A Tutor™ for CASAS GOALS 2 Student Edition

Aztec Paxen Publishing

Level C

Math

Sampler

Steck-Vaughn Adult Education

- Aligned to CASAS Math GOALS 2 and CCRS
- Pretest to identify strengths and weaknesses
- Step-by-step instruction and targeted practice to boost CASAS Math GOALS 2 scores
- Full-length practice test to build learners' confidence

Aztec Paxen Publishing

Math

A Tutor™ for CASAS GOALS 2 Student Edition

Level C

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About CASAS Math GOALS 2

CASAS stands for the Comprehensive Adult Student Assessment Systems. *GOALS* stands for Greater Opportunities for Adult Learning Success. The CASAS Math GOALS 2 tests are available in paper-and-pencil formats and online formats. CASAS Math GOALS 2 tests align with the CASAS Competencies and the Adult Education College and Career Readiness Standards (AE-CCR). The CASAS Math GOALS 2 tests measure progress on the basic skills that adults need to succeed on the job and in life.

There are five levels for the CASAS Math GOALS 2:

CASAS Math GOALS 2, Levels A, B, C, D, E

Test	Number of Items (approximate)	Maximum Allowable Testing Time
Math GOALS 2 Level A	33	50 minutes
Math GOALS 2 Level B	36	65 minutes
Math GOALS 2 Level C	36	75 minutes
Math GOALS 2 Level D	36	75 minutes
Math GOALS 2 Level E	36	90 minutes

These tests measure basic adult math skills and the ability to make calculations and solve word problems that relate to real-world situations and traditional academic contexts. The CASAS Math GOALS 2 test includes multiple-choice items with four answer options. Basic calculators are allowed. Formulas are provided.

The math tests include items from the following domains.

CASAS Math GOALS 2 Content Areas	Covered Domains				
	A	B	C	D	E
Number Sense and Operations	✦	✦	✦	✦	✦
Algebraic Thinking	✦	✦	✦	✦	✦
Geometry	✦	✦	✦	✦	✦
Measurement	✦	✦	✦		
Data Analysis	✦	✦	✦		✦
Statistics		✦	✦	✦	✦
Probability			✦	✦	✦

Using *A Tutor™ for CASAS Math GOALS 2 Student Edition*

Step-by-Step Instruction

Each lesson starts with step-by-step instruction on a math concept or skill. The instruction contains examples and guided practice items with feedback. This instruction is followed by independent practice items. All items are aligned to a College and Career Readiness Standard and a CASAS Competency. Math items address real-life scenarios, workplace topics, and academic contexts. Work all of the items in the lesson's practice and then check your work in the Answers and Explanations section in the back of the book.

Pretest

Begin by taking the pretest on pages 1–5. Use the Pretest Analysis Chart on page 193 to identify your areas of strength and the areas you need to review. The chart will refer you to specific lessons in this book for further study.

Unit Reviews

Unit reviews give you a chance to check your understanding and determine if you have mastered the skills taught in each unit. Use the corresponding Unit Review Analysis Charts on pages 195–208 to identify strengths and weaknesses. These charts will help you determine if you need to review any of the lessons before continuing to the next unit.

Strategies and Hints

Pay careful attention to the Strategies and Hints throughout this book. Strategies are test-taking tips that help you do better on the test. Hints give you extra information about a skill.

Practice Test

At the end of the book, there is a full-length practice test. This test is similar to the CASAS Math GOALS 2 test. It has the same number and type of questions. This assessment will give you an idea of what the real test is like. Use the Practice Test Analysis Chart on page 209 to identify areas you need to review.

Answers and Explanations

The answer key includes explanations for the correct answers to all practice items. After completing a lesson or unit review, check your answers on pages 160–192. For each item answered incorrectly, read the provided explanation and try reworking the item to obtain the correct answer. Please remember, there may be more than one way to solve a math problem. The explanations show one method of solving a problem. You may have used a different method than the one provided to correctly answer the question.

Additional Practice with *A Tutor™ for CASAS Math GOALS 2: Workbooks*

A Tutor™ for CASAS Math GOALS 2: Student Editions are designed to be used hand-in-hand with *A Tutor™ for CASAS Math GOALS 2: Workbooks,* which include practice sets for each lesson in the student editions. Each practice set provides additional items similar to those found on the CASAS Math GOALS 2 test.

- Use the practice sets after completing the corresponding student edition lesson if you feel you need additional practice.
- Use the practice sets after completing the unit reviews or Practice Test in the student edition for areas that need review and improvement.

Lesson 1 Add and Subtract Whole Numbers

4.NBT.4

When you are asked to combine numbers to find a total, you are using the mathematical operation of addition. When you are asked to find the difference between numbers, you are using the mathematical operation of subtraction.

Clue Words for Addition	add, altogether, combine, in all, increased, more than, plus, sum, total
Clue Words for Subtraction	decreased, difference, fewer, how many more, how much more, left, less than, minus, remain

Example **A parking lot has two entrances. At the south gate, 619 cars entered. At the north gate, 184 cars entered.**

How many cars in all entered the parking lot?

$$\begin{array}{r} {\scriptstyle 1} \\ 619 \\ +184 \\ \hline 3 \end{array} \qquad \begin{array}{r} {\scriptstyle 1\,1} \\ 619 \\ +184 \\ \hline 03 \end{array} \qquad \begin{array}{r} {\scriptstyle 1\,1} \\ 619 \\ +184 \\ \hline 803 \end{array}$$

1) The words *in all* tell you this is an addition problem. Add the numbers.

2) Add the ones: 9 + 4 = 13. Write 3 in the ones column. Regroup 1 to the tens column.

3) Add the tens: 1 + 1 + 8 = 10. Write 0 below the tens column. Regroup 1 to the hundreds column.

4) Add the hundreds: 1 + 6 + 1 = 8. The answer is 803.

How many more cars entered at the south gate than at the north gate?

$$\begin{array}{r} 619 \\ -184 \\ \hline 5 \end{array} \qquad \begin{array}{r} {\scriptstyle 5\,11} \\ 6\not{1}9 \\ -184 \\ \hline 35 \end{array} \qquad \begin{array}{r} {\scriptstyle 5\,11} \\ 6\not{1}9 \\ -184 \\ \hline 435 \end{array}$$

1) The words *how many more* tell you this is a subtraction problem. Subtract the numbers.

2) Subtract the ones. 9 − 4 = 5.

3) Subtract the tens. 8 is greater than 1, so you must regroup. To regroup, trade 1 hundred from the hundreds. Now there are 11 tens. 11 − 8 = 3.

4) Subtract the hundreds. 5 − 1 = 4. The answer is 435.

Guided Practice

A delivery truck driver drove 209 miles to Springfield to make a delivery. Then she drove another 122 miles to Lennox for another delivery. How many miles did she drive altogether?

A. 87 **B.** 107

C. 321 **D.** 331

Option D is correct. The word altogether tells you this is an addition problem.

$$\begin{array}{r} {\scriptstyle 1} \\ 209 \\ +122 \\ \hline 331 \end{array}$$

Strategy

Clue words are helpful, but you should also apply your own reasoning.

Practice

Read each question. Select the correct answer.

1 What is the sum?

$$\begin{array}{r} 295 \\ +433 \\ \hline \end{array}$$

A. 628
B. 637
C. 639
D. 728

2 What is the difference?

$$\begin{array}{r} 9{,}461 \\ -\ 520 \\ \hline \end{array}$$

A. 8,741
B. 8,941
C. 9,981
D. 9,941

3 What is the difference?

$$\begin{array}{r} 853 \\ -150 \\ \hline \end{array}$$

A. 703
B. 753
C. 903
D. 953

4 What is the sum?

$$\begin{array}{r} 444 \\ +657 \\ \hline \end{array}$$

A. 1,111
B. 1,102
C. 1,101
D. 1,001

5 A garden center had 341 trees on Friday. It sold 59 of those trees over the weekend. How many trees are left?

A. 382 **B.** 292
C. 318 **D.** 282

6 Dwayne wants to buy a new phone that costs $765. He has saved $521. How much more money does he need to buy the new phone?

A. $234 **B.** $244
C. $245 **D.** $286

7 Last month, a store sold 1,431 sweaters. This month, the store sold 1,148 sweaters. How many fewer sweaters were sold this month?

A. 183 **B.** 203
C. 283 **D.** 579

8 Cheryl is putting in new tile floors. She used 156 tiles in the dining room. She used 224 tiles in the living room. How many tiles did she use altogether?

A. 380 **B.** 379
C. 188 **D.** 68

9 A business sent 4,472 samples to customers in May. In June, the business sent 1,223 more samples. What was the total number of samples sent?

A. 3,251 **B.** 3,691
C. 5,665 **D.** 5,695

10 Artville apartment complex has 1,641 apartments. 54 of those apartments are empty. The rest are leased. How many apartments are leased?

A. 1,687
B. 1,590
C. 1,587
D. 1,498

Lesson 12 Equivalent Ratios

6.RP.3, 6.RP.3.a

Equivalent ratios are two ratios that express the same relationship between the two numbers. You can use a multiplication table to find equivalent ratios.

Example **There are 6 apples in 1 basket. Complete the table of equivalent ratios.**

	Original ratio	2•1 ↓	3•1 ↓	4•1 ↓	5•1 ↓
Baskets	1	2	3	4	5
Apples	6	12	18	24	30
		↑ 2•6	↑ 3•6	↑ 4•6	↑ 5•6

1) First, identify the rows in a multiplication table that can be used to find equivalent ratios.

×	1	2	3	4	5
1	1	2	3	4	5
2	2	4	6	8	10
3	3	6	9	12	15
4	4	8	12	16	20
5	5	10	15	20	25
6	6	12	18	24	30

2) Use the rows in the multiplication table to enter equivalent ratios in the table.

Because the initial ratio uses the 1 and 6 rows in a multiplication table, 2:12, 3:18, 4:24, and 5:30 are all equivalent ratios.

Guided Practice

A certain shade of purple paint is created by mixing the correct ratio of blue and red paints. Every time a batch is mixed, the ratio of blue to red paints is recorded in the table. One of the batches in the table below is made incorrectly. Which batch is *not* the same as the others?

Batch	Blue (gallons)	Red (gallons)
1	8	4
2	4	2
3	5	9
4	16	8

A. Batch 1 **B.** Batch 2

C. Batch 3 **D.** Batch 4

Option C is correct. The ratio of blue to red for batches 1, 2, and 4 is 2:1. The ratio for batch 3 is not equivalent to the other batches; if the ratio were equivalent, 18 gallons of blue paint would be mixed with 9 gallons of red.

Strategy

Find the ratio in the table that is not equivalent to the others.

Practice

Read each question. Select the correct answer.

1 Lemonade is made by combining water with sugar and lemon juice. The table shows the amount of sugar necessary to make certain amounts of lemonade. What value is missing in the table?

Water (gallons)	Sugar (cups)
1	3
2	?
3	9
4	12

A. 4

B. 5

C. 6

D. 7

2 The table shows the distance a cyclist traveled at a constant speed. What is the value of x?

Time (hours)	Miles Traveled
1	10
2	20
x	50
7	70

A. $x = 3$

B. $x = 5$

C. $x = 10$

D. $x = 500$

3 There are 2 cap erasers for every 7 pencils in a box. Which ratio is equivalent to the ratio of cap erasers to pencils?

A. 1:7

B. 3:14

C. 4:14

D. 5:21

4 In a certain granola mix there are 3 cups of rolled oats for every 2 cups of raisins. Which of the following ratios are equivalent to the ratio of raisins to rolled oats?

A. $\frac{3}{2}$

B. $\frac{6}{4}$

C. $\frac{3}{4}$

D. $\frac{6}{9}$

5 The table shows the distance a car traveled at a constant speed. What is the value of y?

Time (hours)	Miles Traveled
1	55
2	y
4	220
8	440

A. $y = 27.5$

B. $y = 55$

C. $y = 110$

D. $y = 165$

6 A student is interested in purchasing pens in bulk to get ready for school. Three stores are offering different sizes of packages containing the pens the student wants. The table shows the offers. Which list shows the stores in order from *worst* deal to *best* deal for purchasing pens?

Store	Cost	Number of Pens
A	$3.60	3
B	$8.00	8
C	$5.00	4

A. Store A, Store B, Store C

B. Store B, Store C, Store A

C. Store B, Store A, Store C

D. Store C, Store A, Store B

Lesson 25 Solve Problems with Equations

6.EE.7

To solve an equation with unknowns, you want to get the variable (such as x) on one side of the equation and all the numbers on the other side. You do this by balancing the equation or doing the opposite operation on both sides.

When a number is added to x.

$$\begin{array}{rr} x + 4 = & 5 \\ \underline{-\ 4} & \underline{-\ 4} \\ x = & 1 \end{array}$$

Subtract 4 from both sides of the equation.

When a number is multiplied by x.

$$2x = 8$$

Divide both sides of the equation by 2.

$$\left(\frac{2x}{2}\right) = \frac{8}{2}$$

$$x = 4$$

When a number is subtracted from x.

$$\begin{array}{rr} x - 3 = & 6 \\ \underline{+\ 3} & \underline{+\ 3} \\ x = & 9 \end{array}$$

Add 3 to both sides of the equation.

When x is divided by a number.

$$\frac{x}{5} = 3$$

Multiply both sides of the equation by 5.

$$5\left(\frac{x}{5}\right) = 3(5)$$

$$\frac{5}{1}\left(\frac{x}{5}\right) = 3(5)$$

$$\frac{5 \times x}{5 \times 1} = 3(5)$$

$$x = 15$$

Example **Solve the equation. $x - 1{,}000 = 2{,}210$**

1) Balance the equation by doing the opposite of subtraction on both sides of the equation. The opposite of subtraction is addition.

2) To solve for x, add 1,000 to both sides of the equation.

$$\begin{array}{rr} x - 1{,}000 = & 2{,}210 \\ \underline{+\ 1{,}000} & \underline{+\ 1{,}000} \\ x = & 3{,}210 \end{array}$$

Example **Solve the equation. $\frac{x}{25} = 105$**

1) Balance the equation by doing the opposite of division on both sides of the equation. The opposite of division is multiplication.

2) To solve for x, multiply both sides of the equation by 25.

$$25\left(\frac{x}{25}\right) = 105(25)$$

$$x = 2{,}625$$

Guided Practice

What is the value of x in the equation?
$x - 918 = 4{,}174$

A. $x = 4{,}082$
B. $x = 4{,}092$
C. $x = 5{,}092$
D. $x = 5{,}902$

Option C is correct. The opposite of subtraction is addition.

$$\begin{array}{rcr} x - 918 & = & 4{,}174 \\ +\ 918 & & +\ 918 \\ \hline x & = & 5{,}092 \end{array}$$

Practice

Read each question. Select the correct answer.

1 What is the value of x in the equation?

$\frac{x}{11} = 97$

A. $x = 1{,}067$
B. $x = 1{,}607$
C. $x = 1{,}760$
D. $x = 10{,}067$

2 What is the value of x in this equation?

$x + 3{,}133 = 5{,}000$

A. $x = 1{,}678$
B. $x = 1{,}786$
C. $x = 1{,}867$
D. $x = 8{,}176$

3 What is the value of x in this equation?

$x + 2{,}525 = 2{,}800$

A. $x = 257$
B. $x = 275$
C. $x = 572$
D. $x = 752$

4 What is the value of x in this equation?

$x + 3{,}010 = 6{,}333$

A. $x = 2{,}333$
B. $x = 3{,}233$
C. $x = 3{,}323$
D. $x = 3{,}332$

5 What is the value of x in this equation?

$31x = 1{,}860$

A. $x = 50$
B. $x = 60$
C. $x = 3{,}490$
D. $x = 3{,}560$

6 What is the value of x in this equation?

$x - 21 = 786$

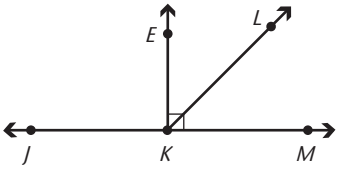
A. $x = 765$
B. $x = 768$
C. $x = 807$
D. $x = 817$

Lesson 31 Understand Angles

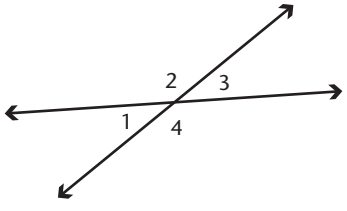
7.G.5

Angles are formed when two straight lines or rays intersect at a common point, or vertex. There are several types of angles.

- **Adjacent** angles are two angles with the same vertex and a common side. There are no common points inside the two angles.
- **Complementary angles** are two angles whose sum is 90°. Together they form a right angle.
- **Supplementary angles** are two angles whose sum is 180°. Together they form a straight line.
- **Vertical angles** are pairs of angles formed by intersecting lines that are opposite each other. Vertical angles are congruent, so they have equal measures.

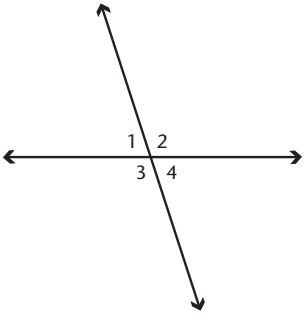


- $\angle EKL$ and $\angle LKM$ are adjacent angles and complementary angles.
- $\angle JKL$ and $\angle LKM$ are adjacent angles and supplementary angles.



- $\angle 1$ and $\angle 3$ are vertical angles.
- $\angle 2$ and $\angle 4$ are vertical angles.

Example **The measure of $\angle 4$ is 72°. What is the measure of each of the other three angles?**



$\angle 1$ and $\angle 4$ are vertical angles, so they are congruent: $m\angle 1 = 72°$.
$\angle 2$ and $\angle 4$ are supplementary angles. So, $m\angle 2 = 180° - 72° = 108°$.
$\angle 2$ and $\angle 3$ are vertical angles, so they are congruent: $m\angle 3 = 108°$.

The measure of $\angle 1$ is 72°, the measure of $\angle 2$ is 108°, and the measure of $\angle 3$ is 108°.

Guided Practice

One of two supplementary angles has a measure that is 3 times greater than the other. What is the measure of the greater angle?

A. 120°
B. 135°
C. 145°
D. 150°

Option B is correct. Write an equation: $x + 3x = 180$. Solve for x: $4x = 180$, so $x = 45$. Find the measure of the greater angle: $3(45°) = 135°$.

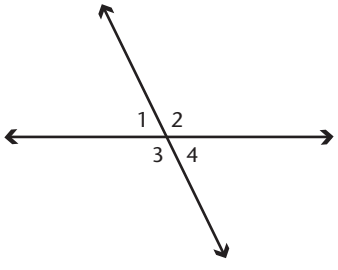
Strategy

After you solve the equation, use the solution to answer the question asked in the problem.

Practice

Read each question. Select the correct answer.

Use the diagram to answer questions 1–3.



1 Which correctly describes ∠1 and ∠2?

A. complementary only

B. supplementary only

C. complementary and adjacent

D. supplementary and adjacent

2 What is the measure of ∠2 when the measure of ∠3 = 116°?

A. 58° **B.** 64°

C. 116° **D.** 180°

3 What is the measure of ∠1 when the measure of ∠3 = 116°?

A. 64°

B. 63°

C. 27°

D. 26°

4 An architect includes 2 angles that are supplementary in the blueprint for a garage. The angles are congruent. Which statement is *true*?

A. Both angles are less than 90°.

B. Both angles are 90°.

C. Both angles are greater than 90°.

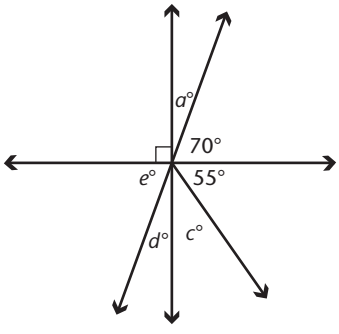
D. One angle is less than 90°, and one angle is greater than 90°.

5 One angle in a pair of vertical angles measures 68°, and the other measures $(4x - 12)$. What is the value of x?

A. $x = 14$ **B.** $x = 20$

C. $x = 25$ **D.** $x = 31$

Use the diagram to answer questions 6–8.



6 Kiri clarifies a diagram for a new co-worker. What is the value of d?

A. $d = 20$ **B.** $d = 35$

C. $d = 55$ **D.** $d = 70$

7 What is the value of c?

A. $c = 20$ **B.** $c = 35$

C. $c = 55$ **D.** $c = 70$

8 What is the value of e?

A. $e = 20$ **B.** $e = 35$

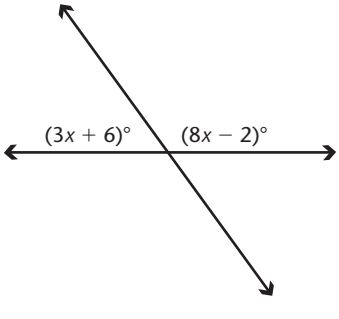
C. $e = 55$ **D.** $e = 70$

9 Two angles are complementary. One angle is 5 times greater than the other angle. What is the measure of the smaller angle?

A. 12° **B.** 15°

C. 25° **D.** 30°

10 What is the value of x?



A. $x = 10$

B. $x = 12$

C. $x = 16$

D. $x = 24$

Lesson 36 Convert Metric Measurements

5.MD.1

The metric system of measurement is used in most of the world and sometimes in the United States. The metric system is based on multiples of 10. The table below shows some of the conversions in the metric system. To convert a larger unit to a smaller unit, multiply. To convert a smaller unit to a larger unit, divide.

Metric Length		
1 centimeter (cm)	=	10 millimeters (mm)
1 meter (m)	=	100 cm
1 kilometer (km)	=	1,000 m

Metric Mass		
1 gram (g)	=	1,000 milligrams (mg)
1 kilogram (kg)	=	1,000 g
1 metric ton (t)	=	1,000 kg

Metric Capacity		
1 liter (L)	=	1,000 milliliters (mL)

Example **There are 2.5 liters of iced tea in a pitcher. Todd is going to pour an equal amount into 8 glasses. He plans on leaving 500 milliliters in the pitcher. How much iced tea will each person receive?**

1) Convert 2.5 liters to milliliters.

$2.5 \text{ L} \times 1{,}000 = 2{,}500 \text{ mL}$

2) Subtract 500 mL to find the amount Todd poured.

$2{,}500 \text{ mL} - 500 \text{ mL} = 2{,}000 \text{ mL}$

3) Calculate the amount of iced each person received.

$2{,}000 \text{ mL} \div 8 = 250 \text{ mL}$

Each person will receive 250 milliliters of iced tea.

Guided Practice

The Olympic record for the pole vault is 6.03 meters. The first two gold medal winners received their victories for pole vaults of 330 centimeters. How many meters greater is the Olympic record than the winning pole vaults for the first two gold medal winners?

A. 0.23 m

B. 0.27 m

C. 2.3 m

D. 2.73 m

Option D is correct. Divide: 330 cm ÷ 100 = 3.3 m. Subtract: 6.03 m − 3.30 m = 2.73 m.

Hint

Because computations in the metric system are often a matter of moving the decimal point, make sure your conversions are reasonable.

Practice

Read each question. Select the correct answer.

1 Anderson is running a 5-kilometer race. With 350 meters left to run, his shoelaces untied. How many meters had Anderson run before his shoelaces untied?

A. 150 m

B. 650 m

C. 4,650 m

D. 4,750 m

2 The mass of a box of books is 6 kilograms. Each book inside the box has a mass of 300 grams. How many books are inside the box?

A. 50

B. 20

C. 18

D. 5

3 Each can holds 330 milliliters of sparkling water. Layla buys a 6-pack of sparkling water. Which statement is *true*?

A. Layla bought 20 mL less than 2 L.

B. Layla bought 120 mL less than 2 L.

C. Layla bought 20 mL less than 20 L.

D. Layla bought 120 mL less than 20 L.

4 A rectangular poster is 1.25 meters long and 67 centimeters wide. Which statement is *true*?

A. The poster is 5.8 cm longer than it is wide.

B. The poster is 58 cm longer than it is wide.

C. The poster is 54.5 cm wider than it is long.

D. The poster is 5.45 m wider than it is long.

5 A pitcher holds 3 liters of lemonade. If the contents of the pitcher are equally divided among 8 people, how much lemonade will each person receive?

A. 37.5 mL

B. 75 mL

C. 375 mL

D. 750 mL

6 A glue stick has a mass of 20 grams. Each time, the same amount of the glue stick is used. If the glue stick lasts for 25 uses, how much will be used each time?

A. 1.25 g

B. 80 mg

C. 125 mg

D. 800 mg

7 A board is 1.6 meters long. It will be cut into pieces that are each 20 centimeters. Into how many pieces will the board be cut?

A. 8

B. 12

C. 80

D. 125

8 There are two glasses on a table. One glass contains 825 milliliters of water. The other glass contains 680 milliliters of water. How much water is in the two glasses in all?

A. 1.405 L

B. 1.505 L

C. 14.05 L

D. 15.05 L

9 Sandi owns two horses. Her older horse has a mass of 675 kilograms. Her younger horse has a mass of 1.02 metric tons. Which statement is *true*?

A. The younger horse's mass is 327 kg greater.

B. The younger horse's mass is 345 kg greater.

C. The older horse's mass is 573 kg greater.

D. The older horse's mass is 664.98 kg greater.

10 Each pile of magazines is 45 centimeters high. There are 6 piles. If the piles were stacked in one pile, how tall would it be?

A. 75 m

B. 27 m

C. 7.5 m

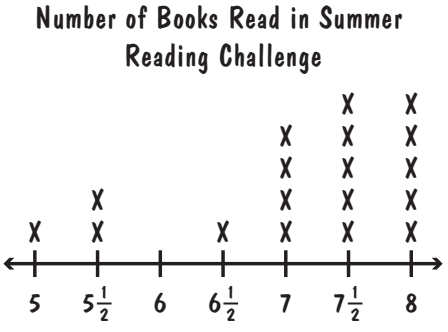
D. 2.7 m

Lesson 53 Line Plots

6.SP.4

A line plot uses Xs to show how often different values appear in a data set. Each X on the plot represents one time that a specific value appears. The horizontal line at the bottom of the graph shows the categories or values being measured. The vertical stacks of Xs show the frequency, or how many times each size or amount occurred.

Example **A library organized a Summer Reading Challenge. How many people participated in the challenge? How many total books were read by all the participants in the challenge?**



1) Count the total number of Xs to determine how many people participated in the challenge. There are 18 Xs, so 18 people participated.

2) To determine exactly how many books were read, look at the frequency (number) of Xs above each of the values on the number line. Count the Xs in each category to determine how many times to add that amount. If there are 0 Xs, 0 participants belong in that category. Write an equation to determine the total number of books read. Simplify.

$$(5) + \left(2 \times 5\tfrac{1}{2}\right) + \left(6\tfrac{1}{2}\right) + (4 \times 7) + \left(5 \times 7\tfrac{1}{2}\right) + (5 \times 8)$$

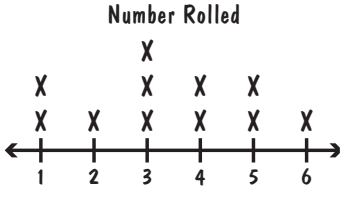
$$5 + 11 + 6\tfrac{1}{2} + 28 + 37\tfrac{1}{2} + 40 = 128$$

18 people participated in the reading challenge. The participants read a total of 128 books.

Guided Practice

Jeanie tracked the numbers she rolled on a 6-sided number cube. How many times did she roll a number that was 4 or *less*?

A. 5 times
B. 6 times
C. 8 times
D. 11 times

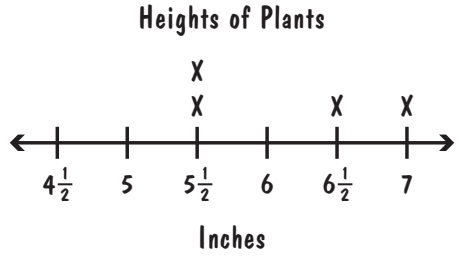


Option C is correct. Count how many times that she rolled a number that is 4 or less, and then add the frequency of each of those numbers.
1 = 2 times, 2 = 1 time, 3 = 3 times, 4 = 2 times.
Add the times: 2 + 1 + 3 + 2 = 8
She rolled a 4 or less 8 times.

Practice

Read each question. Select the correct answer.

1 Zarah measures 4 plants in her garden. The plants measure $5\frac{1}{2}$ inches, $5\frac{1}{2}$ inches, 6 inches, and 7 inches. What change does Zarah need to make to the line plot?



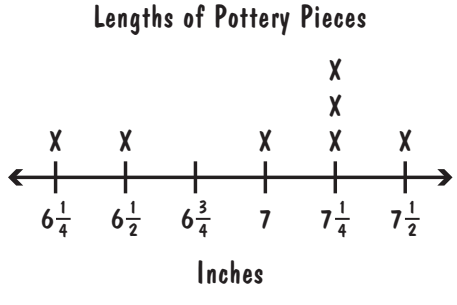
A. Move an X from $5\frac{1}{2}$ in. to 5 in.

B. Move an X from $5\frac{1}{2}$ in. to 6 in.

C. Move the X from $6\frac{1}{2}$ in. to 6 in.

D. Move the X from 7 in. to 6 in.

2 How many pieces of pottery are longer than 7 inches?



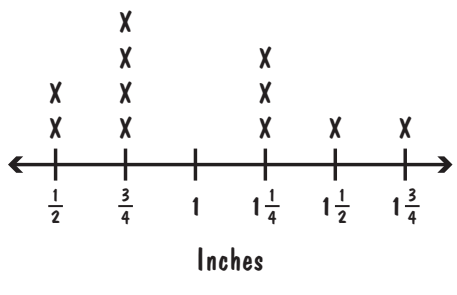
A. 1 piece

B. 2 pieces

C. 3 pieces

D. 4 pieces

3 How many nails are shorter than 1 inch?



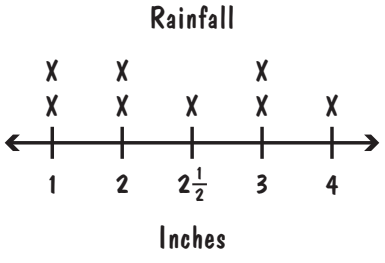
A. 2 nails

B. 4 nails

C. 5 nails

D. 6 nails

4 The line plot shows amounts of rainfall on different days in an area last month.



Which statement is *true*?

A. The area received more than 2 inches of rain on 6 different days.

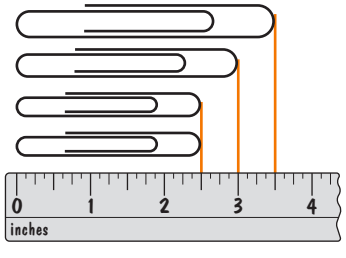
B. The area received rain on 8 days last month.

C. The area received at least 3 inches of rain on each day it rained.

D. The area received a total of 4 inches of rain.

Use the information and figure to answer questions 5–6.

Olivia is recording the measurements of different paper clips on a line plot.



5 How many Xs should Olivia record above the mark for $2\frac{1}{2}$ inches on the line plot?

A. 1 X

B. 2 Xs

C. 3 Xs

D. 4 Xs

6 Which statement is *true*?

A. Olivia should record 1 X above the mark for $3\frac{1}{2}$ inches.

B. Olivia should record 2 Xs above the mark for $3\frac{1}{4}$ inches.

C. Olivia should record 1 X above the mark for $2\frac{3}{4}$ inches.

D. Olivia should record 2 Xs above the mark for $2\frac{1}{4}$ inches.

Lesson 63 Possible Outcomes of Data

7.SP.7

In probability, an **outcome** is a possible result of an experiment or trial. If you ask a person a yes or no question and tell them that those are the only 2 responses they can give, then there are only 2 possible outcomes: *yes* or *no*. There is no guarantee that the person will respond with a *yes* or with a *no*, but one of those must be the response.

Outcomes have to make sense for the situation. If you are measuring the length of your foot, you might say it is 11 inches long. It would not make sense to say your foot is 5 miles long.

Example

Alma flips a coin 5 times. What are the possible outcomes?

1) Determine the possible results when a coin is flipped. The coin can land on heads (H) or tails (T).

2) Determine the number of trials. Alma flips the coin 5 times, so the number of trials is 5.

3) Although the results can vary greatly, they are also limited. The coin could land on heads 5 times in a row. It could land on tails 5 times in a row. Or, the results could be H, T, H, T, H. The result could not be heads 6 times in a row because there are only 5 trials. Nor could landing on green be a result because heads and tails are the only options.

Although the outcomes of the 5 trials can vary, the outcome of each trial can either be heads or tails.

Example

Indu is on the local wheelchair basketball team. She practices shooting 3 different regulation basketballs. Which of these could be the weight of the 3 basketballs?

19 ounces, 10 pounds, 2 tons, 20 ounces, 21 ounces, 200 pounds, 20 inches

1) Regulation basketballs should have similar weights. Look for 3 weights that are similar.

2) A basketball weighs about 20 ounces, so it would be unreasonable to assume that a basketball weighs 10 pounds, 200 pounds, or 2 tons. Also, it would be incorrect to say the basketball weighs 20 inches because inches are not a unit of weight.

The basketballs could weigh 19 ounces, 20 ounces, and 21 ounces.

Guided Practice

Twenty people complete a survey identifying which sport they prefer out of football, soccer, baseball, and basketball. Which could be the outcome of this survey?

A. 3–football; 7–soccer; 8–baseball; 6–basketball

B. 5–hockey; 3–tennis; 5–golf; 7–croquet

C. 10–football; 8–soccer; 5–hockey; 6–basketball

D. 7–football; 6–soccer; 3–baseball; 4–basketball

Option D is correct. There cannot be more than 20 respondents. The choices are limited to football, soccer, baseball, and basketball.

Strategy

Add the results, and make sure the number of responses equals the number of people surveyed. Also, make sure the sports match the choices given.

Practice

Read each question. Select the correct answer.

1 Shasta measures the lengths of 4 hammers in her workshop. Which is the *most likely* outcome?

A. 14 in., 15 in., 16 in., 16 in.

B. 5 mm, 5 cm, 5 cm, 5 m

C. 4 in., 4 in., 4 ft, 5 ft

D. 3 oz, 4oz, 14 in., 76 in.

2 A movie theater manager conducted a survey of 50 people to determine which movie genre they prefer out of action, comedy, and horror/sci-fi. Which could be the outcome of this survey?

A. 75–action; 25–comedy; 10–horror

B. 22–action; 16–comedy; 12–horror

C. 10–action; 15–comedy; 8–horror; 33–thriller

D. 14–action; 28–documentary; 31–horror

3 Hokulani measures the weight of 3 oranges. Which is the *most likely* outcome?

A. 6.2 in., 7.0 in., 6.5 in.

B. 6.0 oz, 6.8 oz, 7.4 oz

C. 12.2 lb, 13.8 lb, 19.6 lb

D. 1.0 ton, 2.0 tons, 2.9 tons

4 A magician says she can predict what cards people will draw from a standard 52-card deck without seeing the card. A person must draw 5 cards from the deck. Which could be the outcome of this experiment?

A. 2 queens, 2 kings, 2 aces, 1 four

B. 1 jack, 1 seven, 2 nines, 2 fives

C. 2 kings, 1 queen, 1 two, 1 eight

D. 1 ace, 1 five, 1 queen, 2 threes, 1 nine

5 Two 6-sided number cubes are rolled a total of 4 times. Which could be the outcomes of the rolls?

A. 2 and 6; 5 and 8; 4 and 1; 3 and 6

B. 3 and 3; 5 and 2; 6 and 4; 1 and 3

C. 0 and 1; 5 and 4; 1 and 3; 6 and 2

D. 6 and 6; 1 and 1; 5 and 3; 4 and 7

6 Five cats are randomly selected from a rescue shelter. Which could be the outcome?

A. 1 black cat, 6 orange cats

B. 4 black cats, 2 dogs, 1 rabbit

C. 2 black cats, 2 gray cats, 1 orange cat

D. 5 black dogs, 2 black cats