Unit 1: End-of-Unit Assessment

1. Polyhedron P is a cube with a corner removed and relocated to the top of P. Polyhedron Q is a cube. How do their surface areas compare?

A. P's surface area is less than Q's surface area.

B. P's surface area is equal to Q's surface area.

C. P's surface area is greater than Q's surface area.

D. There is not enough information given to compare their surface areas.
2. Select **all** of the nets that can be folded and assembled into a triangular prism like this one.

3. A cube has a side length of 8 inches.

Select **all** the values that represent the cube's volume in cubic inches.

A. $8^2$

B. $8^3$

C. $6 \cdot 8^2$

D. $6 \cdot 8$

E. $8 \cdot 8 \cdot 8$
4. a. A square has a side length 9 cm. What is its area?

b. A square has an area of 9 cm². What is its side length?

5. For each pair of numbers, circle the number that is greater.
   a. 13² or 15²
   b. 7 · 6² or 6³
   c. 10³ or 30²

6. A rectangular prism has dimensions of 2 cm by 2 cm by 5 cm. What is its surface area? Explain or show your reasoning.
7. Here is a net made of right triangles and rectangles. All measurements are given in centimeters.

a. If the net were folded and assembled, what type of polyhedron would it make?

b. What is the surface area of the polyhedron? Explain your reasoning.
Unit 2: End-of-Unit Assessment

1. Select all the true statements.

- The ratio of triangles to squares is 2 to 4.
- The ratio of squares to smiley faces is 6 : 4.
- The ratio of smiley faces to triangles is 6 to 4.
- There are two squares for every triangle.
- There are two triangles for every smiley face.
- There are three smiley faces for every triangle.

2. Select all the ratios that are equivalent to 8 : 6.

- 4 : 3
- 6 : 8
- 16 : 12
- 10 : 8
- 7 : 5
3. A mixture of purple paint contains 6 teaspoons of red paint and 15 teaspoons of blue paint. To make the same shade of purple paint using 35 teaspoons of blue paint, how much red paint would you need? Use the double number line diagram to help if needed.

A. 12 teaspoons  
B. 14 teaspoons  
C. 18 teaspoons  
D. 26 teaspoons

4. Lin rode her bike 2 miles in 8 minutes. She rode at a constant speed. Complete the table to show the time it took her to travel different distances at this speed.

<table>
<thead>
<tr>
<th>distance traveled (miles)</th>
<th>elapsed time (minutes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
5. Solve each of the following:
   
a. 3 movie tickets cost $36. At this rate, what is the cost per ticket?

   b. 3 ice cream cones cost $8.25. At this rate, how much do 2 ice cream cones cost?

   c. 3 bananas cost $0.99. At this rate, how much do 5 bananas cost?

6. A bag contains 120 marbles. Some are red and the rest are black. There are 19 red marbles for every black marble. How many red marbles are in the bag? Explain your reasoning.
7. To make orange fizz, Noah mixes 4 scoops of powder with 6 cups of water. Andre mixes 5 scoops of powder with 8 cups of water.

   a. Create a double number line or a table that shows different amounts of powder and water that taste the same as Noah's mixture.

   b. Create a double number line or a table that shows different amounts of powder and water that taste the same as Andre's mixture.

   c. How do their two mixtures compare in taste? Explain your reasoning.
Unit 3: End-of-Unit Assessment

1. There are 15 pieces of fruit in a bowl and 6 of them are apples. What percentage of the pieces of fruit in the bowl are apples?

   A. 0.06%
   
   B. 0.4%
   
   C. 6%
   
   D. 40%

2. Select all of the trips that would take 2 hours.

   A. Drive 60 miles per hour between Buffalo and Seneca Falls, which are 120 miles apart.
   
   B. Walk 3 miles per hour to school, which is 1.5 miles away.
   
   C. Take a train going 80 miles per hour from Albany to New York City, which are 160 miles apart.

3. Lin's family has completed 70% of a trip. They have traveled 35 miles. How far is the trip?

   A. 24.5 miles
   
   B. 50 miles
   
   C. 59.5 miles
   
   D. 200 miles
4. Lin runs 5 laps around a track in 6 minutes.
   a. How many minutes per lap is that?
   b. How many laps per minute is that?
   c. If Lin runs 21 laps at the same rate, how long does it take her?

5. A ship captain is mapping a trip and wants to know the distance the ship will travel over certain time intervals.

<table>
<thead>
<tr>
<th>time (hours)</th>
<th>distance (miles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5</td>
<td>12.5</td>
</tr>
<tr>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>1.5</td>
<td>37.5</td>
</tr>
</tbody>
</table>

Assuming that the ship travels at a constant speed, what is its speed?
6. Which weighs more: a watermelon that weighs 7.5 kilograms or a baby that weighs 12 pounds? Explain your reasoning. Note: 1 pound is about 0.45 kilograms.

7. Elena and Jada are 12 miles apart on a path when they start moving toward each other. Elena runs at a constant speed of 5 miles per hour, and Jada walks at a constant speed of 3 miles per hour. How long does it take until Elena and Jada meet?
Unit 4: End-of-Unit Assessment

Calculators should not be used.

1. Mai biked $6\frac{3}{4}$ miles today, and Noah biked $4\frac{1}{2}$ miles. How many times the length of Noah’s bike ride was Mai’s bike ride?

   A. $\frac{2}{3}$ times as far  
   B. $\frac{3}{2}$ times as far  
   C. $\frac{9}{4}$ times as far  
   D. $\frac{243}{8}$ times as far

2. Select **all** equations that represent this question:

   Priya is stacking building blocks to make a tower. She takes a break when the tower is $2\frac{1}{2}$ feet tall, which is $\frac{5}{8}$ of the height of the tower she wants to build. How tall is the tower when finished?

   A. $\frac{5}{8} \cdot {?} = 2\frac{1}{2}$  
   B. $\frac{5}{8} ÷ 2\frac{1}{2} = {?}$  
   C. $2\frac{1}{2} \cdot {?} = \frac{5}{8}$  
   D. $2\frac{1}{2} \cdot \frac{5}{8} = {?}$  
   E. $2\frac{1}{2} \cdot \frac{8}{5} = {?}$  
   F. $2\frac{1}{2} ÷ \frac{5}{8} = {?}$
3. Select **all** statements that show correct reasoning for finding $15 \div \frac{2}{9}$.

   A. Multiply 15 by 2, then divide by 9.

   B. Multiply 15 by 9, then divide by 2.

   C. Multiply 15 by $\frac{1}{9}$, then multiply by 2.

   D. Multiply 15 by 9, then multiply by $\frac{1}{2}$.

4. Divide.

   a. $\frac{3}{4} \div \frac{1}{5}$

   b. $\frac{9}{2} \div \frac{3}{4}$

   c. $\frac{4}{9} \div \frac{8}{15}$

   d. $5\frac{2}{3} \div \frac{3}{2}$
5. Andre draws this tape diagram for $3 \div \frac{2}{3}$:

Andre says that $3 \div \frac{2}{3} = 4\frac{1}{3}$ because there are 4 groups of $\frac{2}{3}$ and $\frac{1}{3}$ left. Do you agree with Andre? Explain your reasoning.

6. How many $\frac{1}{3}$ inch cubes does it take to fill a box with width $2\frac{2}{3}$ inches, length $3\frac{1}{3}$ inches, and height $2\frac{1}{3}$ inches?

7. Lin has two small baking pans, each shaped like a rectangular prism. For each question, explain or show your reasoning.

   a. Lin lines the bottom of her first pan with aluminum foil. The area of the rectangular piece of foil is $11\frac{1}{4}$ square inches. Its length is $4\frac{1}{2}$ inches. What is the width of the foil?

   b. Lin's second pan has a length of $\frac{8}{3}$ inches, a width of $\frac{15}{4}$ inches, and a height is $\frac{3}{2}$ inches. What is the volume of the second pan?
Unit 5: End-of-Unit Assessment

Calculators should not be used.

1. A woodworker wants to cut a board that is 8.225 feet long into 5 equal-length pieces. How long will each of the cut boards be?

   A. 0.1645 feet
   B. 1.645 feet
   C. 4.1125 feet
   D. 41.125 feet

2. Select all of the expressions that have the same value as $892 \div 8$.

   A. $8920 \div 80$
   B. $894 \div 10$
   C. $89.2 \div 0.08$
   D. $8.92 \div 0.8$
   E. $0.892 \div 0.008$

3. Which is closest to the quotient $4,367 \div 0.004$?

   A. 1,000
   B. 10,000
   C. 100,000
   D. 1,000,000
4. One way to convert from inches to centimeters is to multiply the number of inches by 2.54. How many centimeters are there in $\frac{1}{4}$ inch?

5. Find each quotient using long division.
   
   a. $2,247 \div 7$

   b. $676 \div 13$
6. A sign in a bakery gives these options:
   - 12 cupcakes for $29
   - 24 cupcakes for $56
   - 50 cupcakes for $129

   a. Find each unit price to the nearest cent, and show your reasoning.

   b. Which option gives the lowest unit price?

7. A stack of 500 pieces of paper is 1.875 inches tall.

   a. Diego guesses that each piece of paper is 0.015 inches thick. Explain how you know that Diego's answer is not correct.

   b. Compute the thickness of each piece of paper. Show your reasoning.
Unit 6: End-of-Unit Assessment

Calculators should not be used.

1. Which expression is equal to $6^4$?
   
   A. 10
   
   B. 24
   
   C. $4^6$
   
   D. $6 \cdot 6 \cdot 6 \cdot 6$

2. Select all the equations where $x = 3$ is a solution.
   
   A. $x - 3 = 0$
   
   B. $1 + x = 2$
   
   C. $9 - x = 3$
   
   D. $6 = 2x$
   
   E. $\frac{1}{2}x = 3$
   
   F. $x^2 = 9$
3. Which expression is equivalent to $20c - 8d$?
   
   A. $2(10c + 4d)$
   
   B. $4(5c - 8d)$
   
   C. $4(5c - 2d)$
   
   D. $c(20 - 8d)$
   
4. Here is an expression: $3 \cdot 2^t$
   
   a. Evaluate the expression when $t$ is 1.
   
   b. Evaluate the expression when $t$ is 4.
5. \( \frac{2}{9} \) of the students in a school are in sixth grade.

a. How many sixth graders are there if the school has 90 students?

b. How many sixth graders are there if the school has 27 students?

c. If the school has \( x \) students, write an expression for the number of sixth graders in terms of \( x \).

d. How many students are in the school if 42 of them are sixth graders?
6. Jada makes sparkling juice by mixing 2 cups of sparkling water with every 3 cups of apple juice.

   a. How much sparkling water does Jada need if she uses 15 cups of apple juice?

   b. How much apple juice does Jada need if she uses 6 cups of sparkling water?

   c. Plot these pairs of measurements as points on the graph.

   d. Let $s$ represent the number of cups of sparkling water and $j$ represent the number of cups of apple juice. Write an equation that shows how $s$ and $j$ are related.
7. Mai poured 2.6 liters of water into a partially filled pitcher. The pitcher then contained 10.4 liters.

a. Which diagram (A, B, or C) represents this situation?

```
A
+---+---+
| 2.6| 10.4|
+---+---+
   | x   |
   +---+---+
   | 10.4|
   +---+---+

B
+---+---+
| x  | 2.6 |
+---+---+
   | 2.6 |
   +---+---+

C
+---+---+
| 10.4| x   |
+---+---+
```

b. Write an equation that represents this situation.

c. Solve the equation you wrote.

d. Explain what the solution to the equation means in this situation.
Unit 7: End-of-Unit Assessment

Do not use a calculator.

1. These four numbers are plotted on a number line:

\[
\begin{array}{cccc}
\frac{2}{3}, & \frac{5}{8}, & \frac{3}{5}, & \frac{1}{2}
\end{array}
\]

Which is the correct ordering on the number line, from left to right?

A. \( \frac{1}{2}, -\frac{3}{5}, \frac{2}{3}, \frac{5}{8} \)

B. \( -\frac{1}{2}, -\frac{3}{5}, \frac{5}{8}, \frac{2}{3} \)

C. \( -\frac{2}{3}, -\frac{3}{5}, -\frac{1}{2}, \frac{5}{8} \)

D. \( -\frac{3}{5}, -\frac{2}{3}, -\frac{1}{2}, \frac{5}{8} \)

2. Diego’s dog weighs more than 10 kilograms and less than 15 kilograms.

Select all the inequalities that *must* be true if \( w \) is the weight of Diego’s dog in kilograms.

A. \( w > 10 \)

B. \( w < 10 \)

C. \( w > 11 \)

D. \( w < 11 \)

E. \( w > 15 \)

F. \( w < 15 \)
3. Select **all** the numbers that are common multiples of 4 and 6.

   A. 1  
   B. 2  
   C. 10  
   D. 12  
   E. 24  
   F. 40  
   G. 60

4. Given $x = -2$, mark and place these expressions on the same number line.

   $x, -x, |-1.5|, -4, |5|, |-6|$
5. a. Which temperature is warmer, -2 degrees Celsius, or -5 degrees Celsius?

b. Write an inequality to express the relationship between -2 and -5.

c. On this number line, graph all the temperatures that are warmer than -2 degrees Celsius.

![Number line]

6. Draw polygon ABCDEF in this coordinate plane, given its vertices A = (-2, -3), B = (0, -3), C = (0, 1), D = (3, 1), E = (3, 3), F = (-2, 3).
7. Starting at 7:00 a.m., Lin spent a day hiking through a canyon. This graph shows her elevation (in meters) at some different times. Negative values of \( x \) represent times earlier than noon, and positive values of \( x \) represent times later than noon.

![Graph showing elevation over time]

a. What was Lin's elevation at noon? Explain how you know.

b. At 10:00 a.m., Lin's elevation was 7 meters. Add this point to the graph.

c. At 1:00 p.m., Lin was at sea level. Add this point to the graph.

d. Did Lin's elevation increase or decrease between 7:00 a.m. and 2:00 p.m.? Explain how you know.

e. Lin climbed downward from 2:00 p.m. to 3:00 p.m. Add a point to the graph that shows her possible elevation at 3:00 p.m. Explain your reasoning.
Unit 8: End-of-Unit Assessment

You may use a four-function or scientific calculator, but not a graphing calculator.

1. Select all the true statements.

   A. Given a box plot, it is always possible to calculate the mean of the data.

   B. Given a box plot, it is always possible to calculate the median of the data.

   C. Given a box plot, it is always possible to construct a corresponding dot plot.

   D. Given a dot plot, it is always possible to construct a corresponding box plot.

   E. Given a histogram, it is always possible to construct a corresponding box plot.

2. Here’s a dot plot of a data set.

   ![](dot_plot.png)

Which statement is true about the mean of the data set?

   A. The mean is less than 5.

   B. The mean is equal to 5.

   C. The mean is greater than 5.

   D. There is not enough information to determine the mean.
3. The air quality was tested in many office buildings in two cities. The results of the testing is shown in these box plots.

![Box plots for city P and city Q](image)

A level of less than 50 parts per million is considered healthy. A level of 50 or more parts per million is considered unhealthy.

Select all the statements that must be true.

A. The lowest recorded measurement was in city Q.

B. All buildings tested in city P are in the healthy range.

C. The mean for city P is greater than the mean for city Q.

D. The range for city Q is greater than the range for city P.

E. The median for city P is greater than the median for city Q.
4. This box plot displays information about the number of text messages some students sent one day.

![Box plot diagram]

- 0 5 10 15 20 25 30 35 40 45 50

number of texts

a. What is the median number of texts sent by students?

b. What is the IQR (interquartile range)?

c. Is this data set symmetric? Explain how you know.
5. Two groups went bowling. Here are the scores from each group.

<table>
<thead>
<tr>
<th>Group A</th>
<th>80</th>
<th>100</th>
<th>190</th>
<th>110</th>
<th>70</th>
<th>90</th>
<th>130</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group B</td>
<td>50</td>
<td>110</td>
<td>100</td>
<td>120</td>
<td>107</td>
<td>140</td>
<td>150</td>
</tr>
</tbody>
</table>

a. Draw two box plots, one for the data in each group.

b. Which group shows greater variability?

6. Ten students each attempted 10 free throws. This list shows how many free throws each student made.

8 5 6 6 4 9 7 6 5 9

a. What is the median number of free throws made?

b. What is the IQR (interquartile range)?
7. Jada asked some students at her school how many hours they spent watching television last week, to the nearest hour. Here are a box plot and a histogram for the data she collected.

Box plot:

Histogram:

a. About how many students did Jada ask? Explain how you know.
b. Is the mean or the median a more appropriate measure of center for this data set? Explain your reasoning.

c. Can Jada use these data displays to find the exact median? Explain how you know.

d. Can Jada use these data displays to find the exact mean? Explain how you know.

e. What would be an appropriate measure of variability for this data set? Find or estimate its value.