Show all of your work for the problems in this packet, even the multiple choice ones. If you do not have written work to show, explain your thinking.
Activity 3  Alternate Interior, Alternate Exterior, and Corresponding Angles

\( \overrightarrow{PQ} \) and \( \overrightarrow{RS} \) are parallel lines. \( \overrightarrow{TU} \) is a straight line. Identify each pair of angles as vertical, corresponding, alternate interior, alternate exterior angles, or none of the above.

1. \( \angle 1 \) and \( \angle 5 \)

2. \( \angle 3 \) and \( \angle 8 \)

3. \( \angle 4 \) and \( \angle 7 \)

4. \( \angle 5 \) and \( \angle 6 \)

5. Name all angles that have the same measure as \( \angle 2 \).
\( \overrightarrow{MN} \) is parallel to \( \overrightarrow{PQ} \). \( ST \) is a straight line. Use the diagram to answer each question.

6. Name all angles that have the same measure as \( \angle 7 \).

7. If \( m\angle 1 = 30^\circ \), find \( m\angle 8 \).

8. If \( m\angle 2 = 140^\circ \), find \( m\angle 3 \).

The diagrams may not be drawn to scale. Find the measure of each numbered angle.

9. \( \overrightarrow{AB} \) is parallel to \( \overrightarrow{CD} \).

10. \( \overrightarrow{BA} \) is parallel to \( \overrightarrow{DC} \).
11. $\overrightarrow{AB}$ is parallel to $\overrightarrow{CD}$.

12. $\overrightarrow{BA}$ is parallel to $\overrightarrow{DC}$.

13. $\overrightarrow{AB}$ is parallel to $\overrightarrow{CD}$.

14. $\overrightarrow{AB}$ is parallel to $\overrightarrow{CD}$.
The diagrams may not be drawn to scale. \( \overline{AB} \) is parallel to \( \overline{CD} \). Find the value of each variable.

15

16

17

18
The diagrams may not be drawn to scale. $\overline{AB}$ is parallel to $\overline{CD}$ and $\overline{MN}$ is parallel to $\overline{PQ}$. Find the measure of each numbered angle.

19

\begin{align*}
\angle 1 &= 100^\circ \\
\angle 2 &= 50^\circ \\
\angle 3 &= 46^\circ \\
\angle 4 &= 50^\circ \\
\angle 5 &= 119^\circ \\
\angle 6 &= 47^\circ
\end{align*}

20

\begin{align*}
\angle 1 &= 46^\circ \\
\angle 2 &= 50^\circ \\
\angle 3 &= 119^\circ \\
\angle 4 &= 47^\circ \\
\angle 5 &= 53^\circ
\end{align*}

21

\begin{align*}
\angle 1 &= 42^\circ \\
\angle 2 &= 80^\circ \\
\angle 3 &= 80^\circ
\end{align*}

22

\begin{align*}
\angle 1 &= 47^\circ \\
\angle 2 &= 47^\circ \\
\angle 3 &= 47^\circ
\end{align*}
The diagrams may not be drawn to scale. \( \overrightarrow{PQ} \) is parallel to \( \overrightarrow{RS} \). Find the value of each variable.

23. \( \overrightarrow{BA} \) is parallel to \( \overrightarrow{DE} \).

\[
\begin{array}{c}
A \quad 145^\circ \\
E \\
B \\
145^\circ \\
C \\
D \\
x^\circ \\
\end{array}
\]

24. \( \overrightarrow{GK} \) is parallel to \( \overrightarrow{FJ} \).

\[
\begin{array}{c}
H \\
G \\
x^\circ \\
F \\
J \\
112^\circ \\
K \\
\end{array}
\]

25. \( \overrightarrow{MP} \) is parallel to \( \overrightarrow{NR} \).

\[
\begin{array}{c}
M \\
O \\
23^\circ \\
23^\circ \\
R \\
34^\circ \\
79^\circ \\
\end{array}
\]

26. \( \overrightarrow{ST} \) is parallel to \( \overrightarrow{VX} \).

\[
\begin{array}{c}
T \\
S \\
146^\circ \\
110^\circ \\
W \\
146^\circ \\
V \\
\end{array}
\]
Solve.

27 The diagram below shows the flag of the Czech Republic. \( \overrightarrow{MN}, \overrightarrow{PQ}, \) and \( \overrightarrow{RS} \) are parallel lines. \( \overrightarrow{AB} \) and \( \overrightarrow{CD} \) are straight lines.

a Name two alternate exterior angles.

b Name all angles that have the same measure as \( \angle 10 \).
In the diagram below, \( \overrightarrow{AB} \) is parallel to \( \overrightarrow{CD} \) and \( \overrightarrow{PQ} \) is a straight line. Given that \( m\angle 1 = (20k + 18)^\circ \) and \( m\angle 2 = 78^\circ \), find the value of \( k \).
Activity 10  Operations with Fractions and Mixed Numbers

Evaluate each expression. Give your answer in simplest form.

1. \(-\frac{8}{3} + \frac{1}{4}\)
2. \(\frac{4}{15} + \left(-\frac{7}{9}\right)\)
3. \(\frac{1}{6} - \left(-\frac{2}{3}\right)\)
4. \(\frac{1}{5} - \frac{2}{15}\)
5. \(\frac{1}{3} - \left(-\frac{2}{5}\right) - \frac{3}{4}\)
6. \(\frac{-4}{9} + \left(-\frac{5}{6}\right) + \left(-\frac{1}{3}\right)\)

Evaluate each product. Give your answer in simplest form.

7. \(-\frac{3}{4} \cdot \frac{5}{12}\)
8. \(-\frac{2}{4} \cdot \frac{8}{27}\)
9. \(-\frac{14}{25} \cdot \left(-\frac{13}{7}\right)\)
10. \(1\frac{8}{27} \cdot \left(-2\frac{2}{5}\right)\)
Evaluate each quotient. Give your answer in simplest form.

11. \(-2\frac{2}{3} \cdot (-3\frac{3}{4})\)

12. \(\frac{2}{15} \cdot (-1\frac{2}{3})\)

13. \(-\frac{1}{4} ÷ \frac{3}{8}\)

14. \(\frac{2}{5} ÷ (-\frac{4}{35})\)

15. \(1\frac{2}{3} ÷ (-3\frac{1}{3})\)

16. \(-2\frac{3}{4} ÷ (-1\frac{3}{8})\)

17. \(-\frac{10}{\frac{5}{13}}\)

18. \(\frac{\frac{2}{3}}{-16}\)

19. \(\frac{-\frac{4}{5}}{\frac{7}{20}}\)

20. \(\frac{-2\frac{2}{5}}{\frac{1\frac{1}{5}}{5}}\)
Solve.

21 A restaurant used $8 \frac{5}{6}$ pounds of rice on Monday, and $5 \frac{1}{6}$ pounds of rice on Tuesday. How many more pounds of rice were used on Monday than on Tuesday?

22 Riley has $9 \frac{2}{3}$ feet of cloth. She needs to cut it into lengths of $\frac{1}{3}$ foot. How many complete lengths can she cut?

23 A recipe calls for $2 \frac{1}{2}$ cups of walnuts. A chef has only $\frac{5}{6}$ cup of walnuts. How many more cups of walnuts does the chef need for the recipe?
24 The sum of two mixed numbers is $-9\frac{2}{3}$. One of the numbers is $-2\frac{7}{9}$. Find the other number.

25 The masses of Parcel P, Parcel Q, and Parcel R are $4\frac{1}{2}$, $3\frac{2}{5}$, and $6\frac{4}{5}$ pounds respectively. Find the average mass of the three parcels.

26 A mixed number is divided by $1\frac{4}{5}$, and the quotient is $2\frac{1}{3}$. What is the mixed number?
Activity 1  Understanding Relations and Functions

Given the relation described, identify the input and the output.

1. Chase wants to know his weekly salary when he works for a certain number of hours per week at a constant hourly pay rate.

2. Mr. Morris wants to know how many miles he can drive his car for when the fuel tank is filled with various gallons of gasoline.

Identify the type of relation between the inputs and the outputs.

3. The relation between the inputs and the outputs is a _______-to-_______ relation.

4. The relation between the inputs and the outputs is a _______-to-_______ relation.
Solve.

5 The table shows the favorite color of each student in a class. Draw a mapping diagram to represent the relation between the favorite color and the number of students. Identify the type of relation between the favorite color and the number of students.

<table>
<thead>
<tr>
<th>Input, Favorite Colors</th>
<th>Red</th>
<th>Blue</th>
<th>Yellow</th>
<th>Violet</th>
<th>Green</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output, Number of Students</td>
<td>6</td>
<td>10</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

6 The table shows the number of signatures collected each day for seven days by a citizen wanting to run for town council.

<table>
<thead>
<tr>
<th>Input, Number of Signatures</th>
<th>55</th>
<th>43</th>
<th>55</th>
<th>30</th>
<th>75</th>
<th>55</th>
<th>62</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output, Day</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
</tbody>
</table>

Draw a mapping diagram to represent the relation between the number of signatures collected on each day. Identify the type of relation between the number of signatures and the day.
Identify the type of relation represented by each mapping diagram. Determine whether the relation is a function. Explain.

7 Relation
Input
A  B  C  D
Output
1  2  3  4

8 Relation
Input
A  B  C  D
Output
1  2  3  4

State whether each statement is True or False. Explain.

9 A one-to-one relation is always a function.

10 A function is a special type of relation.

11 When Melanie clicks on any of the icons in a folder on her computer, it will open only the file that she clicks on. She says the folder represents a function.

12 In a relation where the input is the age of the students in a class and the output is the height of the students, the relation is a function.
Solve.

The table shows the number of available parking spots in each of the five parking garages.

<table>
<thead>
<tr>
<th>Input, Garage</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output, Number of Available Parking Spots</td>
<td>425</td>
<td>510</td>
<td>418</td>
<td>425</td>
<td>608</td>
</tr>
</tbody>
</table>

a. Draw a mapping diagram to represent the relation between each garage and the number of available parking spots.

b. From the mapping diagram, identify the relation between the garages and the number available parking spots.

c. Determine whether the relation represented by the mapping diagram is a function. Explain.
The table shows the number of shoes produced by each of five factories and the production cost incurred during the week.

<table>
<thead>
<tr>
<th>Factory</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Shoes Produced</td>
<td>674</td>
<td>480</td>
<td>535</td>
<td>605</td>
<td>674</td>
</tr>
<tr>
<td>Production Cost</td>
<td>$10,110</td>
<td>$7,200</td>
<td>$8,025</td>
<td>$9,075</td>
<td>$10,110</td>
</tr>
</tbody>
</table>

a Draw a mapping diagram to represent the relation between the factories and the number of shoes produced.

b From the mapping diagram, identify the relation between the factory and the number of shoes produced. Then tell whether the relation represented by the mapping diagram is a function. Explain.

c Draw a mapping diagram to represent the relation between the production costs incurred by the factories and the number of shoes produced. Identify the relation between the production cost and the number of shoes produced. Then tell whether the relation represented by the mapping diagram is a function. Explain.
Which of these graphs represents a function? Explain.
Activity 3  Simplifying Algebraic Expressions

Simplify each expression with one variable.

1. $2.1x + 0.8x - 3$
2. $1.6y + 1.9y + 1.3$
3. $3.5p + (-2.8p) - 1$
4. $\frac{5}{9}a + \frac{4}{9}a + \frac{5}{9}$
5. $\frac{7}{8}b + \frac{1}{4}b - 3$
6. $\frac{9}{2}m + \left(-\frac{1}{3}m\right) + 7$

Simplify each expression with three algebraic terms.

7. $1.5x + 0.8x + 0.6x$
8. $5.4a - 2.7a + (-0.8a)$
Simplify each expression with one variable.

9. \(4.8b + 1.2b - 3.9b\)

10. \(\frac{1}{7}p + \frac{4}{7}p + \frac{1}{7}p\)

11. \(\frac{7}{9}q + \frac{1}{3}q + \frac{1}{9}q\)

12. \(\frac{3}{4}m + \frac{2}{3}m + \left(-\frac{1}{6}m\right)\)

13. \(7a - 5 - 3a\)

14. \(16b - 9 + 5b\)

15. \(1.1p + 2.3 + [-0.5p]\)

16. \(6.3q - 1.8 - 5.7q\)

17. \(\frac{3}{5}m + \frac{2}{3} + \frac{7}{10}m\)

18. \(\frac{5}{6}n - \frac{2}{3} + \left(-\frac{1}{2}n\right)\)
Simplify each expression with two variables.

19. \(5x + x + 5y\)

20. \(24m - 16m - (-5n)\)

21. \(11a + 3a + 5b - b\)

22. \(9b - 2a + 3b + (-a)\)

23. \(2.7m + 0.5m + 3.2n + 0.8n\)

24. \(18.5p - 16.6p - 4.3q - (-2.7q)\)

25. \(\frac{3}{7}x + \frac{1}{7}x - \frac{1}{6}y + \frac{5}{6}y\)

26. \(\frac{3}{4}p + \left(-\frac{1}{2}p\right) + \frac{5}{9}q - \frac{1}{3}q\)
Find the perimeter of each figure.

27

28
Activity 2  Solving Algebraic Equations

Solve each equation with variables on the same side.

1. \(5x + 3 = 7\)
2. \(4y - 7 = 5\)
3. \(9p + 5 = -13\)
4. \(23 = 6x - 1\)
5. \(\frac{2}{3}x - 5 = 1\)
6. \(\frac{7}{5}y = 3 - \frac{1}{5}\)
7. \( \frac{5}{8} p = \frac{9}{4} - \frac{3}{8} \)

8. \( \frac{5}{6} = \frac{3}{4} x - \frac{2}{3} \)

9. \( 5.7 + 0.3y = 6.9 \)

10. \( 4.2 + 2.5a = 9.2 \)

11. \( 3.2y - 7 = 9 \)

12. \( 7.8y - 4.9 - 5.4y = 2.3 \)
Solve each equation involving parentheses.

13 \( 4(3x - 2) = 16 \)

14 \( 5(4y - 3) = 45 \)

15 \( 3(4n - 1) - 7n = 17 \)

16 \( 6(5c - 2) - 10c = 13 \)

17 \( \frac{3}{4}(5a - 3) = \frac{3}{8} \)

18 \( \frac{4}{5}(m - 1) - \frac{1}{5}m = 1 \)

Work out the expressions in the parentheses first.
19 \( \frac{2}{5}x - \frac{1}{4}(x - 8) = \frac{13}{2} \)

20 \( 6(3.2y - 1) = 3.6 \)

21 \( 1.8(5a + 3) + 5.6 = 29 \)

22 \( \frac{6}{5}(2f - 3) - 3f = \frac{3}{2} \)

23 \( 0.5(2m - 3) - 0.8m = 2.7 \)

24 \( 0.8(3.5h - 5) = 1.6 \)