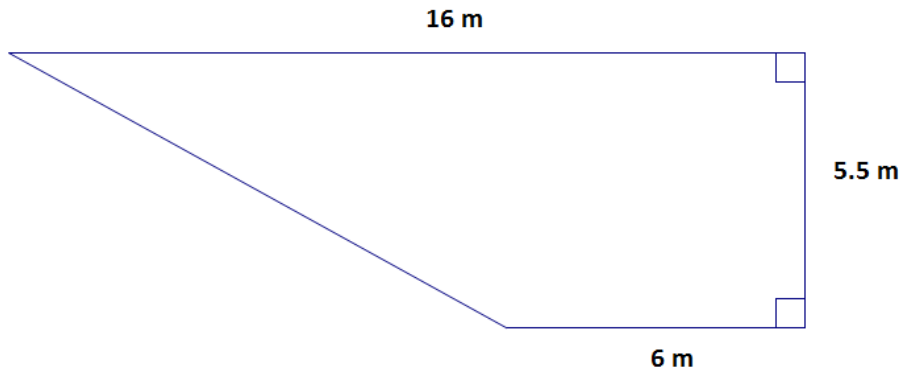# 7.G.B

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

1. The diameter of a circle is 7 yards.

    What is the area of the circle, in square yards? Round your answer to the nearest tenth.

2. The figure shown is created by joining a rectangle and a right triangle

    16 m

    5.5 m

    6 m

    What is the area of the figure, in square meters? Round to the nearest tenth.

3. Angle *A* and Angle *B* are complementary. The measure of Angle *A* is $(3x)°$. The measure of Angle *B* is 15°.

    a. Write an equation that could be used to find the value of *x*.
    b. What is the value of *x*?

4. Rian is packing toys in boxes. Each box is 3 inches by 4 inches by 6 inches. Each toy takes up 65% of the volume of the box, and the rest of the volume of the box is filled with foam packing beads. What is the volume, in cubic inches, of the foam packing beads used to fill each box?

5. The measure of $\frac{2}{3}$ of the circumference of a circle is approximately 17 feet. What is the radius of the circle, to the nearest foot?
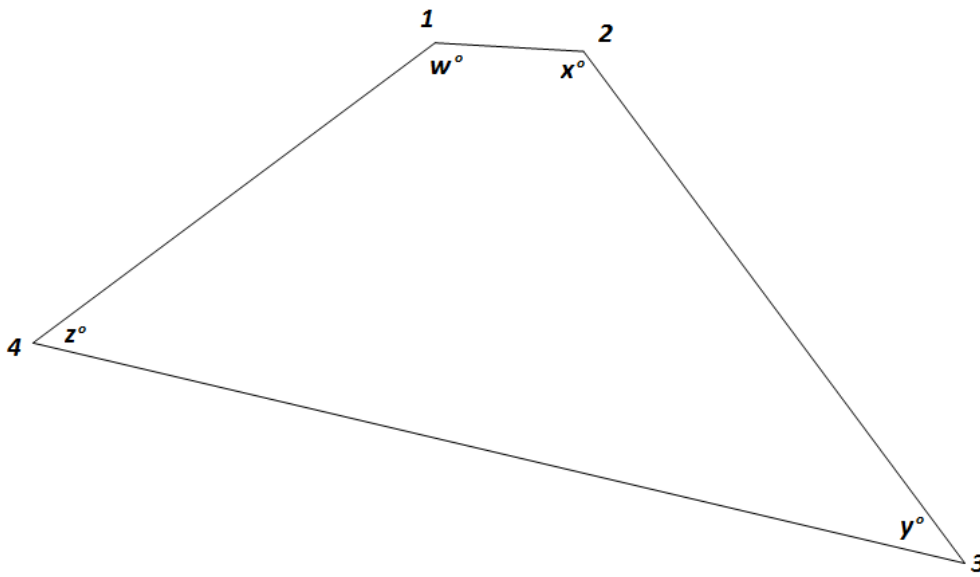
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

6.   In the quadrilateral,

- Angles 2 and 4 are supplementary.
- Angles 3 and 4 are complementary.
- Angles 2 and 3 are not supplementary.

Determine whether each equation is True or False.

not drawn to scale

Equation	True	False
$w + x = 90$		
$w + z = 180$		
$y + w = 180$		

7.   Julia is designing a model of a shipping container in the shape of a rectangular prism. The faces of the model will be made of cardboard. The model must meet the following requirements:

- The surface area of the model must be between 100 and 130 square inches.
- The volume of the model must be between 80 and 90 cubic inches.
- The height of the model must be between 3 and 5 inches.

What are possible dimensions of the height, width, and length of Julia's model?

Teacher Material

7.G.B

Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Question	Claim	Key/Suggested Rubric
1[1]	1	**1 point:** A number in the interval 38.465 to 38.5, inclusive
2[1]	1	**1 point:** 60.5, or equivalent
3[2]	4	**2 points:** $3x + 15 = 90$ AND 25 **1 point:** $3x + 15 = 90$ OR 25
4[2]	2	**1 point:** 25.2, or equivalent
5[2]	2	**1 point:** 4
6[2]	2	**1 point:** <table><tr><th>Equation</th><th>True</th><th>False</th></tr><tr><td>$w + x = 90$</td><td></td><td>x</td></tr><tr><td>$w + z = 180$</td><td></td><td>x</td></tr><tr><td>$y + w = 180$</td><td>x</td><td></td></tr></table>
7[2]	4	**2 points:** Answers will vary. Example: Height of 3 inches, Width of 4 inches, Length of 7 inches. **1 point:** A set of dimensions that includes a height between 3 and 5 inches and results in either a surface area between 100 and 130 square inches OR a volume between 80 and 90 cubic inches

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[1] From Smarterbalanced.org. Grade 7, Claim 1, Target A Item Specifications. Internet. Available from http://www.smarterbalanced.org/smarter-balanced-assessments/; accessed 11/2015.

[2] Adapted from the Mathematics K–12 Learning Standards. Internet. Available from http://www.k12.wa.us/Mathematics/Standards.aspx; accessed 11/2015.

7.RP.A

Analyze proportional relationships and use them to solve real-world and mathematical problems.

1. Edie uses $\frac{1}{4}$ gallon of blue paint for every $\frac{2}{3}$ gallon of yellow paint to make green paint. How many gallons of blue paint does she use for 1 gallon of yellow paint?

2. A toy jeep is $12\frac{1}{2}$ inches long while an actual jeep measures $18\frac{3}{4}$ feet long. What is the ratio of the length of the toy jeep to length of the actual jeep? What does the ratio mean in this situation?

3. During their last workout, Izzy ran $2\frac{1}{4}$ miles in 16 minutes and her friend Julia ran $3\frac{3}{4}$ miles in 28 minutes. Based on their last workout, which girl was the faster runner? Support your answer with a unit rate for each girl.

4. Mr. Stoven is making trail mix. The amount of raisins in the trail mix is proportional to the amount of peanuts. This equation represents the proportional relationship between the number of cups of raisins (*r*) and the number of cups of peanuts (*p*).

$$4r = 3p$$

   What is the number of cups of raisins used for 1 cup of peanuts?

5. You have decided to remodel your bathroom and install a tile floor. The bathroom is in the shape of a rectangle measuring 14 feet 8 inches by 5 feet 6 inches. The tiles you want to use cost $5 each, and each tile covers $5\frac{2}{3}$ square feet. You have $100 to spend. Do you have enough money to complete the project? Explain your reasoning.

7.RP.A

Analyze proportional relationships and use them to solve real-world and mathematical problems.

6. Select **all** tables that represent proportional relationships between *x*, the independent variable, and *y*, the dependent variable.

A.

x	0	3	6	9	12	15
y	0	1	2	3	5	8

B.

x	−1	0	1	2	3	4
y	3	0	5	2	7	4

C.

x	−4	−2	0	2	4	6
y	−12	−6	0	6	12	18

D.

x	−3	−2	−1	0	1	2
y	15	10	5	0	−5	−10

7. Howard and Michael go to lunch. They don't want to spend more than $18 each for lunch, including tax and a tip. They estimate the tax and tip at 25% of the price of their meal. Each boy determines the maximum price of their meal, before tax and tip, using different methods.

Howard's Work	Michael's Work
$100\% - 25\% = 75\%$	$100\% + 25\% = 125\%$
x is the maximum meal price	*x* is the maximum meal price
$x = 0.75(18)$	$1.25x = 18$
$x = 13.50$	$x = 14.40$
The maximum meal price is $13.50.	The maximum meal price is $14.40.

Which boy correctly determined the maximum price of their meal, before tax and tip? Describe why the other boy's method does **not** work.

8. A car dealer sold a car for 120% of the base price. The car sold for $24,000. What was the base price of the car?

Teacher Material

7.RP.A

Analyze proportional relationships and use them to solve real-world and mathematical problems.

Question	Claim	Key/Suggested Rubric
1[1]	1	**1 point:** $\dfrac{3}{8}$, or equivalent
2[2]	3	**2 points:** 1 inch to 1.5 feet, or equivalent OR 1 to 18, or equivalent AND a description of the meaning of the ratio. Example 1: The ratio is 1 inch to 1.5 feet. This meant that every inch on the toy jeep represents 1.5 feet on the actual jeep. Example 2: The ratio is 1 to 18. This means that the actual jeep is 18 times as large as the toy jeep. **1 point:** 1 inch to 1.5 feet, or equivalent OR 1 to 18, or equivalent OR a description of the meaning of the ratio.
3[2]	1	**1 point:** Izzy AND provides a correct unit rate for both students. NOTE: unit rates must both be in the same form: miles per minute, miles per hour, minutes per mile, hours per mile, etc.
4[1]	1	**1 point:** $\dfrac{3}{4}$, or equivalent
5[2]	4	**1 point:** Answers will vary. Example: Yes. I can buy 20 tiles, which cover more than 100 square feet because 20 $\times$ 5 = 100 and each tile has an area greater than 5 square feet. The area of the bathroom is less than 90 square feet because 15 $\times$ 6 = 90 and the dimensions of the bathroom are less than 15 feet by 6 feet.
6[1]	1	**1 point:** Selects C and D
7[3]	3	**1 point:** Michael AND describes why Howard's method does not work. Example: Michael is correct. Howard's method doesn't work because the 25% is being added to the price of the meal, not subtracted from the total amount of money that they spend. Also, 25% of 14.40 is not the same amount as 25% of 18.
8[4]	2	**1 point:** $20,000

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[1] From Smarterbalanced.org. Grade 7, Claim 1, Target A Item Specifications. Internet. Available from http://www.smarterbalanced.org/smarter-balanced-assessments/; accessed 11/2015.

[2] Adapted from the Mathematics K–12 Learning Standards. Internet. Available from http://www.k12.wa.us/Mathematics/Standards.aspx; accessed 11/2015.

[3] Adapted from Smarterbalanced.org. Grades 6–8, Claim 3 Item Specifications. Internet. Available from http://www.smarterbalanced.org/smarter-balanced-assessments/; accessed 11/2015.

[4] Adapted from Smarterbalanced.org. Grades 6–8, Claim 2 Item Specifications. Internet. Available from http://www.smarterbalanced.org/smarter-balanced-assessments/; accessed 11/2015.

7.SP.C

Investigate chance processes and develop, use, and evaluate probability models.

1. Select **all** statements that describe a likely event.

   A.   The observed probability a car turns right at a certain intersection is 53%.
   B.   The observed probability a person has a drink with their lunch is 0.85.
   C.   The observed probability that a random word on a page contains a vowel is $\dfrac{49}{50}$.
   D.   The probability a prime number is rolled on a 10-sided polyhedron is 40%.
   E.   The probability a random key pressed on a certain keyboard is the "Y" key is 0.95%.

2. The line plot shows the number of minutes early (negative values) or late (positive values) the trains at a certain station were for 1 week.
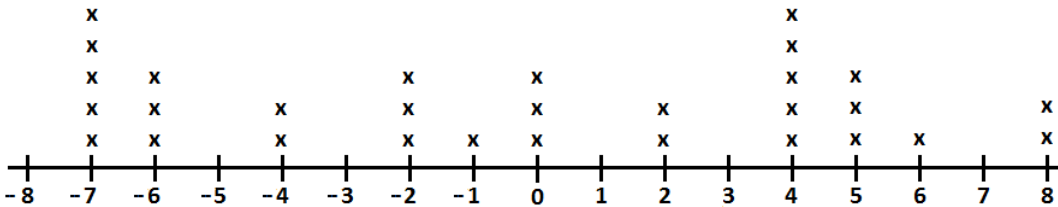
   Based on these results, what is the expected probability a train was 5 or more minutes late?

3. A marble is pulled at random from a bag, the color is noted, and then the marble is put back into the bag. The probability a green marble is pulled each time, using this process, is 0.55. Based on this outcome, which interval is the **best** prediction for the number of times a green marble is expected to be pulled if this process is repeated 200 times?

   A.   5 to 6
   B.   50 to 60
   C.   100 to 120
   D.   140 to 150

4. Assume that a baby being born a boy is as equally likely as a baby being born a girl. Describe a model that could be used to predict the probability that a random family with 3 children has 3 girls and 0 boys.

7.SP.C

Investigate chance processes and develop, use, and evaluate probability models.

5. Mrs. Thames is organizing art supplies for a class project. Each student will get one crayon, one marker, and one pair of scissors. The colors of the crayons and markers and the type of scissors are given below.

   Crayons: Red, Blue, Yellow, Green
   Markers: Black, Blue, Brown
   Scissors: Metal, Plastic

   a. Create an organized list, table, or tree diagram to represent all possible outcomes of randomly selecting one crayon, one marker, and one pair of scissors.
   b. Use your answer to part *a* to determine the probability that a random set of art supplies will have both a blue crayon and a blue marker.

6. A stack of pieces of construction paper contains red, brown, blue, and black paper. The probability a randomly-selected piece of paper is red is 0.35. The probability a randomly-selected piece of paper is brown is 15%. The probability a randomly-selected piece of paper is blue is $\frac{1}{5}$. What is the probability a randomly-selected piece of paper is black?

7. A traffic light is either red, yellow, or green. The probability that the light is yellow is the smallest. The probability that the light is red is slightly less than the probability that the light is green. Describe a model that could be used to predict the probability that the light will be green at 8 a.m. tomorrow morning.

8. Donna and Francis are playing a game. In the game, one player selects Number Cube A, B, C, or D, then the other player selects a different number cube. Both players roll their number cubes and the player with the higher number showing on the number cube is the winner. The numbers on the six faces of each number cube are shown below.

   Number Cube A: 7, 10, 14, 15, 19, 22
   Number Cube B: 3, 6, 8, 9, 20, 24
   Number Cube C: 1, 11, 12, 16, 17, 21
   Number Cube D: 2, 4, 5, 13, 18, 23

   a. Which number cube should the first player choose to have the best probability of winning?
   b. When the first player chooses the number cube you determined in part *a*, which number cube should the second player choose to have the best chance to win?

Teacher Material

7.SP.C

Investigate chance processes and develop, use, and evaluate probability models.

Question	Claim	Key/Suggested Rubric
1[1]	1	**1 point:** Selects B and C
2[2]	1	**1 point:** $\dfrac{6}{30}$, or equivalent
3[2]	1	**1 point:** Selects C
4[1]	4	**1 point:** Answers will vary. Example: On a fair coin, assign "Heads" to "Girl" and "Tails" to "Boy." Flip the coin 3 times. A result of "Heads, Heads, Heads" responds to a family with 3 children having all 3 girls.

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[1] Adapted from the Mathematics K–12 Learning Standards. Internet. Available from
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http://www.smarterbalanced.org/smarter-balanced-assessments/; accessed 11/2015.

5[3]	1	**2 points:** Represents all possible outcomes AND $\frac{2}{24}$, or equivalent. Example representation: | Crayon	Marker	Scissor
Red	Black	Metal
Red	Blue	Metal
Red	Brown	Metal
Blue	Black	Metal
Blue	Blue	Metal
Blue	Brown	Metal
Yellow	Black	Metal
Yellow	Blue	Metal
Yellow	Brown	Metal
Green	Black	Metal
Green	Blue	Metal
Green	Brown	Metal
Red	Black	Plastic
Red	Blue	Plastic
Red	Brown	Plastic
Blue	Black	Plastic
Blue	Blue	Plastic
Blue	Brown	Plastic
Yellow	Black	Plastic
Yellow	Blue	Plastic
Yellow	Brown	Plastic
Green	Black	Plastic
Green	Blue	Plastic
Green	Brown	Plastic | **1 point:** Represents all possible outcomes OR $\frac{2}{24}$, or equivalent.
6[3]	1	**1 point:** 30%, or equivalent
7[3]	4	**1 point:** Answers will vary. Example: Draw a circular spinner. Divide the spinner in half. On one half of the spinner, label that section "Green." Divide the other half into two parts, making one part about 1/10 of the whole circle. Label that smaller, 1/10 part of the circle, "Yellow" and label the last section "Red." Spin the arrow on the spinner to represent the color of the light at 8 a.m. tomorrow morning.
8[4]	4	**1 point:** Number Cube A AND number Cube C

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[3] Adapted from the Mathematics K–12 Learning Standards. Internet. Available from http://www.k12.wa.us/Mathematics/Standards.aspx; accessed 11/2015.

[4] https://www.illustrativemathematics.org/content-standards/7/SP/C/8/tasks/1442, accessed on 11/2015, is licensed by Illustrative Mathematics under CC BY-NC-SA 4.0