ILLINOIS STATE BOARD OF EDUCATION

MATHEMATICS GRADE 7

Samples to Success

Sample items provide valuable insight into how students engage with different texts, tasks, and contexts, highlighting the types of opportunities they need for success in the classroom. These items offer a shared reference point for understanding proficiency expectations, complementing the assessment's role in measuring learning. By analyzing items alongside performance data, educators can gain a deeper understanding of students' strengths and areas for growth. Students thrive in environments rich with diverse materials, challenges that vary in task type, and multiple avenues for demonstrating understanding. High-quality instruction, aligned with the learning goals, is the most effective way to support students' growth and prepare them for success.

The items featured in this rubric are a mix of items representative of those found on the IAR and items appropriate for classroom instruction to support and build the skills measured on the IAR. The distinction between a student scoring proficient and above proficient on the IAR is primarily determined by the total points earned on items that require modeling and/or reasoning. Students who can effectively explain and demonstrate their thinking are most likely to earn these points.

Ratios & Proportional Relationships

7.RP.1	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.	Which ratio represents the rate of driving 50 miles in one hour? A. 50:1 B. 50:2 C. 100:3 D. 100:4	Which rate is equivalent to 50 miles per hour? A. 20 miles in 10 hours B. 50 miles in 2 hours C. 100 miles in 2 hours D. 10 miles in 50 hours	Which rate is equivalent to 50 miles per hour? A. 20 miles in 30 minutes B. 25 miles in 30 minutes C. 30 miles in 20 minutes D. 30 miles in 25 minutes	A car travels 240 miles in 3 hours and 45 minutes. What is the car's average speed, in miles per hour?

Ratios & Proportional Relationships

7.RP.2a Expectation at Proficient:

Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.

Below Proficient

The depth, in meters, of a submarine and the time, in minutes, since it started a dive are shown in the table.

Submarine Depth

Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

As time increases, the depth of the submarine increases.

By how many meters does the submarine descend every 2 minutes?

A. 80

B. 100

C. 180

D. 260

Approaching Proficient

The depth, in meters, of a submarine and the time, in minutes, since it started a dive are shown in the table.

Submarine Depth

Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

What is the ratio of the depth after 2 minutes to the depth after 4 minutes?

What is the ratio of the depth after 6 minutes to the depth after 8 minutes?

Proficient

The depth, in meters, of a submarine and the time, in minutes, since it started a dive are shown in the table.

Submarine Depth

Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Which ordered pair is also in the proportional relationship when x represents the time, in minutes, and y represents the depth, in meters?

A. (3,120)

B. (3,140)

C. (5, 200)

D. (5, 240)

Above Proficient

The depth, in meters, of a submarine and the time, in minutes, since it started a dive are shown in the table.

Submarine Depth

Time (minutes)	Depth (meters)
2	100
4	180
6	260
8	340

Explain if the data represent a proportional relationship.

Ratios & Proportional Relationships

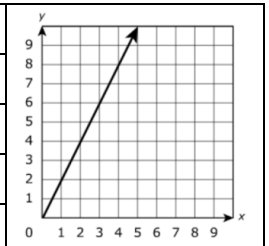
7.RP.2b
Expectation at Proficient:

Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.

Below Proficient

The table of values is graphed on the coordinate plane shown.

x	y
0	0
1	2
2	4
3	6
4	8
5	



Which value completes the table?

A. 8

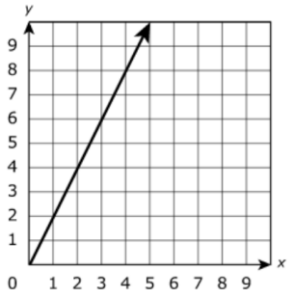
B. 9

C. 10

D. 12

Approaching Proficient

Which value represents the constant of proportionality for the relationship shown in the following graph?



A. $\frac{1}{2}$

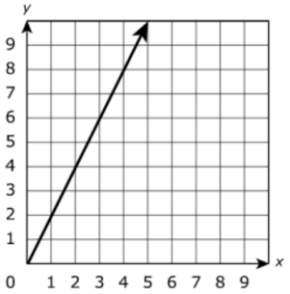
B. 1

C. 2

D. $1\frac{1}{2}$

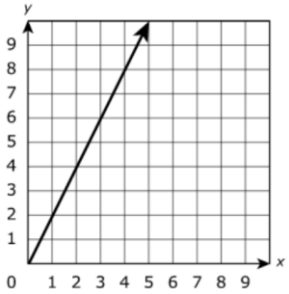
Proficient

What is the constant of proportionality for the relationship shown in the following graph?



Above Proficient

What is the constant of proportionality for the relationship shown in the following graph?



Write a context that can be represented by the relationship.

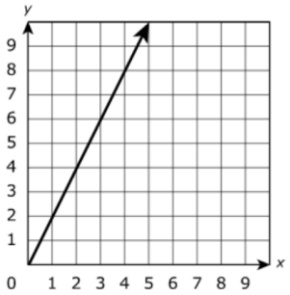
Ratios & Proportional Relationships

7.RP.2c
Expectation at Proficient:

Represent proportional relationships by equations.

Below Proficient

Do the data represented in the graph shown show a proportional relationship?



Approaching Proficient

Hayden mixed 6 cups of blue paint with 8 cups of yellow paint to make green paint.

Which ratio accurately represents the amount of blue pain to yellow paint needed to make green paint?

A. $\frac{6}{8}$

B. $\frac{8}{6}$

C. $6\frac{1}{8}$

D. $8\frac{1}{6}$

Proficient

Hayden mixed 6 cups of blue paint with 8 cups of yellow paint to make green paint.

Write an equation that shows the relationship between the number of cups of blue paint, b, and the number of cups of yellow paint, y, that are needed to create the same shade of green paint. The equation should be written in the form $b = ky$.

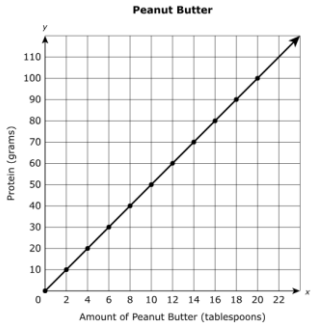
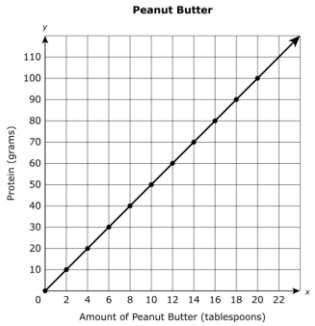
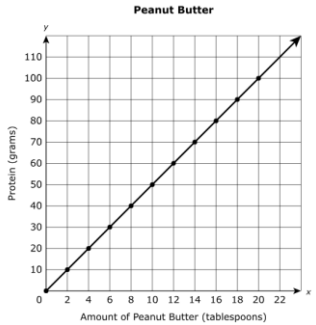
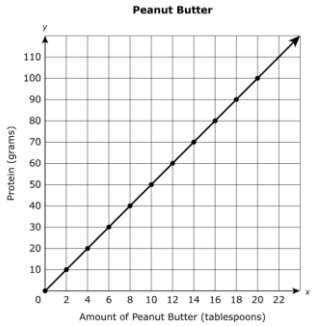
Above Proficient

A car rental company charges a flat rate of $25 per day to rent a car. In addition, there is a one-time fee of $50 for insurance.

Write an equation to model the total cost, C, in dollars, for renting a car for d days.

If a customer has $200, how many days can they rent the car before exceeding their budget?

Ratios & Proportional Relationships

7.RP.2d **Expectation at Proficient:** Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	The graph shows the amount of protein contained in a certain brand of peanut butter.  Create a point on the graph to represent the coordinates (6,30).	The graph shows the amount of protein contained in a certain brand of peanut butter.  According to the graph, how many grams of protein are in 6 tablespoons of peanut butter?	The graph shows the amount of protein contained in a certain brand of peanut butter.  Describe the meaning of the point (6,30).	The graph shows the amount of protein contained in a certain brand of peanut butter.  Megan claims that 13 tablespoons of peanut butter will contain 65 grams of protein. Barry claims that there will be 95 grams of protein in 19 tablespoons of peanut butter. Explain the reasonableness of each claim.

Ratios & Proportional Relationships

7.RP.3 Expectation at Proficient:	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Analyze proportional relationships and use them to solve real-world and mathematical problems. Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	The cost to rent a trumpet for band class for 1 month is $15. What is the cost, in dollars, to rent the trumpet for 6 months? A. 21 B. 30 C. 90 D. 156	The cost to rent a trumpet for band class is $50 for 2 months. What is the cost, in dollars, to rent the trumpet for 3 months?	The yearly cost to rent a trumpet for band class is $114. The monthly cost is constant. Write an equation that represents the relationship between the number of months the trumpet is rented, m, and the total cost, t. Jacob rents a trumpet for 3 years and 5 months. What is Jacob's total cost, in dollars, to rent the trumpet?	Two stores rent trumpets. At store A, the yearly cost to rent a trumpet for band class is $114. The monthly cost is constant. At store B, the cost to rent a trumpet is $10 per month. Write an equation that represents the relationship between the number of months the trumpet is rented, m, and the total cost, t, at both stores. Jacob plans to rent a trumpet for 3 years and 5 months. At which store will his cost be less? Show your work or explain your answer.

The Number System

7.NS.1a	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Describe multiple real-world contexts in which opposite quantities combine to make 0, including fractions and decimals.	Choose the value that best completes each statement. A temperature of 3 degrees Fahrenheit below zero is best described as (-3, +3). A temperature of 5 degrees Fahrenheit is best described as (-5, +5).	Jerry left his house and walked 2 miles directly west. Then he walked 2 miles directly east. Which statement describes the number of miles Jerry is from his house? A. Jerry is negative four miles from his house. B. Jerry is zero miles from his house. C. Jerry is positive four miles from his house. D. Jerry is positive eight miles from his house.	In which of these situations would the answer to the question be 0? A. Ted jumped into a pool from a diving board 8 feet above the water. He sank 8 feet and then swam straight up to the surface of the water. How many feet did Ted swim? B. Jerry left his house and walked 1.5 miles directly west. Then he walked 1.5 miles directly east. At this point, how many miles was Jerry from his house? C. A trail begins at an elevation of −50 feet. The trail ends at an elevation of 50 feet. By how many feet does the elevation of the trail change from beginning to end? D. The low temperature one day was −3° Celsius. The high temperature that day was 3° Celsius. What is the difference between the low temperature and the high temperature that day?	Jana opens a bank account. She deposits $250.10 on Monday. She withdraws $25.25 on Tuesday. On Wednesday, she withdraws $224.85. What is her balance on Thursday? Write an equation using positive and negative numbers to represent the scenario.

The Number System

7.NS.1b-1 7.NS.1b-2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Represent on a horizontal or vertical number line that a number and its opposite have a sum of 0, including fractions and decimals. Represent a real-world context involving addition of positive and negative numbers using an expression or equation and vice-versa, including fractions and decimals.	Two points are graphed on the number line shown.  Use the number line to complete the equation shown. $3 + \_\_\_ = 0$	Two points are graphed on the number line shown.  What is the sum of the values of the two points?	Points Q, R, S, and T are plotted on the number line shown.  Which two points have a sum of zero?	Points Q, R, S, and T are plotted on the number line shown.  Which two points have a sum of zero? Explain how the number line can be used to show that the sum of the two points you identified is zero.

The Number System

7.NS.1c-1	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Represent on a horizontal or vertical number line that the distance between two rational numbers is the same as the absolute value of their difference, including fractions and decimals. Represent a real-world context involving subtraction of positive and negative numbers using an expression or equation and vice-versa, including fractions and decimals.	Emily is tracking her savings for a new bicycle. She starts with $150 in her savings account. Over the next month, she spends $50 on a helmet. How much money does Emily have left in her savings account?	Emily is tracking her savings for a new bicycle. She starts with $150 in her savings account. Over the next month, she spends $50 on a helmet and deposits $30 as a gift from her grandmother. How much money does Emily have left in her savings account after these transactions?	Emily is tracking her savings for a new bicycle. She starts with $150 in her savings account. Over the next month, she spends $45.75 on a helmet and deposits $30.50 as a gift from her grandmother. Write an expression to represent Emily's savings after these transactions. How much money does Emily have left in her savings account after these transactions?	Emily is tracking her savings for a new bicycle. She starts with $150 in her savings account. Over the next month, she spends $45.75 on a helmet and $23.25 on a water bottle. She deposits $30.50 as a gift from her grandmother. Write an expression to represent Emily's savings after these transactions. How much money does Emily have left in her savings account after these transactions?

The Number System

7.NS.1d	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Apply properties of operations as strategies to add rational numbers including fractions and decimals. Apply properties of operations as strategies to subtract rational numbers, including fractions and decimals.	An expression is shown. $1 + 5 - 2$ What is the value of the expression?	An expression is shown. $-1 + 5 + (-2)$ What is the value of the expression?	An expression is shown. $-3.4 + \frac{4}{5} + 2.6$ What is the value of the expression?	An expression is shown. $-3.4 + \frac{4}{5} + 2.6 - \frac{1}{10}$ What is the value of the expression?

The Number System

7.NS.2a-1 7.NS.2a-2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Use models to represent multiplication of positive and negative numbers, including fractions and decimals. Represent a real-world context involving multiplication of positive and negative numbers using an expression or equation and vice versa, including fractions and decimals.	Evaluate each expression: $(2)(2) =$ ____ $(-2)(-2) =$ ____ $(-2)(2) =$ ____	Which expression has a product that is positive? A. $(-2)(2)(2)$ B. $(3)(-5)(-2)$ C. $(4)(2)(-3)$ D. $(4)(-2)(5)$	Which expressions have products that are positive? Select **all** that apply. A. $(-5)(0.2)(-9)$ B. $\left(\frac{2}{3}\right)\left(\frac{3}{2}\right)\left(-\frac{1}{2}\right)$ C. $(6)(-3)(8)(-7)$ D. $\left(4\frac{1}{3}\right)\left(\frac{5}{6}\right)\left(-\frac{1}{2}\right)\left(2\frac{1}{5}\right)$ E. $\left(-\frac{5}{7}\right)(-10)(-2)$ F. $(-1.2)(1.2)(-1.2)(1.2)$	Karen is playing a video game. For each win she gains 5 points. For each loss, she loses $2\frac{1}{2}$ points. On Monday, Karen starts with $7\frac{1}{2}$ points. She wins 3 games and loses 5 games. Analyze how many games she can lose before her point total becomes zero.

The Number System

7.NS.2b-1 7.NS.2b-2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Use models to represent division of positive and negative numbers, including fractions and decimals. Represent a real-world context involving division of positive and negative numbers using an expression or equation and vice-versa, including fractions and decimals.	An ice cream shop puts chopped peanuts on its ice cream sundaes. The shop has 5 pounds of chopped peanuts. The shop uses $\frac{1}{10}$ pound of chopped nuts on each sundae. What is the total number of ice cream sundaes that the shop can make using all the chopped peanuts? A. 5 B. 10 C. 50 D. 500	An ice cream shop uses a mix of blueberries and cherries on its ice cream sundaes. The shop has 5 pounds of blueberries and 4 pounds of cherries. The shop mixes the blueberries and cherries and uses $\frac{1}{10}$ pound of the mix on each sundae. Write an expression to represent the total number of sundaes that the shop can make using all the blueberries and cherries?	An ice cream shop uses a mix of blueberries and cherries on its ice cream sundaes. The shop has $5\frac{3}{4}$ pounds of blueberries and $4\frac{1}{2}$ pounds of cherries. The shop mixes the blueberries and cherries and uses $\frac{1}{16}$ pound of the mix on each sundae. Write an expression to represent the total number of sundaes that the shop can make using all the blueberries and cherries?	An ice cream shop uses a mix of blueberries, strawberries, and cherries on its ice cream sundaes. The shop has $5\frac{3}{4}$ pounds of blueberries, $3\frac{1}{4}$ pounds of strawberries, and $4\frac{1}{2}$ pounds of cherries. The shop mixes the blueberries, strawberries, and cherries and uses $\frac{1}{16}$ pound of the mix on each sundae. Write an expression to represent the total number of sundaes that the shop can make using all the blueberries, strawberries, and cherries?

The Number System

7.NS.2c	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Apply properties of operations as strategies to multiply rational numbers, including fractions and decimals. Apply properties of operations to divide rational numbers, including fractions and decimals.	Which expression represents a number greater than 10? A. 3×3 B. $15 \div 2$ C. 2×10 D. $8 \div 1$	Which expression represents a number greater than 10? A. $3 \times (-3)$ B. $15 \div (-2)$ C. $(-2) \times 10$ D. $(-11) \div (-1)$	Which expression represents a number greater than 1? A. $(-\frac{3}{4}) \times (-3)$ B. $\frac{1}{2} \div \frac{4}{3}$ C. $(-\frac{5}{6}) \times \frac{1}{3}$ D. $(-\frac{2}{3}) \div (-\frac{3}{4})$	Which expression represents a number greater than 1? A. $(-\frac{3}{4}) \times (-4) \times \frac{1}{2}$ B. $\frac{1}{2} \div \frac{4}{3} \times \frac{1}{2}$ C. $(-\frac{5}{6}) \times \frac{1}{3} \times 6$ D. $(-\frac{2}{3}) \div (-\frac{3}{4}) \div (-\frac{1}{2})$

The Number System

7.NS.2d	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Convert a rational number to a terminating or repeating decimal using long division.	Convert $\frac{4}{10}$ to a decimal.	Convert $\frac{7}{8}$ to a decimal using. Is the decimal a terminating or repeating decimal?	Convert $\frac{7}{8}$ to a decimal using long division. Show your work.	Convert $1\frac{7}{8}$ to a decimal using long division. Show your work.

The Number System

7.NS.3	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Solve real-world and mathematical problems involving the four operations with rational numbers, including fractions and decimals.	An expression is shown. $2(5+3)+2\div 2$ What is the value of the expression?	An expression is shown. $2(5-3)+2\div(-2)$ What is the value of the expression?	An expression is shown. $\frac{2}{3}\left(\frac{3}{5}-\frac{3}{4}\right)+\frac{1}{2}\div\frac{1}{4}$ What is the value of the expression?	An expression is shown. $\frac{2}{3}\left(\frac{3}{5}-0.75\right)+0.5\div\frac{1}{4}$ What is the value of the expression?

Expressions & Equations

7.EE.1	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	Which expression is equivalent to $2x + 3y$? A. $5xy$ B. $3y + 2x$ C. $3x + 2y$ D. $2y + 3x$	Which expression is equivalent to $\frac{1}{4}x + \frac{1}{2}x + \frac{1}{8}y$? A. $\frac{1}{6}x + \frac{1}{8}y$ B. $\frac{1}{14}xy$ C. $\frac{3}{4}x + \frac{1}{8}y$ D. $\frac{3}{12}xy$	Which expression is equivalent to $\frac{1}{4}(8 - 6x + 12)$? A. $\frac{7}{2}x$ B. $-\frac{13}{2}x$ C. $-6x + 14$ D. $-\frac{3}{2}x + 5$	Simplify the expression shown. $\frac{1}{4}(8 - 6x) + \frac{3}{2}(x + 2)$

Expressions & Equations

7.EE.2	Below Proficient	*Approaching Proficient*	Proficient	Above Proficient
Expectation at Proficient: Rewrite an expression in different forms in a problem context and identify how the quantities in it are related.	A company uses x amount of plastic to make bags. The company decreases this amount by 40%. The expression $x - 0.4x$ represents the amount of plastic used after this decrease? Which other expression also represent the amount of plastic used after this decrease? A. $0.4x$ B. $0.6x$ C. $x - 0.1x$ D. $x - 0.6x$	A company uses x amount of plastic to make bags. The company decreases this amount by 40%. Which expression represents the amount of plastic used after this decrease? A. $0.1x$ B. $0.4x$ C. $x - 0.4x$ D. $x - 0.6x$	A company uses x amount of plastic to make bags. The company decreases this amount by 40%. Which expression represents the amount of plastic used after this decrease? Select **all** correct answers. A. $0.4x$ B. $0.6x$ C. $1 - 0.4x$ D. $1 - 0.6x$ E. $x - 0.4x$ F. $x - 0.6x$	A company uses x amount of plastic to make bags. The company decreases this amount by 40%. Which expression represents the amount of plastic used after this decrease? Select **all** correct answers. A. $0.4x$ B. $0.6x$ C. $1 - 0.4x$ D. $1 - 0.6x$ E. $x - 0.4x$ F. $x - 0.6x$ Explain the relationship between the different forms and their meaning in the context.

Expressions & Equations

7.EE.3 Expectation at Proficient:	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies.	An expression is shown. $2(1.4x - 2.6x)$ Which expression is the simplified form of the expression shown? A. $-1.2x$ B. $-2.4x$ C. $1.2x$ D. $2.4x$	A teacher writes the expression shown. $2(1.4x - 2.6x)$ Jax and Ana simplify the expression. Jax: $2.8x - 5.2x$ Ana: $2(1.4x) - 2(2.6x)$ Which student(s) wrote an equivalent expression? A. Jax only B. Ana only C. Both Jax and Ana D. Neither Jax nor Ana	A teacher writes the expression shown. $12.2x + 50.6y + 3(1.4x - 2.6y)$ Jax and Ana simplify the expression. Jax: $4(4.1x + 10.7)$ Ana: $2(6.1x + 25.3y + 2.1x - 3.9y)$ Which student(s) wrote an equivalent expression? A. Jax only B. Ana only C. Both Jax and Ana D. Neither Jax nor Ana	A teacher writes the expression shown. $12.2x + 50.6y + 3(1.4x - 2.6y)$ Jax and Ana simplify the expression. Jax: $4(4.1x + 10.7)$ Ana: $2(6.1x + 25.3y + 2.1x - 3.9y)$ Explain if each student's expression is equivalent to the expression the teacher wrote.

Expressions & Equations

7.EE.4	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Use variables to represent quantities in a real-world or mathematical problem and construct simple equations and inequalities to solve problems by reasoning about the quantities.	A duck's mass at birth was 50 grams. The duck gained approximately 40 grams each week. After how many weeks is the duck's mass 370 grams?	A duck's mass at birth was 0.05 kilogram. The duck gained approximately 0.042 kilogram each week. After how many weeks is the duck's mass 0.890 kilogram?	A duck's mass at birth was 0.05 kilogram. The duck gained approximately 0.042 kilogram each week. Write an equation to determine the mass, m, in kilograms, of the duck after w weeks. After how many weeks is the duck's mass 0.890 kilogram?	A duck's mass at birth was 0.05 kilogram. The duck gained approximately 0.042 kilogram each week. A zookeeper wants to determine the number of weeks it will take for the duck to weight more than 0.5 kilogram. Write an inequality the zookeeper can use to determine the number of weeks, w, it will take for the duck to surpass 0.5 kilogram. How many weeks will it take for the duck to surpass 0.5 kilograms?

Expressions & Equations

7.EE.4a-1	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers.	An expression is shown. $2(x + y)$ What is the value of the expression when $x = 2$ and $y = 1$? A. -2 B. 5 C. 6 D. 9	An expression is shown. $2(x + y)$ What is the value of the expression when $x = 2$ and $y = \frac{1}{2}$? A. -2 B. $1\frac{1}{2}$ C. $4\frac{1}{2}$ D. 5	Megan buys 3 bracelets and 3 necklaces. Each bracelet costs $4.50. Megan pays the clerk $40 and gets $4 change. What is the cost, in dollars, of one necklace?	Megan buys 3 bracelets and 3 necklaces. Each bracelet costs $5. Megan pays the clerk $40 and gets $4 change. Write an equation to determine the cost, x, in dollars of one necklace. What is the cost, in dollars, of one necklace? Explain your work.

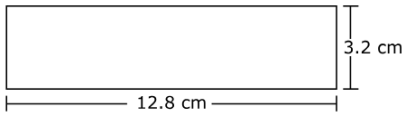
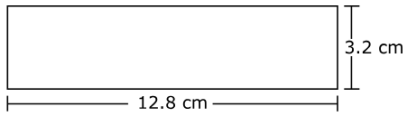
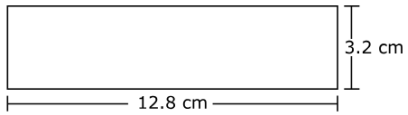
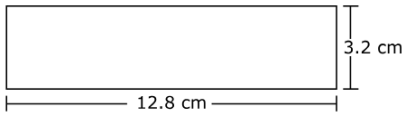
Expressions & Equations

7.EE.4a-2 Expectation at Proficient:	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Solve equations of the form px + q = r and p(x+q) = r, where p, q, and r are specific rational numbers Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q and r are specific rational numbers.	A local pizza shop is selling pizzas for $12 each. Lara has a budget of $60 to spend on pizza for a party. How many pizzas can Lara buy?	A local pizza shop is selling large pizzas for $12 each and small pizzas for $6 each. Lara has a budget of $60 to spend on pizza for a party. She wishes to buy 3 large pizzas and as many small pizzas as possible. What is the largest number of small pizzas Lara can buy?	A local pizza shop is selling large pizzas for $12 each and small pizzas for $6.50 each. Lara has a budget of $70 to spend on pizza for a party. She wishes to buy 3 large pizzas and as many small pizzas as possible. Let x represent the number of small pizzas she buys. Write an inequality to determine the number of small pizzas Lara can buy. What is the largest number of small pizzas Lara can buy?	A local pizza shop is selling large pizzas for $12 each and small pizzas for $6.50 each. Lara has a budget of $70 to spend on pizza for a party. She wishes to buy 3 large pizzas and as many small pizzas as possible. Let x represent the number of small pizzas she buys. Write an inequality to determine the number of small pizzas Lara can buy. What is the largest number of small pizzas Lara can buy? Justify your answer.

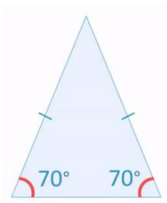
Expressions & Equations

7.EE.4b **Expectation at Proficient:** Graph the solution set of the inequality and interpret it in the context of the problem.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	Graph the solution to the inequality shown on the number line. $x > 3$  	Ali wants to run at least 3 miles this weekend. He writes the following inequality: $m \geq 3$, where m represents the number of miles he runs. Graph the solution on the number line.  	Ali is collecting signatures for a petition. He currently has 520 signatures. He has 6 more weeks to collect the remaining signatures he needs. He needs a total of at least 1,000 signatures before he can submit the petition. Ali wants to collect the same number of signatures each week. On a number line, graph the possible numbers of signatures Ali could collect in each of the remaining weeks so that he will have enough signatures to submit the petition.	Ali is collecting signatures for a petition. He currently has 520 signatures. He has 6 more weeks to collect the remaining signatures he needs. He needs a total of at least 1,000 signatures before he can submit the petition. Ali wants to collect the same number of signatures each week. On a number line, graph the possible numbers of signatures Ali could collect in each of the remaining weeks so that he will have enough signatures to submit the petition. Prove your answer is correct by picking a point in the solution set and showing your work algebraically.

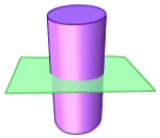
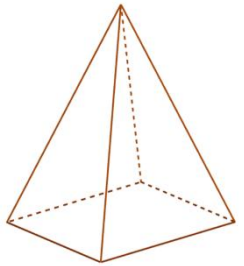
Geometry

7.G.1	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Solve problems involving scale drawings of geometric figures, including computing actual lengths and area from a scale drawing and reproducing a scale drawing at a different scale.	A scale drawing of a rectangular parking lot is shown. The width of the parking lot is shorter than the length. The width of the actual parking lot is 48 feet.  What is the scale factor? A. B. C. D.	A scale drawing of a rectangular parking lot is shown. The width of the parking lot is shorter than the length. The width of the actual parking lot is 48 feet.  What is the length, in feet, of the actual parking lot?	A scale drawing of a rectangular parking lot is shown. The width of the parking lot is shorter than the length. The width of the actual parking lot is 48 feet.  What is the length, in feet, of the actual parking lot? What is the area, in square feet, of the actual parking lot?	A scale drawing of a rectangular parking lot is shown. The width of the parking lot is shorter than the length. The width of the actual parking lot is 48 feet.  What are the dimensions, in **feet**, of the actual parking lot?

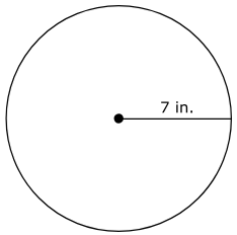
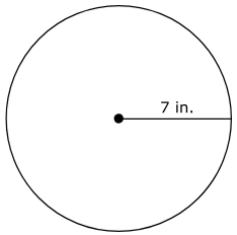
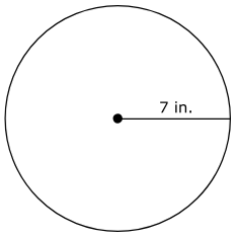
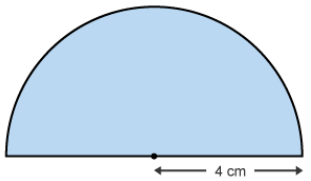
Geometry

7.G.2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Draw geometric shapes with given conditions using a variety of methods by constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	A triangle is shown.  What is the measure, in degrees, of the missing angle? A. 30 B. 40 C. 70 D. 140	Which group of angle measures could form a triangle? A. 90°, 180°, 45° B. 30°, 30°, 30° C. 60°, 60°, 60° D. 45°, 45°, 45°	Which group of side lengths could form a triangle? A. 8,15,22 B. 4,7,19 C. 5,5,11 D. 2,10,12	Triangle ABC is a right isosceles triangle. Draw triangle ABC. Explain the number of possible triangles that could be drawn.

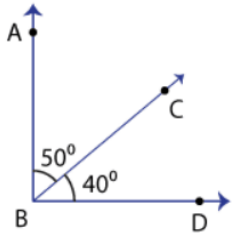
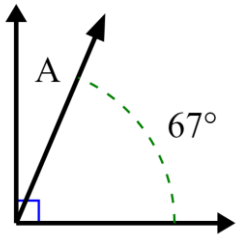
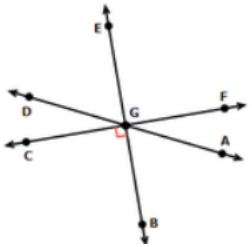
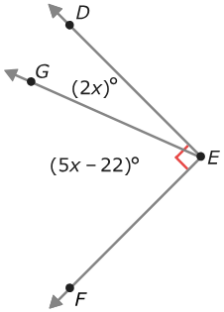
Geometry

7.G.3	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	Which two-dimensional plane section could result from the cross section of the right circular cylinder shown?  A.  B.  C.  D. 	Which two-dimensional plane section could result from the cross section of the right rectangular pyramid shown?  A. circle B. pentagon C. triangle D. rectangle	Jamal will slice a right circular cylinder into two congruent pieces. Which two-dimensional-plane sections could result from the slice Jamal makes? Select **all** possible answers. A. circle B. pentagon C. hexagon D. triangle E. rectangle	Describe the two-dimensional plane sections that could result from **any** cross section of the right rectangular pyramid shown. 

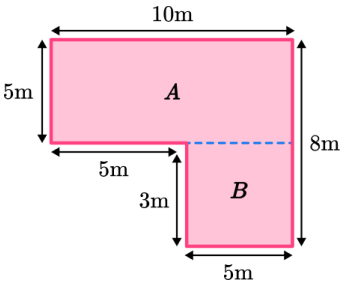
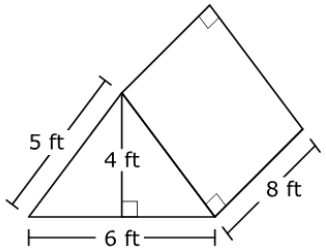
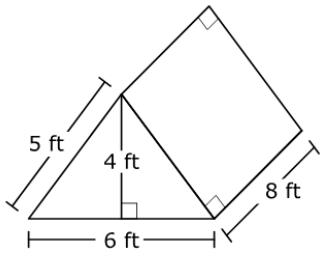
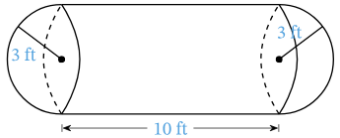
Geometry

7.G.4a Expectation at Proficient:	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Use the formulas for the area and circumference of a circle to solve problems. Give an informal derivation of the relationship between the circumference and area of a circle.	A circle is shown.  The formula for the circumference of a circle is $C = \pi d$ where C is the circumference and d is the diameter of the circle. What is the circumference, in inches, of the circle?	A circle is shown.  What is the circumference, in inches, of the circle?	A circle is shown.  What is the circumference, in inches, of the circle? What is the area, in square inches, of the circle?	A semicircle is shown.  What is the circumference, in centimeters, of the semicircle? What is the area, in square centimeters, of the semicircle?

Geometry

7.G.5 Expectation at Proficient:	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	A figure is shown.  What name best describes the relationship between angle ABC and angle DBC? A. vertical angles B. complementary angles C. supplementary angles D. corresponding angles	A figure of a right angle split by a ray is shown.  What value of A represents the measure of the missing angle, in degrees? A. 23 B. 67 C. 90 D. 180	A figure is shown.  Which statement is true? A. $m\angle EGF > m\angle BGC$ B. $m\angle DGC > m\angle FGA$ C. $m\angle EGF + m\angle FGA = 180^0$ D. $m\angle EGD + m\angle DGC = 90^0$	A figure is shown.  Explain how to determine the value of x. What is the measure, in degrees, of angle DEG?

Geometry

7.G.6 Expectation at Proficient:	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	A figure is shown.  What is the area, in squared meters, of the figure?	A diagram is shown.  What is the volume, in cubic feet, of the triangular prism?	The diagram shows the shape and dimensions of a tent.  What is the volume, in cubic feet, of the tent? What is the total surface area, in square feet, of the 5 sides of the tent?	A figure composed of a cylinder and two hemispheres is shown.  What is the volume, in cubic feet, of the figure?

Statistics & Probability

7.SP.1 Expectation at Proficient:

Examine a sample population and support valid inferences from random samples.

Below Proficient

A company wants to determine if customers prefer blue, green, or rad packaging. They sample random customers on two days. The results are shown in the table.

Color	Day 1	Day 2
Red	6	8
Green	4	4
Blue	5	2

Based on the information presented in the table, what can you infer about the preferred color?

A. Red if preferred

B. Green in preferred

C. Blue is preferred

D. No color is preferred

Approaching Proficient

A mayor wants to determine if people in his town thought he was doing a good job. Which sample best represents the population.

A. The teachers at the town school

B. Local business owners

C. 1,000 random residents of the town

D. 1,000 voters from a nearby town

Proficient

Javier will ask a survey question to determine the average number of times per month people around the United States shop for groceries.

Which sample should Javier use to get results that are the most representative of the total population?

A. a random sample of 1,000 people from his town

B. a random sample of 1,000 people from his state

C. a random sample of 1,000 people from each of the 50 states

D. a random sample of 1,000 people from 5 local grocery stores

Above Proficient

A middle school surveyed 150 students about their favorite elective. The results are shown in the table.

Elective	Votes
Art	10
Band	42
Choir	48
Sports	50

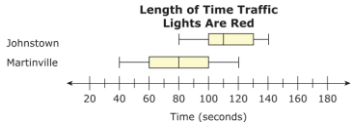
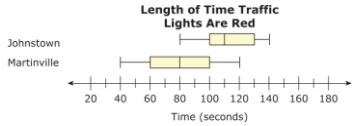
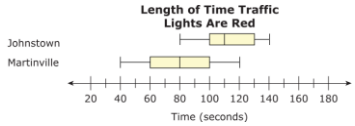
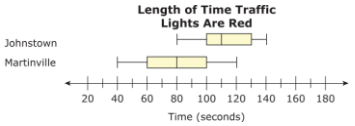
Make 2 inferences based on the information in the table.

If there are 900 students at the school, about how many students can you predict would vote for Art?

Statistics & Probability

7.SP.2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions.	A data det is shown. 5,7,4,6,8,3,9,6,7,5 What is the mean (average) of the data set?	A teacher wants to know how many hours per week students in her class spend on homework. She selects a random sample of 10 students and records the number of hours they spend on homework each week: **Sample Data (in hours):** 5, 7, 4, 6, 8, 3, 9, 6, 7, 5 Based on the results of the sample, what is the average number of hours per week a student in the class spends on homework?	Gabrielle surveyed a random sample of 40 students in her school's cafeteria about whether they ate the cafeteria's tomato soup. Of the students surveyed, 14 said they ate the tomato soup. A total of 840 students eat in the cafeteria each day. Based on the results of Gabrielle's survey, how many of the 840 students who eat in the cafeteria can be expected to eat the tomato soup?	Gabrielle surveyed a random sample of 40 students in her school's cafeteria about whether they ate the cafeteria's tomato soup. Of the students surveyed, 14 said they ate the tomato soup. A total of 840 students eat in the cafeteria each day. Based on the results of Gabrielle's survey, how many of the 840 students who eat in the cafeteria can be expected to eat the tomato soup? Explain additional predictions that can be determined from the data.

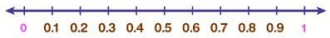
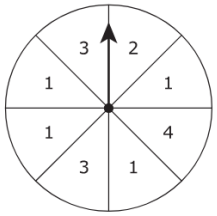
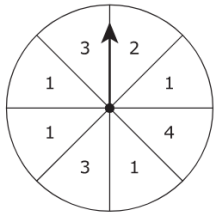
Statistics & Probability

7.SP.3	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability.	The box plots represent the number of seconds that a random sample of 100 traffic lights are red in each of two cities: Johnstown and Martinville.  Use the box plots to determine the median of each set. Johnstown: _____ Martinville: _____	The box plots represent the number of seconds that a random sample of 100 traffic lights are red in each of two cities: Johnstown and Martinville.  Use the box plots to complete the following statement. The difference in the medians of the two data sets is about ___ times the range of the data for Johnstown.	The box plots represent the number of seconds that a random sample of 100 traffic lights are red in each of two cities: Johnstown and Martinville.  Use the box plots to complete the following statements. The difference in the medians of the two data sets is about ___ times the range of the data for Johnstown. The difference in the medians of the two data sets is about ___ times the range of the data for Martinville.	The box plots represent the number of seconds that a random sample of 100 traffic lights are red in each of two cities: Johnstown and Martinville.  Compare and contrast the median, range, and interquartile range of each data set expressing each as a multiple of the other.

Statistics & Probability

7.SP.4	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations.	Liz and Sara each ride their bikes every day. The table shows the number of miles Liz and Sara rode their bikes during five randomly selected days. **Number of Miles Ridden** Liz's distance (miles): 13, 9, 8, 9, 11 Sara's distance (miles): 5, 5, 15, 9, 6 What is the range of each data set?	Liz and Sara each ride their bikes every day. The table shows the number of miles Liz and Sara rode their bikes during five randomly selected days. **Number of Miles Ridden** Liz's distance (miles): 13, 9, 8, 9, 11 Sara's distance (miles): 5, 5, 15, 9, 6 What is the difference in the ranges of each data set?	Liz and Sara each ride their bikes every day. The table shows the number of miles Liz and Sara rode their bikes during five randomly selected days. **Number of Miles Ridden** Liz's distance (miles): 13, 9, 8, 9, 11 Sara's distance (miles): 5, 5, 15, 9, 6 Based on the data in the table, what is the mean number of miles Liz rides? Based on the data in the table, which data set has the greatest range?	Liz and Sara each ride their bikes every day. The table shows the number of miles Liz and Sara rode their bikes during five randomly selected days. **Number of Miles Ridden** Liz's distance (miles): 13, 9, 8, 9, 11 Sara's distance (miles): 5, 5, 15, 9, 6 Use measures of center and measures of variability to compare the two data sets. What limitations affect the accuracy of the predictions made from the data?

Statistics & Probability

7.SP.5	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Calculate the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring.	Plot each of the following values on the number line. Point A: $\frac{1}{3}$ Point B: 0.6 Point C: 40% 	Order the following probabilities from least to greatest. 70% $\frac{1}{2}$ 0.4 30% $\frac{2}{3}$ 0.65	This spinner is divided into eight equal-sized sections. Each section is labeled with a number.  Jake spins the arrow on the spinner once. What is the probability that the arrow lands on a section labeled with the number 1?	This spinner is divided into eight equal-sized sections. Each section is labeled with a number.  Jake spins the arrow on the spinner once. What is the probability that the arrow lands on a section labeled with an even number? What is the probability that the arrow lands on a section labeled with a prime number?

Statistics & Probability

7.SP.6 Expectation at Proficient:	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency and predict the approximate relative frequency given the probability. For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.	Reagan will use a random number generator 100 times. Each result will be a digit from 1 to 5. Approximately how many times will the digit 5 appear?	Reagan will use a random number generator 100 times. Each result will be a digit from 1 to 5. What is the theoretical probability of getting a 5?	Reagan will use a random number generator 1,200 times. Each result will be a digit from 1 to 6. What is the relative frequency of getting the digit 5? Approximately how many times will the digit 5 appear among the 1,200 results?	Reagan will use a random number generator 1,200 times. Each result will be a digit from 1 to 6. What is the relative frequency of getting the digit 5? Approximately how many times will the digit 5 appear among the 1,200 results? Explain how the theoretical probability of getting a 5 may differ from the experimental probability of getting a 5.

Statistics & Probability

7.SP.7a	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Develop a uniform probability model by assigning equal probability to all outcomes and use the model to determine probabilities of events.	Students in a math class will be randomly assigned a polygon for a class project. The only types of polygons being assigned are quadrilaterals, pentagons, hexagons, octagons, nonagons, and decagons. If there is an equal number of each type of polygon, what is the probability that the first polygon assigned will be a nonagon?	Students in a math class will be randomly assigned a polygon for a class project. The only types of polygons being assigned are quadrilaterals, pentagons, hexagons, octagons, nonagons, and decagons. If there is an equal number of each type of polygon, what is the probability that the first polygon assigned will be a nonagon and the second polygon assigned will be an octagon?	Students in a math class will be randomly assigned a polygon for a class project. The only types of polygons being assigned are quadrilaterals, pentagons, hexagons, octagons, nonagons, and decagons. If there is an equal number of each type of polygon, what is the probability that the first polygon assigned will be a nonagon and the second polygon assigned will be an octagon? Explain.	Students in a math class will be randomly assigned a polygon for a class project. The only types of polygons being assigned are quadrilaterals, pentagons, hexagons, octagons, nonagons, and decagons. If there is an equal number of each type of polygon, what is the probability that the first three students are all assigned a nonagon? Explain two different ways to determine the answer.

Statistics & Probability

7.SP.7b	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process.	A student is conducting an experiment with a fair six-sided die. The student rolls the die 20 times and records the results. 2,4,3,5,3,4,1,2,4,3 2,1,4,5,2,3,6,6,4,2 Based on the data, which value represents the probability of rolling a 2? A. $\frac{5}{20} = 25\%$ B. $\frac{5}{10} = 50\%$ C. $\frac{2}{20} = 10\%$ D. $\frac{2}{10} = 20\%$	A student is conducting an experiment with a fair six-sided die. The student rolls the die 20 times and records the results. 2,4,3,5,3,4,1,2,4,3 2,1,4,5,2,3,6,6,4,2 Based on the data, what is the probability of rolling a 2?	A student is conducting an experiment with a fair six-sided die. The student rolls the die 20 times and records the results. 2,4,3,5,3,4,1,2,4,3 2,1,4,5,2,3,6,6,4,2 Based on the relative frequencies of the data, develop a probability model for rolling a number on a six-sided die.	A student is conducting an experiment with a fair six-sided die. The student rolls the die 20 times and records the results. 2,4,3,5,3,4,1,2,4,3 2,1,4,5,2,3,6,6,4,2 Explain if the experiment results are consistent with the theoretical probability of rolling a number on a six-sided die? Why or why not?

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7.SP.8a	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Compute the probability of a compound event using lists or diagrams to support a written explanation.	Which of the following events is a compound event? A. Rolling a 5 on a number cube B. Rolling an even number on a number cube C. Rolling a 5 on a number cube and flipping a *heads* on a coin D. Flipping a *heads* on a coin	A fair coin, with one side *heads* and one side t*ails*, is flipped 3 times. Create a tree diagram to represent all possible outcomes.	A standard number cube, numbered 1 through 6 on each side, is rolled 3 times. What is the probability of rolling a 2 on all three rolls? Express your answer as a fraction.	A standard number cube, numbered 1 through 6 on each side, is rolled once and a fair coin is flipped twice. What is the probability of rolling a 3 and flipping two *heads*?

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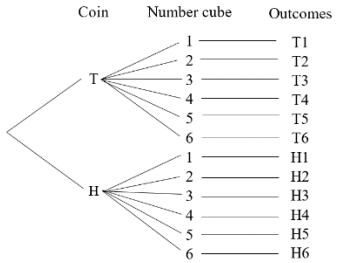
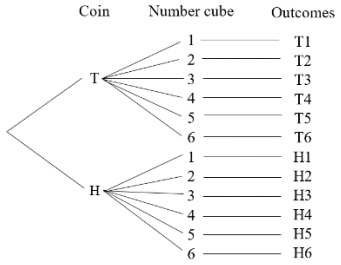
7.SP.8b	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space, which compose the event.	The tree diagram for a compound event is shown.  Which compound event is represented in the tree diagram? A. Flipping a coin and rolling a number cube B. Flipping two coins C. Rolling 2 number cubes D. Rolling 2 number cubes and flipping 2 coins	Luis flips a fair coin and rolls a 6-sided number cube. The tree diagram of the sample space is shown.  How many outcomes are in the sample space?	Luis flips a fair coin and rolls a 6-sided number cube. Draw a tree diagram to illustrate the compound event. How many outcomes are in the sample space? What is the probability of flipping *tails* and rolling a 6?	Luis flips a fair coin twice and rolls a 6-sided number cube. Draw a tree diagram to illustrate the compound event. What is the probability of flipping at least 1 *head?*

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7.SP.8c Expectation at Proficient:	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Design and use a simulation to generate frequencies for compound events. For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?	Martina surveyed 100 people and recorded if they are left-handed or right-handed, and if they have blue, green, or brown eyes. The results are listed in the table show. How many people in the survey have blue eyes and are left-handed?	Martina surveyed 100 people and recorded if they are left-handed or right-handed, and if they have blue, green, or brown eyes. The results are listed in the table show. Based on the data, what is the probability that a person is left-handed and has blue eyes?	Martina read that approximately 10% of all people are left-handed. She wants to design a simulation to approximate the probability of selecting exactly 2 right-handed people when 3 people are randomly selected. In the simulation, Martina has a spinner with sections of equal size. One section is labeled “L” (left) and the rest of the sections are labeled “R” (right). For this simulation to be as accurate as possible, what is the total number of sections that the spinner should have?	Martina read that approximately 10% of all people are left-handed. She wants to design a simulation to approximate the probability of selecting exactly 2 right-handed people when 3 people are randomly selected. In the simulation, Martina has a spinner with sections of equal size. One section is labeled “L” (left) and the rest of the sections are labeled “R” (right). For this simulation to be as accurate as possible, what is the total number of sections that the spinner should have? What is the probability of selecting exactly 2 right-handed people when 3 people are randomly selected?

	Blue	Green	Brown
R	18	23	49
L	2	3	5