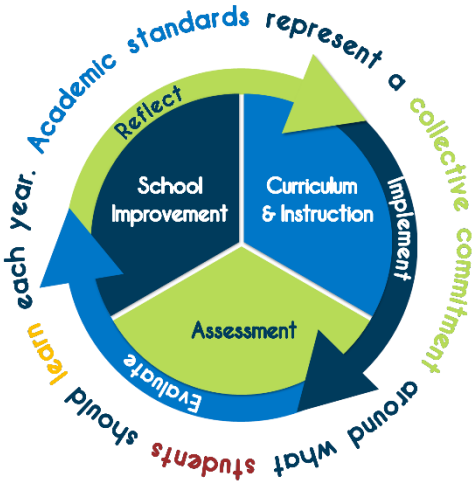
ILLINOIS STATE BOARD OF EDUCATION

MATHEMATICS GRADE 6

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 Illinois Assessment of Readiness (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

6.RP.1

Expectation at Proficient:

Describe a ratio relationship between two quantities using ratio language in multiple ways.

Below Proficient

A bag of marbles contains 1 red marble and 3 yellow marbles.

What is the ratio of red to yellow marbles?

A. 1:1

B. 1:3

C. 3:1

D. 3:3

Approaching Proficient

Results of the Class President election are represented in the table.

Which ratio represents Claire's votes to Juan's votes?

Candidate	Votes
Juan	12
Silas	36
Claire	48

A. 1:2

B. 1:4

C. 2:1

D. 4:1

Proficient

Results of the Class President election are represented in the table.

What is the ratio of votes for Claire's votes to Juan's votes?

Candidate	Votes
Juan	12
Silas	36
Claire	48

Answer: 4:1

Above Proficient

Results of the Class President election are represented in the table.

Candidate	Votes
Juan	12
Silas	36
Claire	48

Select **all** that apply. The ratio of…

A. Juan's votes to Claire's votes is 1:4.

B. Silas' votes to Juan's votes is 1:3.

C. Juan's votes to Silas and Claire's votes together is 1:7.

D. Claire's votes to all votes is 1:8.

E. Silas' votes to Silas' votes is 1:4.

Ratios & Proportional Relationships

6.RP.2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Determine a unit rate a/b that is equivalent to a ratio a:b with b ≠ 0 and describes the relationship with rate language.	A store sells cookies for $3. At this unit rate, how much will 15 cookies cost? A. $3 B. $5 C. $18 D. $45	A store sells boxes of 15 cookies for $45. What is the unit rate, in dollars, for 1 cookie? A. $3 B. $5 C. $15 D. $30	A store sells boxes of 15 cookies for $45. What is the unit rate, in dollars, for 1 cookie? Answer: $3	A store sells boxes of 15 cookies for $45. Explain how you can use the unit rate to determine the cost of 7 cookies. The student response should include the unit rate, $3 per cookie, and show that multiplying $3×7=$21.

Ratios & Proportional Relationships

6.RP.3a

Expectation at Proficient:

Solve real-world and mathematical problems by identifying ratios and using rate reasoning to make tables, find missing values in the tables, and plot the pairs of values on the coordinate plane using whole number measurements.

Below Proficient

Gloria can bake 30 cookies in 2 hours. Which value best completes the sentence:

At this rate, Gloria can bake ___ cookies in 1 hour.

A. 5

B. 15

C. 32

D. 60

Approaching Proficient

The following table represents the number of cookies that Gloria can bake in certain numbers of hours. Based on this rate, how many cookies can Gloria bake in 1 hour?

Time (hours)	Number of Cookies
2	30
3	45
4	60

Answer: 15

Proficient

Gloria can bake 30 cookies in 2 hours. Complete the table using the same rate.

Time (hours)	Number of Cookies
1	15
3	45
5	75

Above Proficient

Gloria can bake 30 cookies in 2 hours. Complete the table using the same rate.

Time (hours)	Number of Cookies
1	15
3	45
5	75

Create a graph on a coordinate plane to display the data.

Graphs may vary.

Ratios & Proportional Relationships

6.RP.3b	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Solve unit rate problems including those using unit pricing and constant speed using ratios and rate reasoning.	Sabastian can ride his bike 3 miles in 20 minutes. At his current rate, what is the distance, in miles, Sebastian can ride his bike in 1 **hour**? A. 3 B. 9 C. 17 D. 20	Sabastian can ride his bike 3 miles in 20 minutes. At his current rate, what is the distance, in miles, Sebastian can ride his bike in 1 **hour**? Answer: 9	Sabastian can ride his bike 3 miles in 24 minutes. At his current rate, what is the distance, in miles, Sebastian can ride his bike in 1 **hour**? Answer: 7.5	Sabastian can ride his bike 3 miles in 24 minutes. Josie can ride her bike 2.5 miles in 20 minutes. At their current rates, determine the distance, in miles, Sabastian and Josie can each ride in 1 hour. Answer: Sabastian, 7.5; Josie 7.5 Compare and contrast the unit rate of each rider. The student response should include that the unit rates are the same.

Ratios & Proportional Relationships

6.RP.3c	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole given a part and the percent.	A class of 4th grade students is taking a math test. Of the 20 students in the class, 15 answered the first question correctly. The expression shown can be used to find the percentage of student who answered the first question correctly. $\frac{part}{whole} \times 100$ What percentage of students answered the first question correctly? A. $\frac{15}{20} \times 100 = 75\%$ B. $\frac{20}{15} \times 100 = 133\%$	Natalie has 80 pictures from a school carnival. She gives 25% of them to the school yearbook staff. How many pictures does Natalie give to the school yearbook staff? A. 20 B. 40 C. 55 D. 75	Natalie buys a camera. The original price of the camera is $45.00. Natalie uses a 15% off coupon. How much money does Natalie save by using the coupon? Answer: $6.75	Natalie buys a camera. The original price of the camera is $45.00. Natalie uses a 15% off coupon. Write an equation to determine the amount of money, in dollars, Natalie saves by using the coupon. Answer: $45 \times 0.15 = x$ How much money, in dollars, does Natalie spend on the camera? Answer: $38.25

Ratios & Proportional Relationships

6.RP.3d **Expectation at Proficient:** Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	A car travels 120 miles in 2 hours. Which ratio represents the car's speed in miles per hour (mph). A. $\frac{120}{2} = 60$ B. $\frac{2}{120} = \frac{1}{60}$	A recipe calls for 3 cups of flour, but you only have a measuring cup that measures in tablespoons. How many tablespoons of flour do you need to use if 1 cup = 16 tablespoons? A. $3 \times \frac{16}{1} = 48$ B. $16 \times \frac{3}{1} = 48$ C. $3 \times \frac{1}{16} = \frac{3}{16}$ D. $16 \times \frac{1}{3} = 5\frac{1}{3}$	There are 5,280 feet in 1 mile. There are 12 inches in 1 foot. Which measures are equivalent to 2640 feet? Select **all** the correct answers. A. 0.5 mile B. 2 miles C. 5 miles D. 2640 inches E. 17,280 inches F. 31,680 inches	Sarah is baking cookies and uses 2 cups of sugar for every 5 cups of flour. Tom is making the same recipe but only has 32 tablespoons of flour. How many **cups** of sugar should Tom use to keep the ratio of sugar to flour the same as Sarah's? (1 cup = 16 tablespoons) Answer: $\frac{4}{5}$

The Number System

6.NS.1	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Solve word problems involving division of fractions by fractions.	Robert cuts ½ -foot sections from a board that is 12 feet long. How many sections can he cut from the board? A. 2 B. 6 C. 24 D. 48	Robert cuts ¼ -foot sections from a board that is 11 ¼ feet long. How many sections can he cut from the board? A. 4 B. 11 C. 44 D. 45	Robert cuts ¾ -foot sections from a board that is 11 ¼ feet long. How many sections can he cut from the board? A. 11 B. 15 C. 37 D. 45	Robert cuts ¾ -foot sections from a board that is $11\frac{3}{8}$-feet long. How many sections can he cut from the board? Answer: 15 What length, in feet, of the board is left? Answer: $\frac{1}{8}$ Explain your work. The student response should include calculations or verbal explanation of how to divide fractions and what the remainder represents.

The Number System

6.NS.2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Divide multi-digit numbers using the standard algorithm.	What is the product of 425×4 ? Answer: 1700	What is the quotient of $42{,}576 \div 4$? Answer: 10,644	What is the quotient of $42{,}576 \div 24$? Answer: 1,774	What is the quotient of $42{,}566 \div 24$? Round your answer to the nearest hundredth. Answer: 1,773.58

The Number System

6.NS.3	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Add, subtract, multiply, and divide multi-digit decimals using the standard algorithm.	Which expression has a value of 6? A. $5.7 + 2.3$ B. $8.5 - 2.5$ C. 2×2.5 D. $7.5 \div 1.5$	Which expression has a value of 6? A. $5.75 + 2.25$ B. $8.5 - 1.5$ C. 2×2.5 D. $7.5 \div 1.25$	Which expression has a value of 6? A. $5.75 + 2.3$ B. $8.44 - 1.32$ C. 3.2×2.55 D. $7.5 \div 1.25$	A bottle of juice costs $4.75. A bag of chips costs $5.45. Jose buys 6 bottles of juice and 1 bag of chips for a party. The cost of the juice and chips is split evenly among 5 friends. What amount of money, in dollars, will each friend pay for their share of the juice and chips? Answer: 7

The Number System

6.NS.4 **Expectation at Proficient:** Determine the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Use the distributive property to express a sum of two whole numbers 1–100 with a common factor as a multiple of a sum of two whole numbers with no common factor.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	Use the distributive property to rewrite the expression $48 + 12$ as a multiple of a sum of two whole numbers with no common factor. Which expression is equivalent to $48 + 12$? A. $6(8 + 6) = 60$ B. $12(4 + 1) = 60$ C. $4(44 + 3) = 60$ D. $8(6 + 4) = 60$	Use the distributive property to rewrite the expression $48 + 12$ as a multiple of a sum of two whole numbers with no common factor. Which expression is equivalent to $48 + 12$? A. $6(8 + 6)$ B. $12(4 + 1)$ C. $4(44 + 3)$ D. $8(6 + 4)$	Which expression is equivalent to $48 + 12$? A. $6(8 + 6)$ B. $12(4 + 1)$ C. $4(44 + 3)$ D. $8(6 + 4)$	Which expression is equivalent to $108 + 168$? A. $3(36 + 46)$ B. $8(13 + 21)$ C. $12(9 + 14)$ D. $14(8 + 12)$

The Number System

6.NS.5
Expectation at Proficient:

Use positive and negative integers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.

Below Proficient

Water freezes at 0° Celsius, which is 32° Fahrenheit.

Which number represents the freezing temperature of water in degrees Fahrenheit?

A. 0

B. -32

C. 32

D. 320

Approaching Proficient

Water freezes at 0° Celsius. The temperature of the water in 4 buckets is recorded in the table below.

Bucket	Temperature
A	$4°C$
B	$18°C$
C	$9°C$
D	$46°C$

Which bucket is the closest to the freezing temperature, in degrees Celsius?

A. Bucket A

B. Bucket B

C. Bucket C

D. Bucket D

Proficient

Water freezes at 0° Celsius. The table shows five different temperatures in degrees Celsius. Indicate whether each temperature is above or below freezing.

Select one box per row.

Temperature	Above Freezing	Below Freezing
$6°C$	☐	☐
$-13°C$	☐	☐
$100°C$	☐	☐
$5°C$	☐	☐
$-2°C$	☐	☐

Above Proficient

Water freezes at 0° Celsius. The table shows five different temperatures in degrees Celsius. Indicate whether each temperature is above or below freezing.

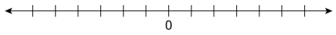
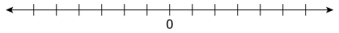
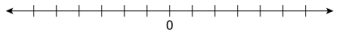
Select one box per row.

Temperature	Above Freezing	Below Freezing
$6.5°C$	☐	☐
$-13°C$	☐	☐
$100°C$	☐	☐
$5.5°C$	☐	☐
$-2.25°C$	☐	☐

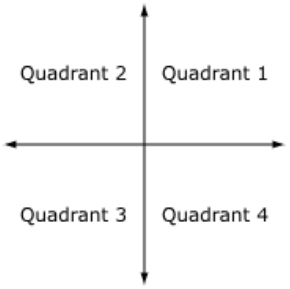
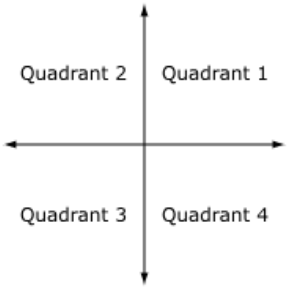
Use the meaning of zero to explain how you determined your answers.

The student response should include an explanation of positive numbers representing above zero and negative numbers representing below zero.

The Number System

6.NS.6a	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Recognize opposite signs of integers by determining locations on opposite sides of 0 on the number line. Identify that the opposite of the opposite of a number is the number itself, and that 0 is its own opposite.	Which number is the opposite of 4? A. -4 B. 0 C. 4 D. 44	Each mark on the number line represents one unit. Plot a point on the number line that represents the **opposite** of 4 units.  Answer: A point should be plotted on the 4th tick mark to the left of zero (-4).	Each mark on the number line represents one unit. Plot a point on the number line that represents the **opposite** of -4 units.  Answer: A point should be plotted on the 4th tick mark to the right of zero (4).	Each mark on the number line represents one unit. Plot a point on the number line that represents the **opposite** of -4.5 units.  Answer: A point should be plotted between the 4th and 5th tick mark to the right of zero (4.5).

The Number System

6.NS.6b	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Use signs of numbers in ordered pairs to indicate locations in quadrants of the coordinate plane. Recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.	In which quadrant of the coordinate plane will the point (2,5) be plotted?  A. Quadrant 1 B. Quadrant 2 C. Quadrant 3 D. Quadrant 4	Which point, when plotted, will be in Quadrant 4 of the coordinate plane?  A. (5,5) B. (-5,5) C. (-5,-5) D. (5,-5)	Which point, when plotted, will be in Quadrant 4 of the coordinate plane? A. (5,5) B. (-5,5) C. (-5,-5) D. (5,-5)	In which quadrant or on which axis of the coordinate plane will each point be plotted? Select one box per column. ☐ = unchecked, ☒ = checked | Location	(-3,3)	(0,3)	(-3,0)
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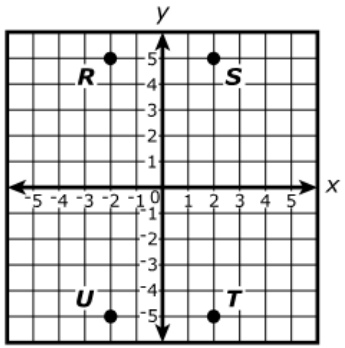
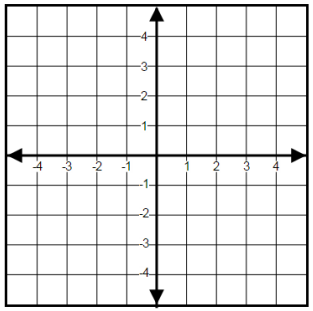
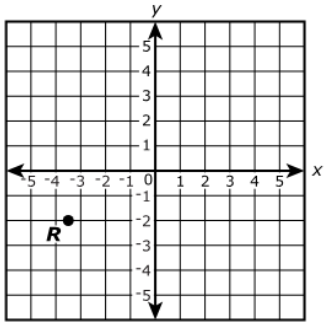
Quadrant 1	☐	☐	☐
Quadrant 2	☒	☐	☐
Quadrant 3	☐	☐	☐
Quadrant 4	☐	☐	☐
x-axis	☐	☐	☒
y-axis	☐	☒	☐

The Number System

6.NS.6c **Expectation at Proficient:** Identify and position integers and other rational numbers on a horizontal or vertical number line diagram. Identify and position pairs of integers and other rational numbers on a coordinate plane.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	Four points are plotted on the coordinate plane shown.  The coordinates for points R, U, and T are shown. R (-2,5) U (-2,-5) T (2,-5) What coordinates best represent the location of point S? (_____ , _____) Answer: (2,5)	Plot the point (3,2) on the coordinate plane.  Answer: a point should be plotted right 3 units and up 2 units from the origin.	Point R is plotted on the coordinate plane shown.  What coordinates best represent the location of point R? (_____ , _____) Answer: (-3.5, -2)	Draw a coordinate plane. On the coordinate plane, plot the following points. Be sure to label each point. A (-2.5 , 5) B (6 , 1.5) C (-1.5 , 0) Point A is 2.5 units left and 5 units up from the origin, point B is 6 units right and 1.5 units up from the origin, and point C is 1.5 units left from the origin, on the x-axis.

The Number System

6.NS.7a **Expectation at Proficient:** Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	A number line is shown.  Which comparison is true? You may use the number line to help you. A. $2 > 4$ B. $4 > 4$ C. $3 < 4$ D. $5 < 4$	A number line is shown.  Plot the numbers 2 and 8 on the number line. A point should be plotted on the 2nd tick mark and another on the 8th tick mark to the right of zero. Use mathematical symbol < or > to write an inequality that compares 2 and 8. Answer: $2 < 8$ or $8 > 2$	A number line is shown.  Plot the numbers -2 and -8 on the number line. A point should be plotted on the 2nd tick mark and another on the 8th tick mark to the left of zero. Use mathematical symbol < or > to write an inequality that compares -2 and -8. Answer: $-8 < -2$ or $-2 > -8$ Explain how the number line can be used to show that your inequality is correct. Answers may vary. A point to the left of another point is less than and a point to the right is greater than.	A number line is shown.  Estimate the location of the numbers $-2\frac{1}{2}$ and $-8\frac{1}{4}$ on the number line. A point should be plotted between -3 and -2 and another on between -9 and -8. Use mathematical symbol < or > to write an inequality that compares $-2\frac{1}{2}$ and $-8\frac{1}{4}$. Answer: $-8\frac{1}{4} < -2\frac{1}{2}$ or $-2\frac{1}{2} > -8\frac{1}{4}$ Explain how the number line can be used to show that your inequality is correct. Answers may vary. A point to the left of another point is less than and a point to the right is greater than.

The Number System

6.NS.7b **Expectation at Proficient:** Write, interpret, and explain statements of order for rational numbers in real-world contexts.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	Choose the term that best completes the statement. A temperature of -5°F is (colder, warmer) than a temperature of -7°F.	Which statement is true? A. A temperature of -5°F is colder than a temperature of -7°F. B. Losing a game by 8 points is less of a loss than losing by 1 point. C. A fish swimming at 8 feet below sea level is closer to the surface of water than a fish swimming at 2 feet below sea level. D. On a number line, -4 is to the left of -2.	Which statements are true? Select **all** that apply. A. A temperature of -5°F is colder than a temperature of -7°F. B. Losing a game by 8 points is less of a loss than losing by 1 point. C. A fish swimming at 8 feet below sea level is closer to the surface of water than a fish swimming at 2 feet below sea level. D. On a number line, -4 is to the left of -2. E. A deposit of $120 increases an account balance more than a deposit of $80.	The temperatures, in degrees Celsius, of three cities at 6:00 a.m. are given. City A: $-3.5°C$ City B: $-2.8°C$ City C: $5°C$ Compare the values of the three temperatures. Which city recorded the coldest temperature at 6:00 a.m.? Explain your answer. City A recorded the coldest temperature because it is further to the left on a number line than the temperatures recorded in City B and City C.

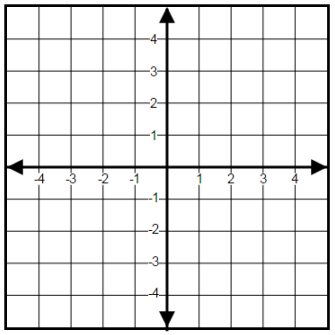
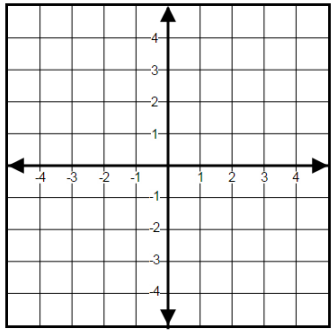
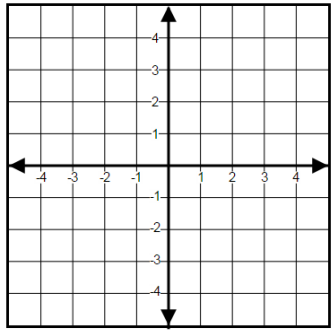
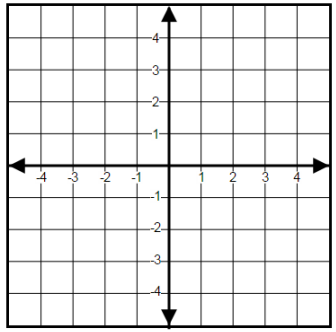
The Number System

6.NS.7c **Expectation at Proficient:** Determine the absolute value of a positive rational number as its distance from 0 on the number line. Interpret absolute value as magnitude for a positive or negative integer in a real-world situation.	**Below Proficient**	***Approaching Proficient***	**Proficient**	**Above Proficient**
	What is the absolute value of 5? $\|5\| = \_\_\_\_$ Answer: 5	A well extends 120 feet below the ground. Which equation represents the depth, in feet, of the lowest point of the bottom of the well? A. $\|-120\| = 120$ B. $\|120\| = -120$ C. $-\|120\| = 120$ D. $\|-120\| = -120$	A well extends 120.5 feet below the ground. Which equation represents the depth, in feet, of the lowest point of the bottom of the well? A. $\|-120.5\| = 120.5$ B. $\|120.5\| = -120.5$ C. $-\|120.5\| = 120.5$ D. $\|-120.5\| = -120.5$	The temperature in a city dropped to $-3\frac{1}{2}$ degrees Celsius. What is the absolute value $-3\frac{1}{2}$? Answer: $3\frac{1}{2}$ Explain the distance of $-3\frac{1}{2}$ and its absolute value from zero on a number line. The student response could include an explanation of both values being the same distance from zero on a number line, the negative value to the left and the positive to the right.

The Number System

6.NS.7d **Expectation at Proficient:** Distinguish comparisons of absolute value from statements about order. (e.g., recognize that an account balance less than –30 dollars represents a debt greater than 30 dollars.)	Below Proficient	Approaching Proficient	Proficient	Above Proficient
	What is the absolute value of 10? Answer: 10	Miko has an account balance of -30 dollars. Mara has an account balance of -10 dollars. Explain who has a greater debt? The student response should include an explanation that because Miko's debt is further from zero than Mara's debt, he has a greater debt.	Write the following values in order from least to greatest. $\lvert -7\rvert \quad -0.7 \quad 70 \quad \lvert -0.7\rvert$ Answer: $-0.7, \lvert -0.7\rvert, \lvert -7\rvert, 70$	Write the following values in order from least to greatest. $\lvert -7\rvert \quad -0.7 \quad 70 \quad \lvert -0.7\rvert$ Answer: $-0.7, \lvert -0.7\rvert, \lvert -7\rvert, 70$ Explain how to order numbers based on their absolute value. The student response could include a comparison of each value's distance from zero on a number line.

The Number System

6.NS.8 **Expectation at Proficient:** Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	Below Proficient	Approaching Proficient	Proficient	Above Proficient
	A point is exactly 1 unit away from (2,3). The point has the same y-coordinate at (2.3). The possible coordinates are (?,3). Plot the **two** possible locations of the point.  Answer: (2,3) and (4,3)	A point is exactly 3 units away from (1,2). The point has the same y-coordinate at (1,2). The possible coordinates are (?,2). Plot the **two** possible locations of the point.  Answer: (-2,2) and (4,2)	A point is exactly 3 units away from (-1,1). The point has the same x-coordinate at (-1,1). Plot the **two** possible locations of the point.  Answer: (-1,4) and (-1,-2)	A point is exactly 3 units away from (-1.5,0.5). The point has the same x-coordinate at (-1.5,0.5). Plot the **two** possible locations of the point.  Answer: (-1.5,-2.5) and (-1.5, 3.5)

Expressions & Equations

6.EE.1	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Write, read, and evaluate numerical expressions including those that contain whole-number exponents.	What is the value of the expression shown? $\left(\frac{1}{2}\right)^2$ A. $\frac{1}{2}+\frac{1}{2}=1$ B. $\frac{1}{2}\times\frac{1}{2}=\frac{1}{4}$ C. $\frac{1}{2}\div\frac{1}{2}=1$ D. $\frac{1}{2}-\frac{1}{2}=0$	What is the value of the expression shown? $\left(\frac{2}{5}\right)^2$ A. $\frac{4}{5}$ B. $\frac{4}{10}$ C. $\frac{2}{25}$ D. $\frac{4}{25}$	What is the value of the expression shown? $\left(\frac{2}{5}\right)^2$ Answer: $\frac{4}{25}$	What is the value of the expression shown? $\left(\frac{2}{5}\right)^2$ Answer: $\frac{4}{25}$ Explain 2 different ways to evaluate the expression. The student response could show work to explain that $\frac{2}{5}\times\frac{2}{5}=\frac{4}{25}$ and $\frac{2^2}{5^2}=\frac{4}{25}$.

Expressions & Equations

6.EE.2	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Write, read, and evaluate expressions in which letters stand for numbers (algebraic expressions).	Which expression represents "the product of 5 and x"? A. $5+x$ B. $5-x$ C. $5\times x$ D. $5\div x$	Match each expression with the name of the result. Expression / Result $5+x$ — Difference $5-x$ — Quotient $5\times x$ — Sum $5\div x$ — Product Answer: $5+x$ — Sum $5-x$ — Difference $5\times x$ — Product $5\div x$ — Quotient	Which expressions represents "the product of 5 and x"? Select **all** that apply. A. $5-x$ B. $5+x$ C. $x\times 5$ D. $x+5$ E. $5\div x$ F. $5\times x$	Evaluate the given expression when $x=2$ and $y=3$. x^3-2y+1 Explain your work. The student response should show an accurate series of steps similar to the following: $(2)^3-2(3)+1$ $8-6+1$ 3

Expressions & Equations

6.EE.2a	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Write expressions that record multiple operations with numbers and with letters standing for numbers.	Which algebraic expression represents the verbal expression "two less than a number?" A. $n + 2$ B. $n - 2$ C. $n \times 2$ D. $n \div 2$	Which verbal expression best represents the algebraic expression $n - 2$? A. Two less than a number B. Two more than a number C. A number divided by two D. A number times two	Which verbal expression best represents the algebraic expression $4n - 2$? A. Two less than four divided by a number B. Two less than the product of four and a number C. Four divided by a number minus two D. Four minus two times a number	Write an algebraic expression that best represents the verbal expression shown. "Five less than the quotient of a number squared and 4." Answer: $\frac{n^2}{4} - 5$

Expressions & Equations

6.EE.2b	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Identify all parts of an expression using mathematical terms (sum, term, product, factor, quotient, coefficient). View one or more parts of an expression as a single entity.	An expression is shown. $3x - 2$ Which value is a coefficient? A. 3 B. x C. - D. 2	An expression is shown. $3x - 2$ Match each term with the correct part of the expression. **Part** — **Name** 3 — Constant x — Variable - — Coefficient 2 — Operation Answer: 3 — Coefficient x — Variable - — Operation 2 — Constant	An expression is shown. $2x - 5y + 3z - 4$ Which value is **not** a coefficient? A. 2 B. -5 C. 3 D. -4	Create an expression using the mathematical terms shown. $4x$ y^2 $\div$ 5 + () Explain how each part of the expression relates to the other parts. Answers will vary.

Expressions & Equations

6.EE.2c	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Evaluate expressions at specific values for their variables. Evaluate expressions at specific values for their variables in real-world problems. Perform arithmetic operations, including those involving whole-number exponents, in the conventional order when there are no parentheses to specify a particular order.	An expression is shown. $8 + x^2 - 5$ Which value represents the value of the expression when $x = 2$? A. -7 B. 1 C. 7 D. 17	An expression is shown. $x^2 - 5y + 8$ Which value represents the value of the expression when $x = 2$ and $y = -1$? A. -7 B. 1 C. 7 D. 17	An expression is shown. $x^2 - 5y + 8$ What is the value of the expression when $x = 2$ and $y = -1$? Answer: 17	The area of a circle can be found by using the equation shown when A represents the area and r represents the length of the radius. $A = \pi r^2$ What is the area, in square inches, of a circle with a radius of 3 inches? Round your answer to the nearest hundredth. Answer: 28.26 or 28.27 or 28.29 (depending on the value used for pi).

Expressions & Equations

6.EE.3	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Apply the properties of operations to generate equivalent expressions.	Determine if each statement is true or false. $2 + 3 = 3 + 2$ $5 \times 4 = 4 \times 5$ $5 - 2 = 2 - 5$ $6 \div 3 = 3 \div 6$ Answers: True, True, False, False	An expression is given. $\frac{1}{2}[2(x - 3)]$ Which expression is equivalent to the given expression? A. $1(x - 3)$ B. $1(2x - 6)$ C. $\frac{1}{2}(2x - 3)$ D. $\frac{1}{2}(2x - 6)$	Jon and Jasmine wrote different equations to simplify the expression $\frac{1}{2}[2(x - 3)]$. Jon: $\frac{1}{2}[2(x - 3)] = \frac{1}{2}(2x - 6)$ Jasmine: $\frac{1}{2}[2(x - 3)] = 1(x - 3)$ Using properties of operations, explain or show why each student is correct or incorrect. The student response should include an explanation of how both Jon and Jasmine are correct.	An expression is given. $\frac{1}{2}[2(x^2 - 3)]$ Write 2 different equivalent expressions. Answers: $\frac{1}{2}[2x^2 - 6]$, $x^2 - 3$

Expressions & Equations

6.EE.4	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Identify when two expressions are equivalent.	Circle the two expressions that are equivalent. $5x + 7h$ $3x + 7h + 3x$ $3x + 3h + 2x + 4h$ $6x + h$ Answers: $5x + 7h$, $3x + 3h + 2x + 4h$	Which expression is equivalent to $6h + 5(x + h)$? A. $7h + 5x$ B. $11h + 5x$ C. $12h + x$ D. $6h + 5x + h$	Which expressions are equivalent to $6h + 5(x + h)$? Select **all** the correct answers. A. $7h + 5x$ B. $11h + 5x$ C. $12h + x$ D. $6h + 5x + 5h$ E. $6(h + 5x + 5h)$	Write 2 different expressions that are equivalent to $6h + 5(x + h)$? Answers could include $11h + 5x$ and $6h + 5x + 5$ Verify that your expressions are equivalent by evaluating each when $x = 2$ and $h = -1$. The student response should show work verifying that their expressions are equivalent.

Expressions & Equations

6.EE.5	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Use substitution to determine whether any given rational number makes an equation or inequality true.	An inequality is shown. $x > 5$ Which value of x is a solution to the inequality? A. 3 B. 4 C. 5 D. 6	An inequality is shown. $2x - 4 > 5$ Which value of x is a solution to the inequality? A. 2 B. 3 C. 4 D. 5	An inequality is shown. $2x - 4 > 5$ What values of x are a solution to the inequality? Select **all** the correct answers. A. 2 B. 3 C. 4 D. 5 E. 6 F. 7	An inequality is shown. $2x - 4 > 5$ Determine 3 values of x that are a solution to the inequality. Possible answers include 5 and integers larger than 5.

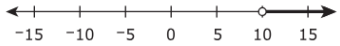
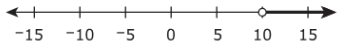
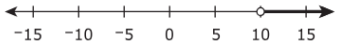
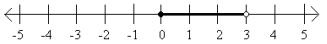
Expressions & Equations

6.EE.6	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Use variables to represent numbers and write expressions when solving a real-world or mathematical problem.	Digital movies can be downloaded for $5 per movie. An expression to determine the total cost, in dollars, to download movies is $5x$. What does x represent in the expression? A. The total cost B. The cost to download 1 movie C. The number of downloaded movies D. The length of 1 movie	Digital movies can be downloaded for $5 per movie. An expression to determine the total cost, in dollars, to download movies is $5x$. What does x represent in the expression? Answer: The number of downloaded movies	Digital movies can be downloaded for $5 per movie. Which expression can be used to determine the total cost, in dollars, of downloading x movies? A. $x + 5$ B. $x - 5$ C. $x \times 5$ D. $x \div 5$	Digital movies can be downloaded for $5 per movie. Write an expression that can be used to determine the total cost, in dollars, of downloading x movies? Answer: $5x$ $(or\ equivalent)$

Expressions & Equations

6.EE.7	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Solve real-world and mathematical problems by writing and solving equations in the form x + p = q and px = q for cases in which p, q, and x are all nonnegative numbers.	Joanna earns $14 per hour at her job. Last week, Joanna earned $560. How many hours did Joanna work last week? A. $\frac{14}{560} = 0.025$ B. $\frac{560}{14} = 40$ C. $560 - 14 = 546$ D. $560 \times 14 = 7840$	Joanna earns $14 per hour at her job. Last week, Joanna earned $560. How many hours did Joanna work last week? Answer: 40	Joanna earns $14.50 per hour at her job. Last week, Joanna earned $580. How many hours did Joanna work last week? Answer: 40	Joanna earns $14.50 per hour at her job. Last week, Joanna earned $580. Write an equation that can be used to determine the number of hours (h) Joanna worked last week? Answer: $\frac{580}{14.50} = h$ $(or\ equivalent)$ How many hours did Joanna work last week? Answer: 40

Expressions & Equations

6.EE.8	Below Proficient	Approaching Proficient	Proficient	Above Proficient
Expectation at Proficient: Write an inequality of the form x > c or x < c to represent a constraint or condition in a real-world or mathematical problem. Recognize that inequalities of the form x > c or x < c have infinitely many solutions. Represent solutions to inequalities in real-world or mathematical problems in the form x > c or x < c on number line diagrams.	Which inequality statement could be represented by the graph on the number line shown?  A. $x < 10$ B. $x \leq 10$ C. $x > 10$ D. $x \geq 10$	Write an inequality that can be represented by the graph on the number line shown?  Answer: $x > 10$	Which statement could be represented by the inequality graphed on the number line shown?  A. Shelly owes at least $10. B. Jerika has at least 10 pencils. C. Brody has more than 10 cards. D. Finnian has less than 10 books.	Write a compound inequality to represent the graph on the number line shown.  Possible answers: $0 \leq x < 3$ or $x \geq 0 \ and \ x < 3$

Expressions & Equations

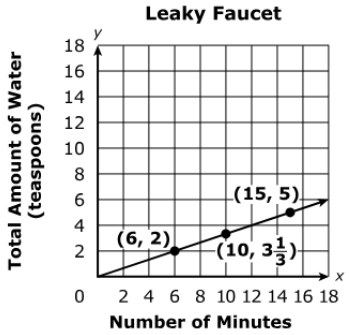
6.EE.9

Expectation at Proficient:

Write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable.
Analyze the relationship between the dependent and independent variables using graphs and tables and relate these to the equation.

Below Proficient

The graph shows the number of teaspoons of water, y, that have dripped from a leaky faucet after x minutes.



Identify each variable as either the independent variable or the dependent variable.

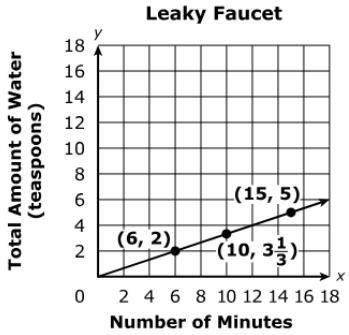
Number of Minutes: _____

Total Amount of Water: _____

Number of Minutes: Dependent
Total Amount of Water: Independent

Approaching Proficient

The graph shows the number of teaspoons of water, y, that have dripped from a leaky faucet after x minutes.



Which equation best represents the relationship between x and y shown in the graph.

A. $y = \frac{1}{3}x$

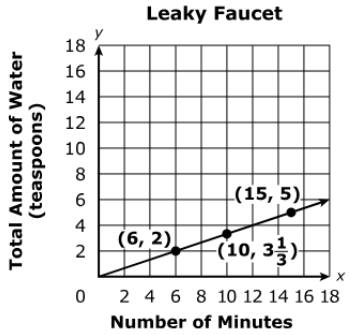
B. $y = 3x$

C. $y = \frac{1}{6}x$

D. $y = 6x$

Proficient

The graph shows the number of teaspoons of water, y, that have dripped from a leaky faucet after x minutes.

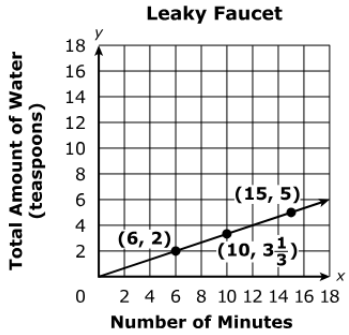


Write an equation to represent the relationship between x and y shown in the graph.

Answer: $y = \frac{1}{3}x$

Above Proficient

The graph shows the number of teaspoons of water, y, that have dripped from a leaky faucet after x minutes.



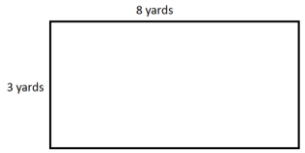
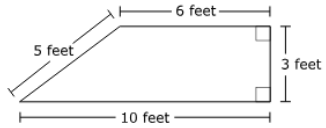
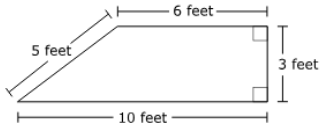
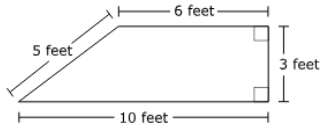
Write an equation to represent the relationship between x and y shown in the graph.

Answer: $y = \frac{1}{3}x$

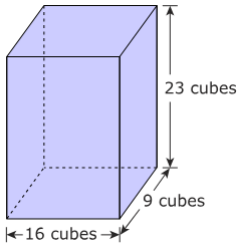
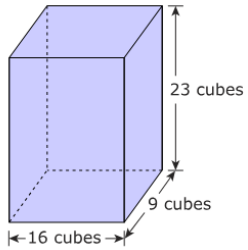
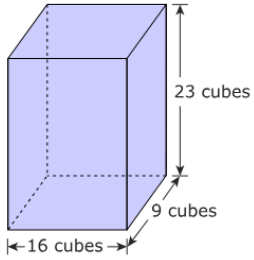
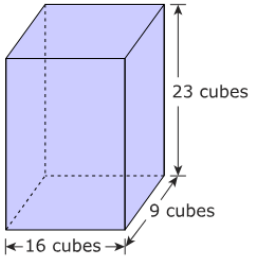
Use your equation to predict the amount of water, in teaspoons, that will drip after 25 minutes?

Answer: $\frac{25}{3}$

Geometry

6.G.1 **Expectation at Proficient:** Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes. Apply these techniques to solve mathematical problems and problems in real-world context.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	A figure with dimensions, in yards, is shown.  Determine the area, in square yards, of the rectangle. A. 11 B. 22 C. 24 D. 38	A figure with dimensions, in feet, is shown.  Determine the area, in square feet, of the figure? A. 18 B. 24 C. 30 D. 32	A figure with dimensions, in feet, is shown.  Determine the area, in square feet, of the figure? Answer: 24	Bailey is painting the top of a table in the shape of a trapezoid as shown.  What is the area, in square feet, of the tabletop? Answer: 24 A tube of paint will cover 5 square feet. How many tubes of paint will Bailey need to paint the tabletop? Answer: 5

Geometry

6.G.2 **Expectation at Proficient:** Find the volume of a right rectangular prism with fractional edge lengths by packing it with unit cubes of the appropriate unit fraction edge lengths and show that the volume is the same as multiplying the edge lengths of the prism. Apply the formula V = Bh, where B is the area of the base (B= lw) to find volumes of right rectangular prisms with fractional edge lengths in mathematical and real-world problems.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	A right rectangular prism is packed with identical cubes. The dimensions of the prism are given in terms of the number of cubes needed to fill the prism.	A right rectangular prism is packed with identical cubes. The dimensions of the prism are given in terms of the number of cubes needed to fill the prism.	A right rectangular prism is packed with identical cubes. The dimensions of the prism are given in terms of the number of cubes needed to fill the prism.	A right rectangular prism is packed with identical cubes. The dimensions of the prism are given in terms of the number of cubes needed to fill the prism.
				
	The side length of each cube is 1 inch. The area of the base, B, is 144 square inches. Use the formula $V = B \times h$ to determine which value represents the volume, in cubic inches, of the rectangular prism. A. 48 B. 167 C. 1192 D. 3312	The side length of each cube is $\frac{1}{4}$ inch. The height of the rectangular prism is $\frac{23}{4}$ inches. The area of the base is 9 square inches. What is the volume, in cubic inches, of the right rectangular prism? Answer: $\frac{207}{4}$ or $51\frac{3}{4}$	The side length of each cube is $\frac{1}{4}$ inch. What is the volume, in cubic inches, of the right rectangular prism? Answer: $\frac{207}{4}$ or $51\frac{3}{4}$	The side length of each cube is $\frac{1}{4}$ inch. Explain how to determine the volume, in cubic inches, of the right rectangular prism? Student response should include an explanation of how to the use the formula to get $\frac{207}{4}$ or $51\frac{3}{4}$.

Geometry				
6.G.3 **Expectation at Proficient:** Draw polygons in a coordinate plane given coordinates for the vertices; use coordinates to find the length of a side by joining points with the same first coordinate or the same second coordinate. Apply these techniques to solve mathematical problems and real-world problems.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
Rectangle $PQRS$ has vertices at $P(-2,4), Q(3,4),$ $R(3,-2)$ and $S(-2,-2)$. Graph the rectangle on a coordinate plane. Student graph should include all 4 points with their corresponding label.	Rectangle $PQRS$ has vertices at $P(-2,4), Q(3,4),$ $R(3,-2)$ and $S(-2,-2)$. Graph the rectangle on a coordinate plane. Determine the length, in units, of each side of the rectangle. Answer: PQ=5, QR= 6, RS=5, ST=6	Rectangle $PQRS$ has vertices at $P(-2,4), Q(3,4),$ $R(3,-2)$ and $S(-2,-2)$. Graph the rectangle on a coordinate plane. Determine the perimeter, in units, of the rectangle. Answer: 22	Rectangle $PQRS$ has vertices at $P(-2,4), Q(3,4)$, and $R(3,-2)$. Determine the coordinates of vertex S. Answer: $(-2,-2)$ Graph the rectangle on a coordinate plane. Determine the perimeter, in units, and the area, in square units, of the rectangle. Answer: the perimeter is 22 units and the area if 30 square units.

Geometry

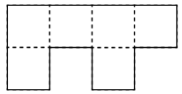
6.G.4

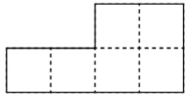
Expectation at Proficient:

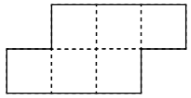
Represent three-dimensional figures using nets made up of rectangles and triangles and use the nets to find the surface area of the figure. Apply these techniques to solve mathematical problems and real-world problems.

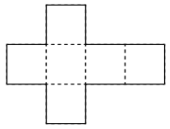
Below Proficient

Which net can be folded to make a cube?

A. 

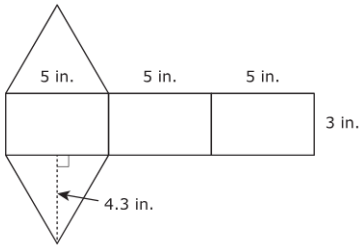
B. 

C. 

D. 

Approaching Proficient

The net of a triangular prism is shown.



What is the surface area, in square inches, of the triangular prism?

A. 22.3

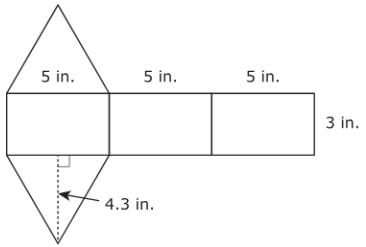
B. 36.5

C. 66.5

D. 322.5

Proficient

The net of a triangular prism is shown.

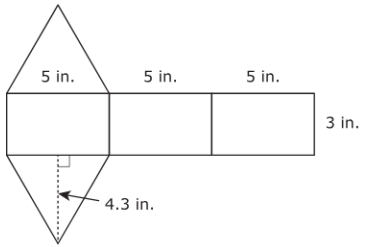


What is the surface area, in square inches, of the triangular prism?

Answer: 66.5

Above Proficient

Jenny wants to paint bird houses that are in the shape of a triangular prism. The net of a bird house is shown.



What is the surface area, in square inches, of one bird house?

Answer: 66.5

Jenny has a can of paint that will cover 110 square inches. How many bird houses can she paint with the amount of paint in the can?

Answer: 1

Statistics & Probability

6.SP.1 **Expectation at Proficient:** Recognize a statistical question as one that anticipates variability in the data related to the question and accounts for it in the answers.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	Which question will result in numerical data? A. What color is your house? B. What is your middle name? C. How many pets do you have? D. How do you write your name?	Which question is a statistical question? A. How old is Mr. Jones? B. How many states has Mr. Jones visited? C. How many students eat lunch in the cafeteria each day? D. How many students are in Mr. Jones' class today?	Which equations are statistical questions? Select **all** correct answers. A. How old is Mr. Jones? B. How many states has Mr. Jones visited? C. How many students are in Mr. Jones' class today? D. How many students eat lunch in the cafeteria each day? E. How many pets does each student in Mr. Jones' class have at home?	Write 3 statistical questions about your school day. Explain the variability that you anticipate discovering in the data. Answers will vary and should include an explanation of how variability can be expected.

Statistics & Probability

6.SP.2
Expectation at Proficient:

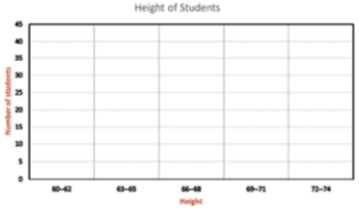
Describe the aspects of distribution (center, spread, and overall shape) for a set of data collected to answer a statistical question.

Below Proficient

The height of 100 students is recorded in the table shown.

Height	Number of Students
60-62	5
63-65	15
66-68	40
69-71	30
72-74	10

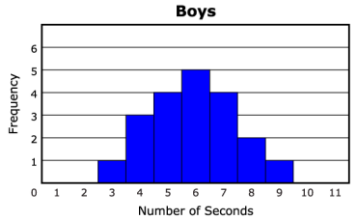
Complete the histogram using the data in the table.

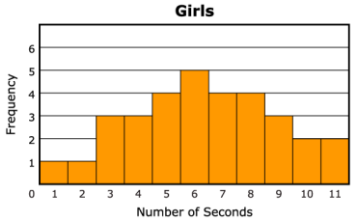


Given a prelabeled graph, students should be able to draw bars according to the table.

Approaching Proficient

The histograms show the number of seconds it took a group of boys and a group of girls to complete a word puzzle.



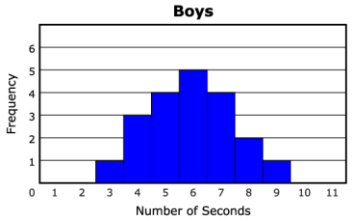


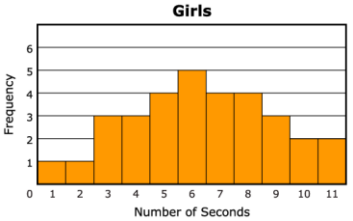
What is the center value of both histograms?

Answer: 6

Proficient

The histograms show the number of seconds it took a group of boys and a group of girls to complete a word puzzle.



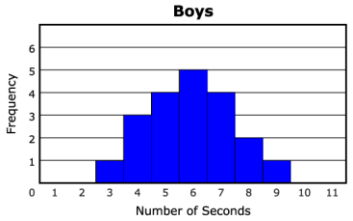


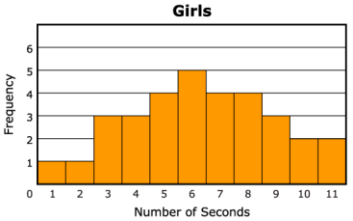
The spread of the boys' data is (greater than/less than) the center of the girls' data.

Answer: less than

Above Proficient

The histograms show the number of seconds it took a group of boys and a group of girls to complete a word puzzle.





Compare the graphs. Draw a conclusion about the center, spread, and overall shape of the data.

The centers are about the same, both are symmetrical however the spread of the girls' data is greater than that of the boys' data.

Statistics & Probability

6.SP.3 **Expectation at Proficient:** Recognize that a measure of center for a numerical data set summarizes all of its values with a single number, while a measure of variation describes how its values vary with a single number.	Below Proficient	Approaching Proficient	Proficient	Above Proficient
	Ms. Deb recorded the number of books read by 6 students in a month: 12, 15, 8, 10, 18. What is the mean (average) number of books read? A. 8 B. 12.6 C. 14 D. 15.2	Ms. Deb recorded the number of books read by 6 students in a month: 12, 15, 8, 10, 18. What is the mean (average) number of books read? A. 8 B. 12.6 C. 14 D. 15.2 What is the range of the number of books read? A. 8 B. 10 C. 12 D. 18	Deb recorded the number of cups of water she drank each day for 7 days. The median daily number of cups of water she drank was 6. The range of the number of cups of water she drank was 4. Based on the given information, which statement is true? A. At least one day, she drank exactly 6 cups of water. B. The least amount of water she drank could have been 1 cup. C. The mean daily number of cups of water she drank is greater than the median daily number of cups of water. D. If the least amount of water she drank was 3 cups, then the greatest amount of water she drank was 9 cups.	Deb recorded the number of cups of water she drank each day for 7 days. The median daily number of cups of water she drank was 6. The range of the number of cups of water she drank was 4. On day 8, she drank 14 cups of water. Explain how adding the data from day 8 to the data set affects the shape, center, and spread of the data. Possible answers: The shape will be skewed right, the center and the spread will increase.

Statistics & Probability

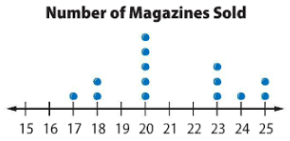
6.SP.4 Expectation at Proficient:

Display numerical data in plots on a number line, including dot plots, histograms, and box plots.

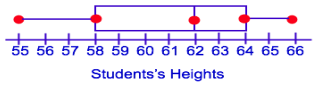
Below Proficient

Which display is a histogram?

A.

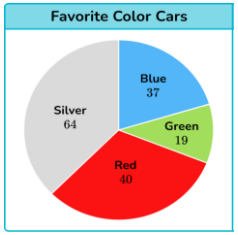


B.



C.

D.



Approaching Proficient

The ages of animals at a zoo are listed in the table shown.

10	9	3	16	16	7
1	5	7	4	10	13
5	12	2	11	17	8
4	7	8	2	8	9

Which display would be most appropriate to show the distribution of ages in groups?

A. Dot plot

B. Coordinate plane

C. Pie chart

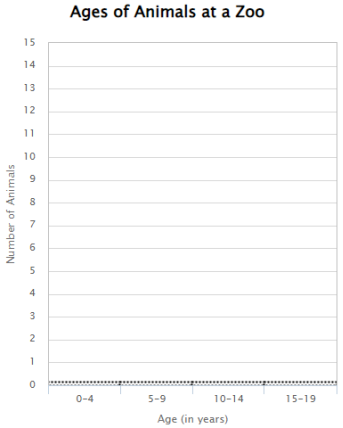
D. Histogram

Proficient

The ages of animals at a zoo are listed in the table shown.

10	9	3	16	16	7
1	5	7	4	10	13
5	12	2	11	17	8
4	7	8	2	8	9

Complete the histogram to display the data.



Above Proficient

The ages of animals at a zoo are listed in the table shown.

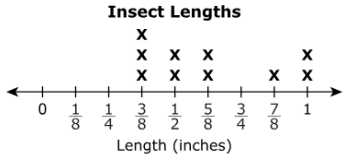
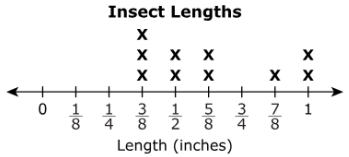
10	9	3	16	16	7
1	5	7	4	10	13
5	12	2	11	17	8
4	7	8	2	8	9

Which display would be most appropriate to show the distribution of ages in groups?

Answer: Histogram

Create a display of the data in the table.

Statistics & Probability

6.SP.5 **Expectation at Proficient:** Summarize numerical data sets in relation to their context.	**Below Proficient**	**Approaching Proficient**	**Proficient**	**Above Proficient**
	A data set is shown. Data Set 21 30 39 43 58 67 What is the mean of the data? A. 39 B. 43 C. 67 D. 93	A data set is shown. Data Set 21 30 39 43 58 67 What is the mean of the data? Answer: 43	The mean length of an insect is 0.6 inch. The students in a science class measured 10 insects. The lengths are shown in the line plot.  Part A: How many of the insects have a length greater than 0.6 inch? Answer: 5 Part B: What is the mean of the insects measured by the students? Answer: $\frac{5}{8}$	The mean length of an insect is 0.6 inch. The students in a science class measured 10 insects. The lengths are shown in the line plot.  Jana wants to predict the length of an insect. If she uses the mean, she will get a different answer than if she uses the data in the line plot. Explain which method will result in a more accurate prediction. Answers will vary but may include that the mean is more accurate because the sample was larger.