CHAPTER 16 Time and Temperature

Worksheet 1  Telling Time
Look at each clock. Fill in the blanks.

1. The minute hand shows _______ minutes after the hour.

2. The minute hand shows _______ minutes after the hour.

Write the time.

3. _______ : _______

4. _______ : _______
Find the length of time.

5. 2:30 P.M. is _________ after 2 P.M.

6. 7 A.M. is _________ before 8 A.M.

Complete the table.

7. The minute hand of a clock points at the number given in the table. How many minutes have passed since the minute hand was at 12?

<table>
<thead>
<tr>
<th>Number Minute Hand Points to</th>
<th>2</th>
<th>4</th>
<th>5</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minutes Passed</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Write the time.

8. The time is 15 minutes after 7.

9. The time is 45 minutes before 12.
Example

10:15 is 15 minutes past 10.

The time is ten fifteen.
It is 15 minutes after 10.

10. 5:25 is _______ minutes past 5.

11. 11:06 is _______ minutes past 11.

12. 9:22 is _______ minutes past 9.

Fill in the blanks. Use past.

Example

The time is 8:15.
It is 15 minutes past 8.

13. The time is _______.

It is ____________________.
14. The time is ________.

It is ____________________.

Complete.

Example

3:55 is ________ minutes to 4.

The time is three fifty-five.

\[ 60 - 55 = 5 \]

It is 5 minutes before 4:00.

We say the time is 5 minutes
to 4.

15. 7:50 is ________ minutes to 8.

16. 4:49 is ________ minutes to 5.

17. 9:36 is ________ minutes to 10.

18. 8:28 is ________ minutes to 9.
The blanks. Use **to**.

Example:

The time is **7:45**.

It is **15 minutes to 8**.

---

The time is **______**.

It is **______**.

The time is **______**.

It is **______**.

The time is **______**.

It is **______**.
Draw the minute hand to show the time.

Example

25 minutes past 7

22. 18 minutes past 10

23. 20 minutes to 8

24. 6 minutes to 4
Worksheet 2  Converting Hours and Minutes

Express the time in minutes.

1. $1 \text{ h} = \underline{\phantom{0}} \text{ min}$

2. $2 \text{ h} = 2 \times \underline{\phantom{0}} \text{ min}$
   $= \underline{\phantom{0}} \text{ min}$

3. $5 \text{ h} = 5 \times \underline{\phantom{0}} \text{ min}$
   $= \underline{\phantom{0}} \text{ min}$

4. $7 \text{ h} = 7 \times \underline{\phantom{0}} \text{ min}$
   $= \underline{\phantom{0}} \text{ min}$

Complete each number bond.

**Example**

$1 \text{ h} 25 \text{ min}$

1 h 25 min

5. $3 \text{ h} 40 \text{ min}$

6. $5 \text{ h} 30 \text{ min}$
Express the time in minutes.

Example

\[
2 \text{ h} 30 \text{ min} = \underline{120} \text{ min} + \underline{30} \text{ min} \\
= \underline{150} \text{ min}
\]

7. \(3 \text{ h} 25 \text{ min} = \underline{} \text{ min} + 25 \text{ min}
   = \underline{} \text{ min}

8. \(5 \text{ h} 35 \text{ min} = \underline{} \text{ min} + 35 \text{ min}
   = \underline{} \text{ min}

9. \(4 \text{ h} 8 \text{ min} = \underline{} \text{ min} + \underline{} \text{ min}
   = \underline{} \text{ min}

10. \(7 \text{ h} 12 \text{ min} = \underline{} \text{ min} + \underline{} \text{ min}
    = \underline{} \text{ min}

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Express the time in hours.

Example

\[ 120 \text{ min} = \underline{2} \times 60 \text{ min} \]
\[ = \underline{2} \text{ h} \]

11. \[ 180 \text{ min} = \underline{3} \times 60 \text{ min} \]
\[ = \underline{3} \text{ h} \]

12. \[ 300 \text{ min} = \underline{5} \times 60 \text{ min} \]
\[ = \underline{5} \text{ h} \]

Fill in the blanks.

Example

80 minutes is between \( \underline{1} \) hour and \( \underline{2} \) hours.

\[ 1 \text{ h} = 60 \text{ min} \]
\[ 2 \text{ h} = 120 \text{ min} \]

13. 99 minutes is between \( \underline{1} \) hour and \( \underline{2} \) hours.

14. 165 minutes is between \( \underline{2} \) hours and \( \underline{3} \) hours.
Express the time in hours and minutes.

**Example**

\[
80 \text{ min} = 1 \text{ h} 20 \text{ min} \\
60 \text{ min} + 20 \text{ min}
\]

1 h = 60 min ✓
2 h = 120 min

15. \[
100 \text{ min} = \underline{\hspace{2cm}} \text{ h} \underline{\hspace{2cm}} \text{ min} \\
\underline{\hspace{2cm}} \text{ min} + \underline{\hspace{2cm}} \text{ min}
\]

16. \[
150 \text{ min} = \underline{\hspace{2cm}} \text{ h} \underline{\hspace{2cm}} \text{ min} \\
\underline{\hspace{2cm}} \text{ min} + \underline{\hspace{2cm}} \text{ min}
\]

17. \[
135 \text{ min} = \underline{\hspace{2cm}} \text{ h} \underline{\hspace{2cm}} \text{ min} \\
\underline{\hspace{2cm}} \text{ min} + \underline{\hspace{2cm}} \text{ min}
\]

18. \[
200 \text{ min} = \underline{\hspace{2cm}} \text{ h} \underline{\hspace{2cm}} \text{ min} \\
\underline{\hspace{2cm}} \text{ min} + \underline{\hspace{2cm}} \text{ min}
\]
Worksheet 3  Adding Hours and Minutes

Add the minutes.

Example

25 min + 15 min = _______ min

1.  5 min + 35 min = _______ min

2.  25 min + 25 min = _______ min

Add the minutes.
Then convert the minutes to hours and minutes.

Example

30 min + 40 min = _______ min

= _______ h _______ min

3.  50 min + 45 min = _______ min

= _______ h _______ min

4.  40 min + 65 min = _______ min

= _______ h _______ min
Add. Use number bonds to help you.

**Example**

\[
\begin{align*}
2 \text{ h} & \quad 20 \text{ min} + 3 \text{ h} & \quad 10 \text{ min} = \, ? \\
2 \text{ h} & \quad 20 \text{ min} & \quad 3 \text{ h} & \quad 10 \text{ min} \\
\end{align*}
\]

Add the hours: \(2\) h + \(3\) h = \(5\) h

Add the minutes: \(20\) min + \(10\) min = \(30\) min

\(2\) h \(20\) min + \(3\) h \(10\) min = \(5\) h \(30\) min

5.

\[
\begin{align*}
3 \text{ h} & \quad 30 \text{ min} + 5 \text{ h} & \quad 25 \text{ min} = \, ? \\
\end{align*}
\]

Add the hours: \(3\) h + \(5\) h = \__________ h

Add the minutes: \(30\) min + \(25\) min = \__________ min

\(3\) h \(30\) min + \(5\) h \(25\) min = \__________ h \__________ min

6.

\[
\begin{align*}
5 \text{ h} & \quad 25 \text{ min} + 4 \text{ h} & \quad 5 \text{ min} = \, ? \\
\end{align*}
\]

Add the hours: \__________ h + \__________ h = \__________ h

Add the minutes: \__________ min + \__________ min = \__________ min

\(5\) h \(25\) min + \(4\) h \(5\) min = \__________ h \__________ min
Add. Use number bonds to help you.

Example

\[ 2 \text{ h} 45 \text{ min} + 35 \text{ min} = ? \]

Add the minutes: \[ 45 \text{ min} + 35 \text{ min} = 80 \text{ min} \]

\[ \frac{80 \text{ min}}{60 \text{ min}} = 1 \text{ h} 20 \text{ min} \]

Add the hours and minutes: \[ 2 \text{ h} + 1 \text{ h} + 20 \text{ min} \]

\[ = 3 \text{ h} 20 \text{ min} \]

So, \[ 2 \text{ h} 45 \text{ min} + 35 \text{ min} = 3 \text{ h} 20 \text{ min} \]

7. \[ 3 \text{ h} 50 \text{ min} + 55 \text{ min} = ? \]

Add the minutes: \[ 50 \text{ min} + 55 \text{ min} = \text{ min} \]

\[ \frac{\text{ min}}{60 \text{ min}} = \text{ h} \text{ min} \]

Add the hours and minutes: \[ 3 \text{ h} + \text{ h} + \text{ min} \]

\[ = \text{ h} \text{ min} \]

So, \[ 3 \text{ h} 50 \text{ min} + 55 \text{ min} = \text{ h} \text{ min} \]
8. \(2 \text{ h } 35 \text{ min } + 4 \text{ h } 45 \text{ min} = \) ?

Add the minutes: \(35 \text{ min } + 45 \text{ min} = \) ______ min

______ min = ______ h ______ min

Add the hours: \(2 \text{ h } + 4 \text{ h} = \) ______ h

Add the hours and minutes: ______ h + ______ h ______ min

= ______ h ______ min

So, \(2 \text{ h } 35 \text{ min } + 4 \text{ h } 45 \text{ min} = \) ______ h ______ min

9. \(6 \text{ h } 20 \text{ min } + 7 \text{ h } 50 \text{ min} = \) ?

Add the minutes: ______ min + ______ min = ______ min

______ min = ______ h ______ min

Add the hours: ______ h + ______ h = ______ h

Add the hours and minutes: ______ h + ______ h ______ min

= ______ h ______ min

So, \(6 \text{ h } 20 \text{ min } + 7 \text{ h } 50 \text{ min} = \) ______ h ______ min
Worksheet 4  Subtracting Hours and Minutes

Subtract.

Example

\[35 \text{ min} - 20 \text{ min} = \underline{15} \text{ min}\]

1. \[55 \text{ min} - 25 \text{ min} = \underline{\text{min}}\]

2. \[60 \text{ min} - 45 \text{ min} = \underline{\text{min}}\]

Subtract the minutes.
Then convert the minutes to hour and minutes.

Example

\[90 \text{ min} - 20 \text{ min} = \underline{70} \text{ min}\]
\[= \underline{1} \text{ h} \underline{10} \text{ min}\]

3. \[150 \text{ min} - 40 \text{ min} = \underline{\text{min}}\]
\[= \underline{\text{h}} \underline{\text{min}}\]

4. \[125 \text{ min} - 35 \text{ min} = \underline{\text{min}}\]
\[= \underline{\text{h}} \underline{\text{min}}\]

5. \[160 \text{ min} - 45 \text{ min} = \underline{\text{min}}\]
\[= \underline{\text{h}} \underline{\text{min}}\]
Subtract. Use number bonds to help you.

**Example**

\[ 5 \text{ h 45 min} - 2 \text{ h 10 min} = ? \]

Add the hours and minutes:

\[ 5 \text{ h } 45 \text{ min} - 2 \text{ h } 10 \text{ min} = 3 \text{ h } 35 \text{ min} \]

6.

\[ 7 \text{ h 50 min} - 4 \text{ h 15 min} = ? \]

Subtract the hours:

\[ 7 \text{ h } - 4 \text{ h} = \_\_\_\_ \text{ h} \]

Subtract the minutes:

\[ 50 \text{ min } - 15 \text{ min} = \_\_\_\_ \text{ min} \]

Add the hours and minutes:

\[ \_\_\_\_ \text{ h } \_\_\_\_ \text{ min} \]

\[ 7 \text{ h 50 min } - 4 \text{ h 15 min} = \_\_\_\_ \text{ h } \_\_\_\_ \text{ min} \]
9 h 40 min - 5 h 25 min = ?

Subtract the hours: 9 h - 5 h = _____ h
Subtract the minutes: 40 min - 25 min = _____ min
Add the hours and minutes: _____ h _____ min
9 h 40 min - 5 h 25 min = _____ h _____ min

5 h 25 min - 4 h 5 min = ?

Subtract the hours: _____ h - _____ h = _____ h
Subtract the minutes: _____ min - _____ min = _____ min
Add the hours and minutes: _____ h _____ min
5 h 25 min - 4 h 5 min = _____ h _____ min
Subtract.

Example

\[2 \text{ h} \ 15 \text{ min} - 35 \text{ min} = ?\]

1 h \hspace{1cm} 75 \text{ min}

Regroup first. Then subtract.

Subtract the minutes: \(75 \text{ min} - 35 \text{ min} = \underline{40} \text{ min}\)

Add the hours and minutes: \(1 \text{ h} + \underline{40} \text{ min}\)

\[= \underline{1} \text{ h} \underline{40} \text{ min}\]

So, \(2 \text{ h} \ 15 \text{ min} - 35 \text{ min} = \underline{1} \text{ h} \underline{40} \text{ min}\)

9. \[7 \text{ h} \ 40 \text{ min} - 55 \text{ min} = ?\]

6 h \hspace{1cm} 100 \text{ min}

Subtract the minutes: \(100 \text{ min} - 55 \text{ min} = \underline{45} \text{ min}\)

Add the hours and minutes: \(6 \text{ h} + \underline{45} \text{ min}\)

\[= \underline{6} \text{ h} \underline{45} \text{ min}\]

So, \(7 \text{ h} \ 40 \text{ min} - 55 \text{ min} = \underline{6} \text{ h} \underline{45} \text{ min}\)
10. 

\[5 \text{ h } 25 \text{ min } - 2 \text{ h } 45 \text{ min } = ?\]

4 h \hspace{1cm} 85 \text{ min}

Subtract the hours: \(4 \text{ h } - 2 \text{ h} = \) ______ h
Subtract the minutes: \(85 \text{ min } - 45 \text{ min } = \) ______ min
Add the hours and minutes: ______ h + ______ min

\(= \) ______ h ______ min

So, \(5 \text{ h } 25 \text{ min } - 2 \text{ h } 45 \text{ min } = \) ______ h ______ min

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11. 

\[12 \text{ h } 10 \text{ min } - 7 \text{ h } 30 \text{ min } = \] 

11 h \hspace{1cm} 70 \text{ min}

Subtract the hours: \(11 \text{ h } - 7 \text{ h} = \) ______ h
Subtract the minutes: \(70 \text{ min } - 30 \text{ min } = \) ______ min
Add the hours and minutes: ______ h + ______ min

\(= \) ______ h ______ min

So, \(12 \text{ h } 10 \text{ min } - 7 \text{ h } 30 \text{ min } = \) ______ h ______ min
12. \[ 5 \text{ h } 30 \text{ min} - 2 \text{ h } 50 \text{ min} = ? \]

Subtract the hours: \[ \quad \text{h} - \quad \text{h} = \quad \text{h} \]

Subtract the minutes: \[ \quad \text{min} - \quad \text{min} = \quad \text{min} \]

Add the hours and minutes: \[ \quad \text{h} + \quad \text{min} \]

\[ = \quad \text{h} \quad \text{min} \]

So, \[ 5 \text{ h } 30 \text{ min} - 2 \text{ h } 50 \text{ min} = \quad \text{h} \quad \text{min} \]

13. \[ 10 \text{ h } 25 \text{ min} - 4 \text{ h } 50 \text{ min} = ? \]

Subtract the hours: \[ \quad \text{h} - \quad \text{h} = \quad \text{h} \]

Subtract the minutes: \[ \quad \text{min} - \quad \text{min} = \quad \text{min} \]

Add the hours and minutes: \[ \quad \text{h} + \quad \text{min} \]

\[ = \quad \text{h} \quad \text{min} \]

So, \[ 10 \text{ h } 25 \text{ min} - 4 \text{ h } 50 \text{ min} = \quad \text{h} \quad \text{min} \]
Worksheet 5  Elapsed Time

Find the elapsed time. Use the time line to help you.

Example

7 P.M. to 9 P.M. = \( \underline{2} \) h

\[ \begin{array}{cccc}
7 \text{ P.M.} & 8 \text{ P.M.} & 9 \text{ P.M.} & 10 \text{ P.M.} \\
\end{array} \]

Elapsed time is the amount of time that has passed between the start and the end of an activity. We can use a time line to find elapsed time.

1. 8 A.M. to 12 noon = \( \underline{4} \) h

\[ \begin{array}{cccc}
8 \text{ A.M.} & 9 \text{ A.M.} & 10 \text{ A.M.} & 11 \text{ A.M.} & 12 \text{ P.M.} & 1 \text{ P.M.} & 2 \text{ P.M.} \\
\end{array} \]

2. 12 noon to 3 P.M. = \( \underline{3} \) h

\[ \begin{array}{cccc}
12 \text{ P.M.} & 1 \text{ P.M.} & 2 \text{ P.M.} & 3 \text{ P.M.} & 4 \text{ P.M.} \\
\end{array} \]

3. 5 P.M. to 10 P.M. = \( \underline{5} \) h

\[ \begin{array}{cccc}
5 \text{ P.M.} & 6 \text{ P.M.} & 7 \text{ P.M.} & 8 \text{ P.M.} & 9 \text{ P.M.} & 10 \text{ P.M.} \\
\end{array} \]
4. 7:30 P.M. to 9:30 P.M. = ______ h

5. 1:45 P.M. to 4:45 P.M. = ______ h

Find the elapsed time.
Use the time line to help you.

Example

11:20 A.M. to 11:50 A.M. = 30 min

50 min − 20 min
= 30 min
6. 3:10 A.M. to 3:45 A.M. = ________ min

7. 7:05 P.M. to 7:50 P.M. = ________ min

8. 2:20 A.M. to 2:55 A.M. = ________ min

9. 6:15 A.M. to 6:50 A.M. = ________ min
Find the elapsed time.
Use the time line to help you.

Example

11:40 A.M. to 12:15 P.M. = \( \frac{35}{\text{min}} \)

\[ \begin{array}{ccc}
11:40 \text{ A.M.} & \quad & 12 \text{ P.M.} & \quad & 12:15 \text{ P.M.} \\
20 \text{ min} & \quad & \text{15 min} & \quad & \\
\end{array} \]

11:40 A.M. to 12:00 P.M. = \( \frac{20}{\text{min}} \)
12:00 P.M. to 12:15 P.M. = \( \frac{15}{\text{min}} \)
Total = \( \frac{20}{\text{min}} + \frac{15}{\text{min}} = \frac{35}{\text{min}} \)

10. 2:45 P.M. to 3:35 P.M. = \( \frac{______}{\text{min}} \)

\[ \begin{array}{ccc}
2:45 \text{ P.M.} & \quad & 3 \text{ P.M.} & \quad & 3:35 \text{ P.M.} \\
15 \text{ min} & \quad & \text{35 min} & \quad & \\
\end{array} \]

2:45 P.M. to 3:00 P.M. = \( \frac{______}{\text{min}} \)
3:00 P.M. to 3:35 P.M. = \( \frac{______}{\text{min}} \)
Total = \( \frac{______}{\text{min}} + \frac{______}{\text{min}} = \frac{______}{\text{min}} \)
Find the elapsed time. Draw a time line to help you.

**Example**

8:20 A.M. to 11:40 A.M. = \[3\, \text{h} \, 20\, \text{min}\]

11. 7:35 A.M. to 8:20 A.M. = _______ min

\[\begin{array}{c}
7:35\, \text{A.M.} \\
8\, \text{A.M.} \\
8:20\, \text{A.M.}
\end{array}\]

\[\begin{array}{c}
25\, \text{min}
\end{array}\]

\[\begin{array}{c}
20\, \text{min}
\end{array}\]

7:35 A.M. to 8:00 A.M. = _______ min

8:00 A.M. to 8:20 A.M. = _______ min

Total = _______ min + _______ min = _______ min

12. 7:30 A.M. to 10:45 A.M. = _______ h _______ min
13. 2:10 P.M. to 7:35 P.M. = _______ h _______ min

14. 10:45 A.M. to 2:20 P.M. = _______ h _______ min

Find the time at the end.

*Example*

Start at 7:20 A.M. [4 hours later] ____________ ?

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Time at the end: 11:20 A.M.
15. Start at 1:30 A.M. 5 hours later

Time at the end: __________

16. Start at 9:25 A.M. 3 hours 15 minutes later

Time at the end: __________

17. Start at 2:50 P.M. 2 hours 10 minutes later

Time at the end: __________
Find the time at the beginning.

Example

\[
\begin{array}{c}
? \quad \text{4 hours before} \quad \text{End at 7:20 P.M.} \\
3:20 \text{ P.M.} \quad 4:20 \text{ P.M.} \quad 5:20 \text{ P.M.} \quad 6:20 \text{ P.M.} \quad 7:20 \text{ P.M.}
\end{array}
\]

Time at the beginning: \textbf{3:20 P.M.}

18. \quad ? \quad \text{2 hours before} \quad \text{End at 1:30 A.M.}

\[
\begin{array}{c}
? \quad \text{2 hours before} \quad \text{End at 1:30 A.M.} \\
1:30 \text{ A.M.}
\end{array}
\]

Time at the beginning: \underline{__________}

19. \quad ? \quad \text{1 hour 40 minutes before} \quad \text{End at 10:30 P.M.}

\[
\begin{array}{c}
? \quad \text{1 hour 40 minutes before} \quad \text{End at 10:30 P.M.} \\
10:30 \text{ P.M.}
\end{array}
\]

Time at the beginning: \underline{__________}
Worksheet 6  Measuring Temperature

Fill in the blanks with **hot, warm, cool, or cold**.

1. Water boils 212°F
   __________

2. Room temperature 68°F
   __________

3. Water freezes 32°F
   __________

A thermometer is used to measure **temperature**. Temperature can be measured in **degrees Fahrenheit (°F)**.

- A spring day 50°F
  __________
Write each temperature using °F. Then write hot, warm, cool, or cold to describe the temperature.

**Example**

![Temperature Scale](image)

71°F; warm

2. [Temperature Scale](image)

3. [Temperature Scale](image)

4. [Temperature Scale](image)

5. [Temperature Scale](image)
Worksheet 7  Real-World Problems:
Time and Temperature

Solve. Draw a time line to help you.

1. Gary goes to a movie.
The movie starts at 7:30 P.M. and ends at 9:15 P.M.
How long does the movie last?

2. Sean takes 40 minutes to paint a room.
How long would it take Sean to paint 5 identical rooms?
3. Betty leaves for school at 7:15 A.M.  
She takes 55 minutes to reach the school.  
What time does Betty reach school?

4. Andrea spends 4 hours 20 minutes sewing a dress.  
She finishes sewing at 7:45 P.M.  
What time did Andrea start sewing?
5. Rachel is a city tour guide.
   On Saturday, she spends 1 hour 15 minutes with a tour group.
   On Sunday, she spends 1 hour 45 minutes with another tour group.
   Rachel is paid $30 an hour.
   a. How many hours did Rachel spend with the tour groups on both days?
   b. How much did Rachel earn by giving the two tours?

6. Jeron finished his school work at 4:20 P.M. according to his watch.
   His watch was 15 minutes fast.
   a. What was the actual time Jeron finished his school work?
   b. Jeron did his school work for 1 hour 30 minutes.
      What was the actual time he started working on his school work?
Complete the story.
Use the temperatures and words in the box.

7.

<table>
<thead>
<tr>
<th>hot</th>
<th>cold</th>
<th>0°F</th>
<th>100°F</th>
</tr>
</thead>
<tbody>
<tr>
<td>warm</td>
<td>cool</td>
<td>212°F</td>
<td>40°F</td>
</tr>
</tbody>
</table>

Ron played at the beach on a summer day. It was a ________ day.

The temperature was ________ °F. To quench his thirst,

he drank a bottle of ice water. The temperature of the ice water

was ________ °F.