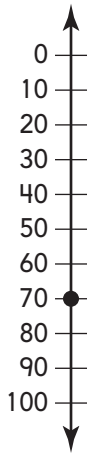
5. 

_____

MATH in the Real World

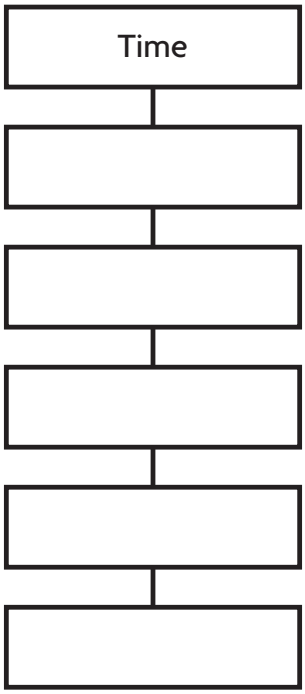
Henrico must record the temperature each day for a week. He isn't sure how to determine what the temperature is using a thermometer. In your own words, describe how he should read the temperature on the thermometer shown.

Vocabulary Builder

Go Online For more help

Visualize It

Complete the flow chart by using words with a ✓.



Connect to Vocabulary

Review Words

- a.m.
- Celsius
- ✓ day
- degrees
- elapsed time
- Fahrenheit
- ✓ hour
- ✓ minute
- p.m.
- ✓ second
- ✓ week

Understand Vocabulary

Write each word in the correct category.

1. Celsius
2. a.m.
3. second
4. day
5. Fahrenheit
6. week
7. degrees

Time	Temperature

Name _____

Temperature

Florida's B.E.S.T.
- **Measurement** 4.M.1.1
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.4.1, MTR.6.1

I Can estimate and measure temperature using a thermometer.

Investigate

Vera wants to go outside to read, but the temperature is too hot. Her mom says if she reads under a tree, it will be cooler.

What tool can you use to determine which spot is cooler?

_____

Temperature is the measure of how hot or cold something is. Degrees Fahrenheit (°F) are customary units of temperature. Degrees Celsius (°C) are metric units of temperature. The scale on the side of the thermometer is like a number line. The top of the red line shows the temperature.

Activity

Materials ■ Fahrenheit and Celsius thermometer

1. Choose a sunny place and a shady place, and estimate what you think the temperature will be. Record your estimates in the table.
2. In each of those places, use a thermometer to determine the outside temperature, and record it in the table.

_____

TEMPERATURE				
Place	Estimate (°F)	Actual (°F)	Estimate (°C)	Actual (°C)
Shady				
Sunny				

Math Talk

MTR 6.1 Assess the reasonableness of solutions.

Which temperature could you use as a benchmark for estimating outdoor temperatures? Explain.

3. How did your estimates compare to the actual temperatures?

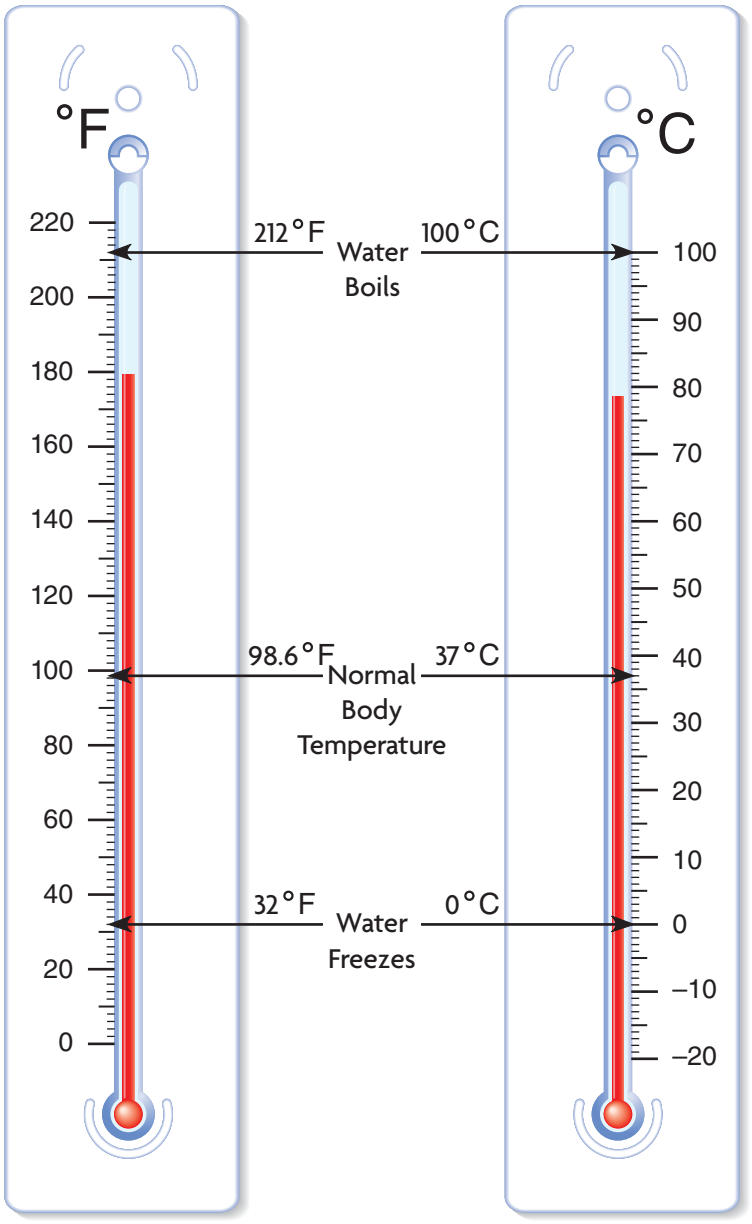
_____

4. What do you notice about the temperatures measured in degrees Fahrenheit compared to the temperatures measured in degrees Celsius?

_____

Draw Conclusions

1. Describe the temperature in each location. What did you notice?



2. Based on your results, estimate your classroom's temperature in degrees Fahrenheit.

3. Measure your classroom's actual temperature in degrees Fahrenheit. How does your measurement compare with your estimate?

Make Connections

Look at the Celsius scale. Water freezes at 0 °C and boils at 100 °C. These benchmarks help you to know that 30 °C is too warm for ice-skating.

4. Explain why the water in a container with ice can be warmer than 0 °C.

Look at the Fahrenheit scale. Water freezes at 32 °F and boils at 212 °F.

5. Explain how you can use these benchmarks to decide if 27 °F is cold enough for storing ice cream.

Math Talk

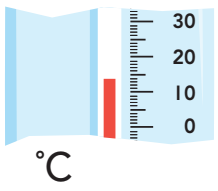
MTR 4.1 Engage in discussions on mathematical thinking.

How do customary and metric units of temperature compare?

Name _____

Write the temperature in degrees Celsius.

6.



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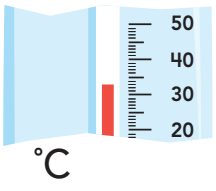
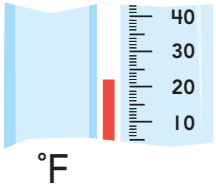
7.



_____

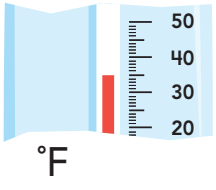
Write the temperature in degrees Fahrenheit.

8.



_____

9.



_____

Choose the better temperature for the activity.

10. 36 °F 74 °F

11. 2 °C 28 °C

On Your Own

12. It's 27 °C outside. What activity might you do? What clothes should you wear?

_____

13. Laslo is wearing a coat, a scarf, and gloves. For problems 13a-13d, choose Yes or No to tell whether his clothing is reasonable for the outdoor temperature.

13a. 21 °F ○ Yes ○ No

13b. 37 °C ○ Yes ○ No

13c. 73 °F ○ Yes ○ No

13d. 6 °C ○ Yes ○ No

Problem Solving · Applications

Find the temperature that is 0.1 degree more.

14. 

_____

15. 

_____

Find the temperature that is 0.01 degree more.

16. 

_____

17. 

_____

Find the temperature that is 0.1 degree less.

18. 

_____

19. 

_____

20. Delilah wants to garden today. Which is the better temperature for gardening, 4 °C or 24 °C? Explain.

_____

21. Cedric is sledding with his friends. He says the temperature outside is about 22 °C. Is this temperature reasonable? Explain.

_____

22. Select all the activities that can be done when the outdoor temperature is 89 °F.

- (A) flying a kite
- (B) ice-skating
- (C) fishing
- (D) skateboarding
- (E) building a snowman

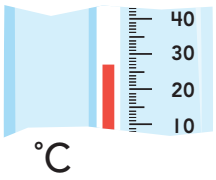
Name _____

Temperature

Go Online
Interactive Examples

Write the temperature in degrees Celsius.

1.



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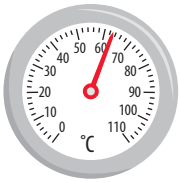
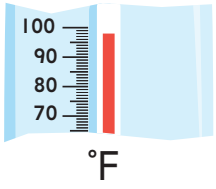
2.



_____

Write the temperature in degrees Fahrenheit.

3.



_____

4.

_____

Choose the better temperature for the activity.

5. 4 °C 26 °C

6. 38 °F 74 °F

7. It's 12 °C outside. What activity might you do? What clothes should you wear?

_____

_____

8. Anu is wearing shorts and sandals. For problems 8a-8d, choose Yes or No to tell whether her clothing is reasonable for the outdoor temperature.

8a. 38 °F ○ Yes ○ No

8b. 31 °C ○ Yes ○ No

8c. 95 °F ○ Yes ○ No

8d. 11 °C ○ Yes ○ No

9. Look at the thermometer. What is 0.1 °F more?

_____

10. Look at the thermometer. What is 0.01 °C less?

_____

Lesson Check

11. Gilbert is wearing shorts and a T-shirt while hiking. Which is the best choice for the temperature?

Ⓐ 0 °C

Ⓑ 10 °C

Ⓒ 30 °C

Ⓓ 50 °C

12. Benjamin's temperature is 0.1 °F above normal. What is his temperature?

Ⓐ 32.1 °F

Ⓑ 72.1 °F

Ⓒ 98.7 °F

Ⓓ 100.7 °F

Spiral Review

13. What is 5,499 rounded to the nearest thousand?

_____

14. Nurse Juliette has 47 patients. Nurse Miguel has 8 times as many patients. How many patients does Miguel have?

_____

15. Mario's family ate $\frac{5}{8}$ of a sausage pizza and $\frac{2}{4}$ of a cheese pizza. Which pizza has a smaller part left?

_____

16. List the first five prime numbers after 20.

_____

Name _____

Units of Time

I Can use models to compare units of time.

Florida's B.E.S.T.
- **Measurement** 4.M.1.2
- **Mathematical Thinking & Reasoning** MTR.2.1, MTR.3.1, MTR.4.1, MTR.6.1

UNLOCK the Problem Real World

The analog clock below has an hour hand, a minute hand, and a **second** hand to measure time. The time is 4:30:12.

Read Math

Read 4:30:12 as 4:30 and 12 seconds, or 30 minutes and 12 seconds after 4.

- Are there more minutes or seconds in one hour?

_____

There are 60 seconds in a minute and 60 minutes in an hour. The clocks show how far the hands move for each length of time.

Start Time: 3:00:00

One second elapses.

The time is now 3:00:01.

One minute, or 60 seconds, elapses. The second hand has made a full turn clockwise.

The time is now 3:01:00.

One hour, or 60 minutes, elapses. The minute hand has made a full turn clockwise.

The time is now 4:00:00.

Example 1 How does the size of an hour compare to the size of a second?

There are _____ minutes in 1 hour.

There are _____ seconds in 1 minute.

60 minutes × _____ = _____ seconds

Think: Multiply the number of minutes in 1 hour by the number of seconds in 1 minute.

There are _____ seconds in 1 hour.

So, 1 hour is _____ times as long as 1 second.

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

How many full turns clockwise does a minute hand make in 3 hours? Explain.

Example 2 Compare measures.

Larissa spends 2 hours on her science project.
Cliff spends 200 minutes on his science project.
Who spends more time?

STEP 1 Make a table that relates hours and minutes.

Hours	Minutes
1	60
2	
3	

STEP 2 Compare 2 hours and 200 minutes.

2 hours ____ 200 minutes

Think: Write each measure in minutes, and compare using <, >, or =.

2 hours is _____ than 200 minutes.

So, _____ spends more time than _____ on the science project.

Activity Compare the length of a week to the length of a day.

Materials ■ color pencils

The number line below shows the relationship between days and weeks.

STEP 1 Use a color pencil to shade 1 week on the number line.

STEP 2 Use a different color pencil to shade 1 day on the number line.

STEP 3 Compare the size of 1 week to the size of 1 day.

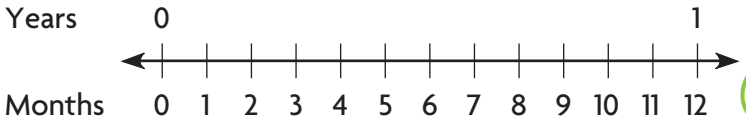
There are _____ days in _____ week.

So, 1 week is _____ times as long as 1 day.

Name _____

Share and Show

1. Compare the length of a year to the length of a month. Use a model to help.



1 year is _____ times as long as _____ month.

Complete.

2. 2 minutes = _____ seconds

3. 4 years = _____ months

Units of Time

1 minute (min) = 60 seconds (s)
1 hour (hr) = 60 minutes
1 day (d) = 24 hours
1 week (wk) = 7 days
1 year (yr) = 12 months (mo)
1 year (yr) = 52 weeks

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

Explain how the number line helped you compare the length of a year and the length of a month.

On Your Own

Complete.

4. 3 minutes = _____ seconds

5. 4 hours = _____ minutes

MTR Compare using <, >, or =.

6. 3 years ◯ 35 months

7. 2 days ◯ 40 hours

Problem Solving · Applications

8. Damien has lived in the apartment building for 5 years. Ken has lived there for 250 weeks. Who has lived in the building longer? Explain. Make a table to help.

Years	Weeks
1	
2	
3	
4	
5	

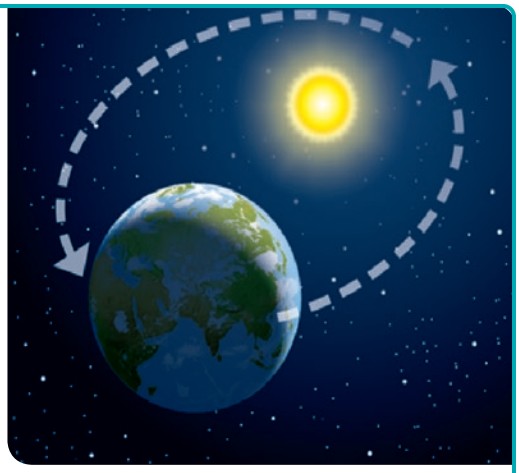
9. How many hours are in 3 weeks? Explain.

10. MTR Explain how you know that 9 minutes is less than 600 seconds.

11. Draw lines to match equivalent time intervals.

1 hour	2 hours	5 hours	42 days	48 hours
2 days	120 minutes	6 weeks	3,600 seconds	300 minutes

Cross-Curricular: Science



One day is the length of time it takes Earth to make one complete rotation. One year is the time it takes Earth to revolve around the sun. To make the calendar match Earth's orbit time, there are leap years. Leap years add one extra day to the year. A leap day, February 29, is added to the calendar every four years.

1 year = 365 days
1 leap year = 366 days

12. How many days are there in 4 years if the fourth year is a leap year? Explain. Make a table to help.

Years	Days
1	
2	
3	
4	

13. Parker was born on February 29, 2008. The second time he is able to celebrate on his actual birthday is in 2016. How many days old will Parker be on February 29, 2016?

Name _____

Units of Time

Go Online
Interactive Examples

Complete.

1. 6 minutes = 360 seconds

Think: 1 minute = 60 seconds,
so 6 minutes = 6 × 60 seconds, or 360 seconds.

2. 5 weeks = _____ hours

3. 3 years = _____ weeks

4. 9 hours = _____ minutes

5. 9 minutes = _____ seconds

Compare using <, >, or =.

6. 2 years ◯ 14 months

7. 3 hours ◯ 300 minutes

8. 2 days ◯ 48 hours

9. 6 years ◯ 300 weeks

Problem Solving Real World

10. Jody practices a piano piece for 500 seconds. Bill practices a piano piece for 8 minutes. Who practices longer? Explain.

_____

_____

_____

_____

11. Yvette's younger brother just turned 3 years old. Fred's brother is now 30 months old. Whose brother is older? Explain.

_____

_____

_____

_____

12. WRITE Math Explain how you can prove that 24 days is more than 3 weeks.

_____

_____

_____

Lesson Check

13. Aemilius rides his bike for 2 hours. For how many seconds does Aemilius ride his bike?

14. Caelum says that vacation starts in exactly 4 weeks. In how many days does vacation start?

Spiral Review

15. Da-xia buys $\frac{9}{4}$ pounds of apples. What is that weight as a mixed number?

16. Lam, Fo-hai, and Maili each earn $5.40 raking leaves. How much do they earn together?

17. Melinda rides her bike $\frac{54}{100}$ mile to the library. Then she rides $\frac{4}{10}$ mile to the store. How far does Melinda ride her bike in all? Write your answer as a decimal.

18. One day, the students drink 60 quarts of milk at lunch. How many pints of milk do the students drink?

Name _____

Elapsed Time

Florida's B.E.S.T.
- **Measurement** 4.M.2.1
- **Mathematical Thinking & Reasoning** MTR.1.1, MTR.2.1, MTR.6.1

I Can solve real-world problems involving elapsed time.

UNLOCK the Problem Real World

Dora and her brother Kyle spend 1 hour and 35 minutes doing yard work. Then they stop for lunch at 1:20 p.m. At what time did they start doing yard work?

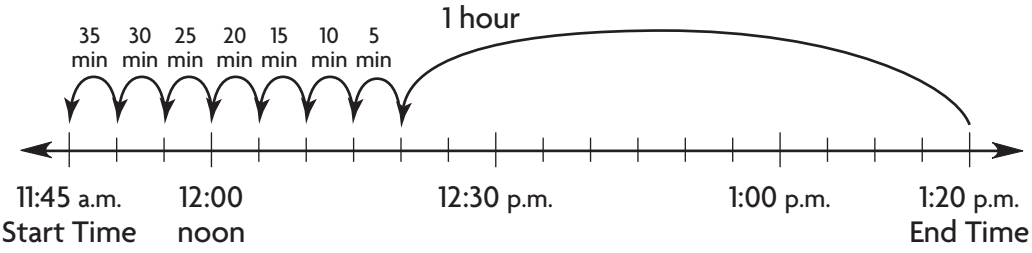
Use the graphic organizer to help you solve the problem.

Read the Problem

What do I need to find?	What information do I need to use?	How will I use the information?
I need to find the time that Dora and Kyle _____.	I need to use the _____ and the time that they _____.	I can draw a timeline to help me count backward and find the _____.

Solve the Problem

I draw a timeline that shows the end time of 1:20 p.m. Next, I count backward 1 hour and then 5 minutes at a time until I have 35 minutes.



So, Dora and her brother Kyle started doing yard work at _____.

1. What if Dora and Kyle spend 50 minutes doing yard work and they stop for lunch at 12:30 p.m.? What time would they have started doing yard work?

_____

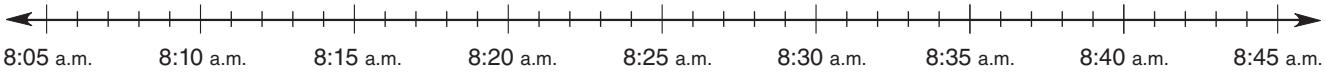
Try Another Problem

Diego left his home at 8:05 a.m. It took him 23 minutes to ride his bike to school. When he arrived school, there was 17 minutes until the tardy bell rang. What time does the tardy bell ring?

Read the Problem

What do I need to find?	What information do I need to use?	How will I use the information?

Solve the Problem



2. How did your diagram help you solve the problem?

_____

_____

_____

Math Talk

MTR 4.1 Engage in discussions on mathematical thinking.

Describe another way you could find the time an activity started or ended given the elapsed time and either the start or end time.

Name _____

Share and Show

Math Board

1. Evelyn takes two dance classes every Saturday. Each class is 45 minutes long. The last class ends at 12:45 p.m. At what time does Evelyn's first dance class begin?

First, write the problem you need to solve.

_____

Next, find the total number of minutes Evelyn's dance classes are. Then draw a timeline to show the end time and the elapsed time.

Finally, find the start time.

Evelyn's first dance class begins at _____ .

2. What if Evelyn's dance classes started at 11:00 a.m. and lasted 1 hour and 25 minutes? At what time would her last class end? Describe how this problem is different from Problem 1.

_____

_____

3. Vita got on the bus at 8:06 a.m. Thirty-five minutes later, she arrived at school. At what time did Vita arrive at school?

_____

_____

4. It takes Luisa 20 minutes to ride her bike to the pond. She fished for 1 hour and 30 minutes until she ran out of bait at 6:40 p.m. At what time did Luisa leave her house to go fishing?

_____

_____

5. Boone and Cetus went skiing at 10:30 a.m. They skied for 1 hour and 55 minutes before stopping for lunch. They ate lunch for 17 minutes. At what time did Boone and Cetus finish lunch?

6. Mike can run a mile in 12 minutes. He starts his run at 11:30 a.m. and runs 4 miles. What time does Mike finish his run?

7. **MTR** Explain how you can use a diagram to determine the start time when the end time is 9:00 a.m. and the elapsed time is 26 minutes. What is the start time?

8. Bethany finished her math homework at 4:20 p.m. She did 25 multiplication problems in all. If each problem took her 3 minutes to do, at what time did Bethany start her math homework?

MATH on the Spot

9. Vincent began his weekly chores on Saturday morning at 11:20 a.m. He did 7 chores, and each one took 10 minutes to complete. What time did Vincent finish his chores?

Vincent finished his chores at _____

Show the Math

Demonstrate Your Thinking

Name _____

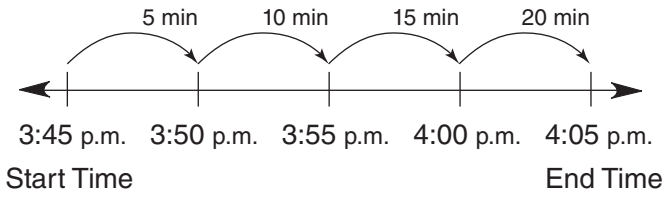
Elapsed Time

Go Online
Interactive Examples

Read each problem and solve.

1. Candra started her piano lesson at 3:45 p.m. The lesson lasted 20 minutes. What time did the piano lesson end?

   Think: What do I need to find? How can I draw a diagram to help?



   4:05 p.m.

2. Capricornus spent 24 minutes playing a computer game. He then went outside and played basketball for 36 minutes. He stopped playing basketball at 3:55 p.m. What time did he start playing video games?

   _____

3. Aimee drives 20 minutes to her karate class. Her karate class lasts 1 hour and 15 minutes and is over at 5:00 p.m. What time does, Aimee start driving to her karate class?

   _____

4. Mr. Giarmo left for work at 7:15 a.m. Twenty-five minutes later, he arrived at his work. What time did Mr. Giarmo arrive at his work?

   _____

5. WRITE Math Explain why it is important to know if a time is in the a.m. or in the p.m. when figuring out how much time has elapsed.

   _____

   _____

Lesson Check

6. Bobbie went snowboarding with friends at 10:10 a.m. They snowboarded for 1 hour and 43 minutes, and then they ate lunch for 37 minutes. What time did they finish lunch?

7. The Cain family drove for 1 hour and 15 minutes and arrived at their camping spot at 3:44 p.m. What time did the Cain family start driving?

Spiral Review

8. A praying mantis can grow up to 15 centimeters long. How long is this in millimeters?

9. Thom's minestrone soup recipe makes 3 liters of soup. How many milliliters of soup is this?

10. Horace walks $\frac{2}{3}$ mile each day. List three multiples of $\frac{2}{3}$.

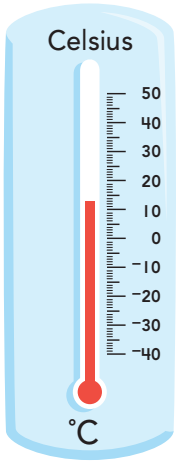
11. Angelica colored in 0.60 of the squares on her grid. Write 0.60 as tenths in fraction form.

Name _____

Chapter 16

Chapter Review

1. Write the temperature in ºC.



_____ °C

2. Franco played computer chess for 3 hours. Lian played computer chess for 150 minutes. Compare the times spent playing computer chess. Complete the sentence.

_____ played for _____ longer than _____.

3. Compare using >, <, or =.

7 minutes ☐ 100 seconds

4. Francois has played guitar for 4 years. Janet has played guitar for 32 months. Who has played guitar longer? Explain.

5. Raquel and her brother Sai work together to complete jobs around the yard. Mowing the lawn takes 1 hour and 42 minutes. Raking leaves takes 50 minutes. Weeding the garden takes 1 hour and 16 minutes.

Part A

How much time do Raquel and Sai need to complete all the jobs around the yard?

Part B

If they start at noon and have to stop by 2:15 p.m., which jobs could they complete?

Part C

If they start at 10:30 a.m., when will they complete all the jobs around the yard?

6. Choose the better temperature for the activity.

Ⓐ 10°F

Ⓑ 25°F

Ⓒ 72°F

Ⓓ 102°F

Name _____

7. Which is longer: 6 minutes or 400 seconds? Explain.

8. How many days are there in 6 weeks?

Ⓐ 7

Ⓑ 13

Ⓒ 42

Ⓓ 360

9. Find the temperature that is 0.1° more.

_____ °C

10. Angelo hiked for 1 hour and 45 minutes until he reached the lake at 3:52 p.m. At what time did Angelo start hiking? Explain.

11. Janu starts painting a cabinet at 2:15 p.m. It takes him 46 minutes to paint the cabinet. The paint takes 3 hours to dry. What time will it be when the paint on the cabinet is dry?

_____

12. Franny left her home at 10:10 a.m. It took her 26 minutes to ride her scooter to the park . When she arrived at the park, she had to wait 15 minutes until her friend Gemma showed up. What time did her friend get to the park?

_____

13. Ali has 2 hours of leisure time. Which of the following activities could Ali choose to do with his time?

Ⓐ read a book for 140 minutes

Ⓑ sketch a bird for 8,000 seconds

Ⓒ listen to music for 90 minutes

Ⓓ watch a show for 7,400 seconds

14. Complete each statement to find the number of hours in 3 weeks.

3 weeks = _____ days

_____ days = _____ hours

15. Find the temperature that is 0.01° more.

_____ °F

Name _____

16. Hamid's soccer game will start at 11:00 a.m., but the players must arrive at the field 45 minutes early to warm up. The game must end by 1:15 p.m.

Part A

Hamid says he has to be at the field at 9:45 a.m. IS Hamid correct? Explain your answer.

Part B

The park closes at 6:30 p.m. There is a 15-minute break between each game played at the park, and each game takes the same amount of time as Hamid's soccer game. How many more games can be played before the park closes? Explain your answer.

17. Pao is wearing shorts and a short-sleeve shirt. For Problems 17a–d, choose Yes or No to tell whether his clothing is reasonable for the outdoor temperature.

17a.	0 °F	○ Yes	○ No
17b.	71 °F	○ Yes	○ No
17c.	27 °C	○ Yes	○ No
17d.	6 °C	○ Yes	○ No

18. Draw lines to match equivalent time intervals.

$\frac{1}{2}$ hour	2 hours	3 hours	8 hours	72 hours
3 days	180 minutes	1,800 seconds	480 minutes	7,200 seconds

19. Anya arrived at the library on Saturday morning at 11:10 a.m. She left the library 1 hour 20 minutes later. Draw a timeline to show the end time.

Anya left the library at _____ p.m.

20. The tables show patterns for some units of measurement. Write the correct labels in each table.

Hours	Days
1	12
2	24
3	36
4	48

Months	Minutes
1	7
2	14
3	21
4	28

Weeks	Years
1	60
2	120
3	180
4	240

21. Frankie is practicing for a 5-kilometer race. His normal time is 31 minutes 21 seconds. Yesterday it took him only 29 minutes 38 seconds.

How much faster was Frankie yesterday than his normal time?

_____