# GMAS Test Prep Essentials

Grade: 5th
Subject: Mathematics

The vision of CCPS is to be a district of excellence preparing ALL students to live and compete successfully in a global economy.

The mission of CCPS is to be accountable to all stakeholders for providing a globally competitive education that empowers students to achieve academic and personal goals and to become college and career ready, productive, responsible citizens.
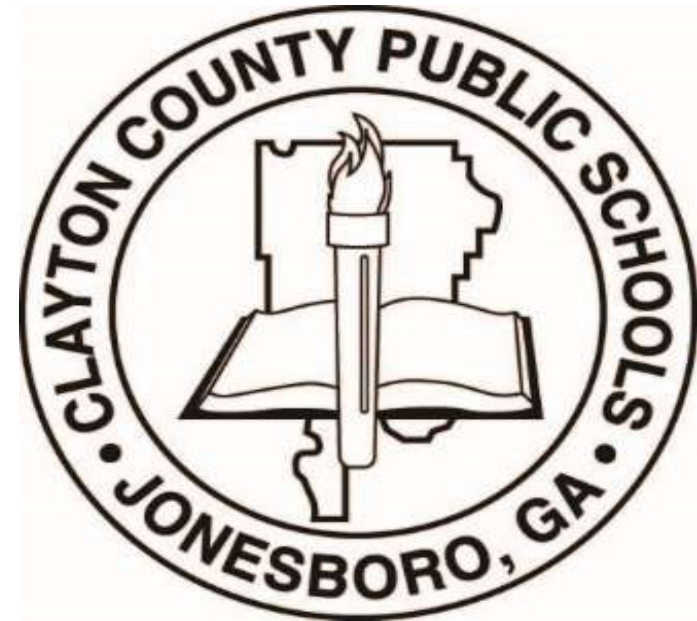
PURPOSE

- To provide students with multiple opportunities to practice applying content standards in preparation for GMAS testing.

CONTENT WEIGHTS

	Operations and Algebraic Thinking	10%
	Number and Operations in Base 10	25%
Mathematics	Number and Operations - Fractions	30%
	Measurement and Data	20%
	Geometry	15%

CONTENTS OF POWERPOINT

- Thought Process for Problem Solving

- Standards

- Practice Problems

- Correct Answers

- Explanation

THOUGHT PROCESS FOR PROBLEM SOLVING

Newman's 5 Prompts

* Please read the question to me. If you don't know a word, leave it out.

* Tell me what the question is asking you.

* Tell me how you are going to find the answer.

* Show me what to do to get the answer. "Talk aloud" as you do it, so I can understand how you are thinking.

* Now, write down your answer to the question

5th Grade

Numbers and Operations and Base-ten

Standard

MGSE.5.NBT.1 Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.

Practice Problem

A number is given below.

136.25

In a different number, the 6 represents a value which is one-tenth of the value of t
6 in the number above. What value is represented by the 6 in the other number?

A   six hundredths

B   six tenths

C   six ones

D   six tens

CORRECT ANSWER AND EXPLANATION

Answer: B

Explanation: Students must understand that the digit to the right is 1/10 as much as the digit to the left and that the digit to the left is 10 times as much as the value to the right.

Practice Problem

$1(10,000) + 2(1,000) + 4(100) + 3(10) + 2(1) + 5(1/10) + 3(1/100).$

Which number below is one-tenth of the expanded form above?

A   12422.53

B   1243.253

C   12432.53

D   12432.43

CORRECT ANSWER AND EXPLANATION

Answer: B

Explanation: Students must first put the answer in standard form: Students will then move the decimal to the left one time to find the answer. Ensure that students read the entire question and understand that they must move the decimal one time to the left to find what 1/10 of the number is.

Standard

MGSE.5.NBT.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.

Practice Problem

Which expression is equivalent to 100,000?

A 10^4

B 10^5

C 10^6

D 10^7

CORRECT ANSWER AND EXPLANATION

Answer: B

Explanation: Students should understand that the number of zeros in a power of 10 corresponds with the exponent. Because 100,000 has 5 zeros, students should choose ten to the 5th power.

Standard

MGSE.5.NBT.3 Read, write, and compare decimals to thousandths.

a. Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 . 100 + 4 . 10 + 7 . 1 + 3 . (1/10) + 9 . (1/100) + 2 . (1/1000).

b. Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons

Practice Problem

Nail Type By Letter	Length (inches)
F	1.241
G	1.236
H	1.274
J	0.944
K	0.942

Based on the table above, which of the following comparisons of nail length is true?

A F > H

B J < K

C J > H

D G < F

CORRECT ANSWER AND EXPLANATION

Answer: D

Explanation: Students should understand that A could not be the right answer because 1.241 is NOT larger than 1.274. B could not be the answer because 0.944 is NOT less than 0.942. C could not be the answer because 0.944 is NOT greater than 1.274

Standard

MGSE.5.NBT.4 Use place value understanding to round decimals to any place.

Practice Problem

Estimate the sum of 4.505 + 15.992 + 11.25 + 9.2

○ A. 35

○ B. 39

○ C. 41

○ D. 49

CORRECT ANSWER AND EXPLANATION

Answer: C

Explanation: Students must understand how to estimate or round to the nearest whole number.

- 4.505 rounds to 5

- 15.992 rounds to 16

- 11.25 rounds to 11

- 9.2 rounds to 9

- 5 + 16 + 11 + 9 = 41

Practice Problem

Which **two** statements about rounding decimals are correct?

Ⓐ The number 5.066 rounded to the nearest hundredth is 5.07.

Ⓑ The number 5.074 rounded to the nearest hundredth is 5.08.

Ⓒ The number 5.117 rounded to the nearest hundredth is 5.10.

Ⓓ The number 5.108 rounded to the nearest hundredth is 5.11.

Ⓔ The number 5.025 rounded to the nearest hundredth is 5.02.

CORRECT ANSWER AND EXPLANATION

Answer: A and D

Explanation:

- In answer choice A, students will round 5.066 to 5.07

- In answer choice B, students will round 5.074 to 5.07

- In answer choice C, students will round 5.117 to 5.12

- In answer choice D, students will round 5.108 to 5.11

- In answer choice E, students will round 5.025 to 5.03

Standard

MGSE.5.NBT.5 Fluently multiply multi-digit whole numbers using the standard algorithm (or other strategies demonstrating understanding of multiplication) up to a 3 digit by 2 digit factor.

Practice Problem

Melanie earns $12.50 and hour cleaning houses. If she works from 8:00am to 5:00pm, how much money will she make?

CORRECT ANSWER AND EXPLANATION

Answer: $112.50

Explanation: Students will understand that from 8:00 – 5:00 is 9 hours. They will multiply $12.50 x 9 hours.

Standard

MGSE.5.NBT.6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Practice Problem

Mr. Hinckley owns 83 acres of land. He divides the land into eight equal sections to sell to eight buyers. Which phrase describes how much land, in acres, each buyer will receive?

A more than 9 and less than 10

B more than 10 and less than 11

C more than 11 and less than 12

D more than 12 and less than 13

CORRECT ANSWER AND EXPLANATION

Answer: B, more than 10 but less than 11.

Explanation: Students must know to divide when they see the key words each and equal sections. When they divide 83/8 they will get the answer 10 remainder 3. Explain to the students that 10 r 3 is more than 10 and less than 11.

Standard

MGSE.5.NBT.6. Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Practice Problem

Each team in a youth basketball league pays $984 to join the league. If a team consists of 12 players and the fee is divided equally among the players, how much does each player pay?

CORRECT ANSWER AND EXPLANATION

Answer: $82.00.

Explanation: Students must be able to determine that the key words are each, divide, equally." The students must be able to show how to use the standard algorithm to divide 984/12.

Standard

MGSE.5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Practice Problem

Pax wants to make fruit punch for a party using the recipe below.

Fruit Punch
1.25 L orange juice
2.5 L cranberry juice
1 L ginger ale

He will make three times the amount of fruit punch listed in the recipe. What is the total amount of fruit punch, in liters, that Pax will make?

A 4.53

B 4.75

C 12.90

D 14.25

CORRECT ANSWER AND EXPLANATION

Answer: D

Explanation: Students must add all of the ingredients by lining up the decimal. Once 1.25, 2.5 and 1 are added together, the answer is 4.75. The students will then multiply 4.75 by 3 and come up with the answer 14.25 liters.

Standard

MGSE.5.NBT.7 Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Practice Problem

$$\begin{array}{r} \overset{\overset{1}{1}}{6}22 \\ \times \quad 205 \\ \hline 3070 \\ 000 \\ 1244 \\ \hline 12\,7{,}470 \end{array}$$

A store owner used this computation to find the number of square feet of floor space in her store. Which **best** describes the error the store owner made in her computation?

A. She added the partial products incorrectly

B. She left off a zero at the end of the final product

C. She regrouped correctly but did not add the 1 ten in the next step

D. She multiplied 5 times 1 and added 2 instead of multiplying 5 times 2 and adding 1

CORRECT ANSWER AND EXPLANATION

Answer : C

Explanation: When the store owner multiplied the 5 times 2 in the ones place, she did not correctly regroup by adding the 1 to the tens place answer.

5th Grade Math

Operations & Algebraic Thinking

STANDARD

MGSE5.OA.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.

PRACTICE PROBLEM

Evaluate the numerical expression

$7 \times (8 + 3) - 4$

A. 75

B. 73

C. 55

D. 49

CORRECT ANSWER AND EXPLANATION

Answer: (B)

Explanation: The students will understand how to correctly use order of operations. Choices (A), (C), and (D) use incorrect operations to relate the numbers.

STANDARD

MGSE5.OA.1 Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.

PRACTICE PROBLEM

Which is the second step to evaluate this expression?

$$25 ÷ 5 − 10 \times 3 + 4$$

A. $25 ÷ 5$
B. $5 - 10$
C. 10×3
D. $3 + 4$

CORRECT ANSWER AND EXPLANATION

Answer: (C)

Explanation: The students will understand how to correctly use order of operations. We first look for parenthesis and other grouping symbols. Since there are none they start with multiplication or division. In this expression division appears first. So multiplication is the second operation.

Standard

MGSE.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without, evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 +921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

PRACTICE PROBLEM

Write "the quotient of the product of 32 and 15 and the difference of 17 and 9" as a numerical expression.

CORRECT ANSWER AND EXPLANATION

Answer: (32 x 15) ÷ (17 – 9)

Explanation: The students will need to understand written expressions.

Standard

MGSE.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without, evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 +921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

PRACTICE PROBLEM

Write the following expression using numbers and grouping symbols. Then solve.

Luke has 3 packs of 15 pieces of gum, plus and additional 4 pieces, to share among 7 people.

CORRECT ANSWER AND EXPLANATION

Answer: [(3 x 15) +4] ÷ 7

Explanation:

3 packs of 15 pieces of gum: of means to multiply

                                                                        3x15

Plus an additional 4 pieces: plus means to add

                                                                         +4

To share among 7 friends: share means divide

                                                                        ÷ 7

Students need to know that when you need to calculate out of order, you will need parenthesis and brackets.

Standard

MGSE.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without, evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 +921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

PRACTICE PROBLEM

A library has 6,422 music CD's stored on 26 shelves. If the same number of CD's were stored on each shelf how many CD's were stored on each shelf?

Part A. Write an expression that can be used to find out how many CD's were store on each shelf.

Part B. Evaluate the word problem.

CORRECT ANSWER AND EXPLANATION

Answer: 6,422 ÷ 2 = 26

Explanation: The students will need to have an understanding of how to decompose a word problem in order to set up a written expression. The written expression will be used to solve the word problem.

Standard

MGSE.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without, evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 +921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

Antoine wrote the expressions shown below.

- Expression A: $4 \times [(1.5 + 100.25) \times 3.65]$

- Expression B: $\square \times [(1.5 + 100.25) \times 3.65]$

The value of Expression B is eight times the value of Expression A. Without evaluating Expression A, determine what number belongs in the box in Expression B. Explain how you determined this number.

CORRECT ANSWER AND EXPLANATION

Answer: Only the number outside needs to be multiplied, so

$4 \times 8 = 32$

Explanation: The students will need to understand how to decompose word problems in order to correctly set up the expression. Basic skills necessary to complete the problem include: Long division

Standard

MGSE.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without, evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 +921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

PRACTICE PROBLEM

What is the correct solution when this expression is simplified?

$$2 + 8 \times 6 - [(40 \div 55)] - 1]$$

A. 3
B. 43
C. 47
D. 53

CORRECT ANSWER AND EXPLANATION

Answer: B

Explanation: The students will need to understand order of operations. First start inside the brackets. Next, complete the calculations within parenthesis. Multiply or divide from left to right. Add or subtract from left to right.

Standard

MGSE.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without, evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 +921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

Which statement is true about the values of the two expressions below?

Expression A: $3 \times (8 + 4)$
Expression B: $8 + 4$

A The value of Expression B is three times the value of Expression A.

B The value of Expression A is three times the value of Expression B.

C The value of Expression A is three more than the value of Expression B.

D The value of Expression B is three more than the value of Expression A.

CORRECT ANSWER AND EXPLANATION

Answer: B

Explanation: "The value of Expression A is three times the value of Expression B." This is the correct interpretation of Expression A and Expression B. The student may have understood that multiplying the expression 8 + 4 by 3 would make it 3 times as great as the original expression. The student who selects this response understands how to interpret numerical expressions without evaluating them. Responses C, and D incorrectly use order of operations.

Standard

MGSE.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without, evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 +921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

PRACTICE PROBLEM

Which is a correct way of expressing 3 x (534 -216) – 14?

A.   3 times 534, minus 216, plus 14
B.   The product of 3 and 534, minus the sum of 216 and
        14
C.   3 times the difference of 534 and 216, plus 14
D.   3 times the sum of (534 – 216) and 14

CORRECT ANSWER AND EXPLANATION

Answer: C

Explanation: "The subtraction step in parenthesis must occur first. "3 times the difference of 534 and 216, plus 14" implies that the difference must be found before multiplying by 3, which is correct.

Standard

MGSE.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without, evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 +921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

PRACTICE PROBLEM

Write the numerical expression for "The sum of 6 and 4, multiplied by the difference of 15 and 3."

CORRECT ANSWER AND EXPLANATION

Answer: (6 x 4) x (15 – 3)

Explanation: The students will need to understand written expressions.

Standard

MGSE.5.OA.2 Write simple expressions that record calculations with numbers, and interpret numerical expressions without, evaluating them. For example, express the calculation "add 8 and 7, then multiply by 2" as 2 x (8+7). Recognize that 3 x (18932 +921) is three times as large as 18932 + 921, without having to calculate the indicated sum or product.

PRACTICE PROBLEM

Which expression is equivalent to 32?
A. (30 + 6) ÷ 3
B. 2×(9 + 7)
C. 9 ×(3 + 5)
D. 6 + 2× 4

CORRECT ANSWER AND EXPLANATION

Answer: B

Explanation: The students will understand how to correctly use order of operations. Choices (A), (C), and (D) use incorrect operations to relate the numbers.

5th Grade Math

Fractions

Standard

MGSE.5.NF.1 Add and subtract fractions and mixed numbers with unlike denominators by finding a common denominator and equivalent fractions to produce like denominators.

Morgan made 1 and 5/8 quarts of punch. Then she made 1 and 7/8 more quarts. How much punch did she make in all?

A) 3 ½

B) 6 ½

C) 4 4/8

D) 1 and 12/8

CORRECT ANSWER AND EXPLANATION

- The correct answer is A. The student must understand that when the denominators are like the only need to add numerators and then convert improper fraction to mixed number and add whole numbers to final equation. Student must also simplify fraction. Choices B,C and D use incorrect operations to solve equation.

Standard

MGSE.5.NF.1 Add and subtract fractions and mixed numbers with unlike denominators by finding a common denominator and equivalent fractions to produce like denominators.

Practice Problem

You give 1/3 of a pan of brownies to Cynthia and 1/6 pan of brownies to David. How much of the pan of brownies did you give away? Explain how you got your answer.

CORRECT ANSWER AND EXPLANATION

The correct answer is ½. The student must understand they must find the common denominator, the operation is addition and then they should simplify the fraction.

STANDARD

MCC5.MD.2 MAKE A LINE PLOT TO DISPLAY DATA SET OF MEASUREMENTS IN FRACTIONS OF A UNIT (1/2, ¼, 1/8) USE OPERATIONS ON FRACTIONS FOR THIS GRADE TO SOLVE PROBLEMS INVOLVING INFORMATION PRESENTED IN LINE PLOTS.

Make a line plot of the measurements in the table below. Then find the fair share.

1/4	¼	¼	½	½	½	¼	1/2

CORRECT ANSWER AND EXPLANATION

The answer is 3/8. The student will add the measurements, then divide the whole by the number of measurements.

STANDARD

MGSE.5NF.3 – INTERPRET A FRACTION AS DIVISION OF THE NUMERATOR BY THE DENOMINATOR. SOLVE WORD PROBLEMS INCLUDING DIVISION OF WHOLE NUMBERS LEADING TO ANSWERS IN THE FORM OF FRACTIONS OR MIXED NUMBERS.

Four families equally share 5 pies. How much pie will each family receive?

- A) 6/5
- B) 1 3/5

    C) 1 ¼

- D) ¼

CORRECT ANSWER AND EXPLANATION

The correct answer is C. The student will know that each family will receive 5/4 which is an improper fraction that converts to 1 ¼. Choices A,B and D are converted incorrectly. The student either didn't convert the improper fraction or computed incorrectly.

Standard

MGSE.5.NF.1 Add and subtract fractions and mixed numbers with unlike denominators by finding a common denominator and equivalent fractions to produce like denominators.

Autumn purchased a square picture frame. Each side measured 1¼ feet. What is the area of the picture frame in square feet?

A) 5 feet

B) 4 ½ feet

C) 1 and 9/16 square feet

D) 4 and 4/8 square feet

CORRECT ANSWER AND EXPLANATION

The correct answer is C. The student must multiply, after converting mixed number into improper fraction, length times width because its asking for the <u>area</u>. They will then convert the fraction into a mixed number. Choices A, the student incorrectly added all sides. Choices B and D are have incorrectly computed.

Standard

MGSE.5.NF.1 Add and subtract fractions and mixed numbers with unlike denominators by finding a common denominator and equivalent fractions to produce like denominators.

Practice Problem

A school wants to build a new playground by cleaning up an abandoned lot shaped like a rectangle. The students decide to use ¼ of the playground for a basketball court and 3/8 of the playground for a soccer field. How much is left for the swings and play equipment? Explain your thinking.

CORRECT ANSWER AND EXPLANATION

The correct answer is 3/8. The common denominator is 8. ¼ is equivalent to 2/8 and 2/8 plus 3/8 is 5/8. Subtracted from 8/8 or 1 whole gives them a difference of 3/8. The student must know it is as multi step process in order to find correct answer.

STANDARD

MGSE.5NF.3 – INTERPRET A FRACTION AS DIVISION OF THE NUMERATOR BY THE DENOMINATOR. SOLVE WORD PROBLEMS INCLUDING DIVISION OF WHOLE NUMBERS LEADING TO ANSWERS IN THE FORM OF FRACTIONS OR MIXED NUMBERS.

Practice Problem

A dime is ½ inch wide. If you put 5 dimes end to end, how long would they be from beginning to end? Explain your thinking.

CORRECT ANSWER AND EXPLANATION

Answer: 2 ½

Explanation: ½ times 5/1 is 5/2 which, by division (5/2), converts the improper fraction into a mixed number

Standard

MGSE.5.NF.1 Add and subtract fractions and mixed numbers with unlike denominators by finding a common denominator and equivalent fractions to produce like denominators.

Practice Problem

Lisa has 3 dogs: Rex, Maxim and Butch

Part A. Lisa feeds them on dog biscuits. Each day Rex eats ½ of the box, Maxim eats 1/8 of the box and Butch eats ¼ of the box. What fraction of the whole box do the dogs eat, in all, each day?

Cont. from previous slide

Part B. Maxim and Butch spend much of each day sleeping. Maxim sleeps 3/5 and Butch sleeps 7/10 of the day. Which of the two dogs sleeps for longer?

How much longer does it sleep each day?

Cont. from previous slide

Part C. Lisa's dogs often share a carton of water. Rex always drinks 1/3 of the water, Maxim drinks 5/12 of the water and Butch always drinks 1/76 of the water. What fraction of the water is left over?

Cont. from previous slide

Part D

Lisa's dogs love to jump in and out of their dog door. Yesterday the door was used 100 times by her dogs. Rex used it for ¼ of the time and Maxim used it for 3/10. How many times did Butch use the door?

CORRECT ANSWER AND EXPLANATION

Part A. The correct answer is 7/8. The student must find common denominator (8) and add the fractions.

Part B. The correct answer is Butch by 1/10. explanation shows 3/5 is equal to 6/10 and the difference between 6/10 and 7/10 is 1/10.

Part C. Correct answer is 1/12. Student finds common denominator (12) and shows 1/3 + 5/12 + 1/6 = 4/12 + 5/12 + 2/12 =11/12 which subtracted from 12/12 is 1/12.

Part D. The correct answer is 45 times. ¼ = 25/100 and 3/10 = 30/100. 25 + 30 =55. 100-55 =45, so Butch used it 45 times.

STANDARD

MGSE.5NF.3 – INTERPRET A FRACTION AS DIVISION OF THE NUMERATOR BY THE DENOMINATOR. SOLVE WORD PROBLEMS INCLUDING DIVISION OF WHOLE NUMBERS LEADING TO ANSWERS IN THE FORM OF FRACTIONS OR MIXED NUMBERS.

Practice Problem

A baker is making cakes for a birthday party. She uses ¼ cup of oil for each cake. How many cakes can she make if she has a bottle of oil that has 6 cups in all?

CORRECT ANSWER AND EXPLANATION

Answer: 24

Explanation: 6/1 divided by ¼ is the same as 6/1 times 4/1 is 24/1. Which simplifies to 24. She can make 24 cakes. The student must know the steps for dividing fractions (Keep/Switch and Flip)

STANDARD

MGSE.5NF.3 – INTERPRET A FRACTION AS DIVISION OF THE NUMERATOR BY THE DENOMINATOR. SOLVE WORD PROBLEMS INCLUDING DIVISION OF WHOLE NUMBERS LEADING TO ANSWERS IN THE FORM OF FRACTIONS OR MIXED NUMBERS.

Practice Problem

Ms. Darden's class is making pillow cases. Each pillow case uses ¾ of a yard of fabric. How many pillow cases can they make with 12 ½ yards of fabric?

CORRECT ANSWER AND EXPLANATION

Answer: 16

Explanation: Convert 12 ½ into improper fraction 25/2 and then multiply by 4/3 which equals 100/6. which simplifies to 16 and 4/6. The keyword *each* indicates they should either divide or multiply. The student should recognize that they have been given the dividend,12 ½, and divisor ¾, and must find the quotient.

STANDARD

MGSE.5NF.3 – INTERPRET A FRACTION AS DIVISION OF THE NUMERATOR BY THE DENOMINATOR. SOLVE WORD PROBLEMS INCLUDING DIVISION OF WHOLE NUMBERS LEADING TO ANSWERS IN THE FORM OF FRACTIONS OR MIXED NUMBERS.

Practice Problem

A teacher has a 60 pound bag of soil. She pours all the soil into 8 containers. She puts an equal amount of soil in each container. What is the total amount of soil in each container?

A. 2/15 pounds

B. 6 ½ pounds

C. 7 ½ pounds

D. 8 ½ pounds

CORRECT ANSWER AND EXPLANATION

Answer: C

Explanation: This response indicates that student wrote division as a fraction 60/8 and then converted the improper fraction into a mixed number. Choice A is incorrect because the response indicates that student reversed the dividend and divisor. Choice B is incorrect because the response indicates the student subtracted 8 before dividing. Choice D is wrong because the response indicates the student added 8 before dividing.

Standard

MGSE.5.NF.1 Add and subtract fractions and mixed numbers with unlike denominators by finding a common denominator and equivalent fractions to produce like denominators.

Practice Problem

Richard and Lalah's goal is to collect a total of 3 ½ gallons of sap from the maple trees. Richard collected 1 and ¾ gallon and Lalah collected 5 and 3/5 gallons. By how much did they beat their goal? Show how you got your answer.

CORRECT ANSWER AND EXPLANATION

Answer: 3 17/20

Explanation: The students finds the common denominator, adds the mixed numbers, converts the mixed numbers into improper fractions the two fractions and then subtracts it from 3 ½ and then converts the improper fraction back into a mixed number. (1 ¾ + 5 and 3/5 = 1 15/20 + 5 12/20 which equals 6 27/20 (7 and 7/20) which equals 147/20 which you subtract from 3 ½ or 3 10/20 (70/20) =77/20 which converts into 3 and 17/20.

5th Grade Math

Measurement and Data

STANDARD

MGSE5.MD.1 Convert among different-sized standard measurement units (mass, weight, length, time, etc.) within a given measurement system (customary and metric) (e.g., convert 5cm to 0.05m), and use these conversions in solving multi-step, real word problems.

Practice Problem

How many 4 inch long pieces of wood could be cut from a board that is 2 yards long?

a. 18 pieces

b. 24 pieces

c. 12 pieces

d. 6 pieces

CORRECT ANSWER AND EXPLANATION

- The correct answer is A.

- Students understand that they must convert the 2 yards into inches.

- They must know that there are 36 inches in one yard.

- They will multiply 36 by 2 yards and then divide by 4 to determine how many 4 inch pieces can by cut out of 2 yards.

- 36 x 2 = 72

- 72/4 = 18

STANDARD

MGSE5.MD.1 Convert among different-sized standard measurement units (mass, weight, length, time, etc.) within a given measurement system (customary and metric) (e.g., convert 5cm to 0.05m), and use these conversions in solving multi-step, real word problems.

Practice Problem

There are three books in Frank's backpack. The math book weighs 1 pound, 8 ounces. The reading book weighs 1 pound, 4 ounces. The science book weighs 1 pound, 2 ounces. What is the combined weight of the three books, in ounces?

a. 44 ounces
b. 62 ounces
c. 50 ounces
d. 38 ounces

CORRECT ANSWER AND EXPLANATION

- The correct answer is B.

- Student will need to convert all pounds into ounces and then add them together.

- Students must know that 1 pound = 16 ounces

- The math book: 1 pound 8 ounces = 16 + 8 = 24

- The reading book: 1 pound 4 ounces = 16 + 4 = 20

- The science book: 1 pound 2 ounces = 16 + 2 = 18

- 24 oz. + 20 oz. + 18 oz. = 62 ounces

STANDARD

- **MGSE5. MD.2** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Practice Problem

A 5th grade science class is raising mealworms. The students measured the mealworms and recorded the lengths on this line plot.

Length of Mealworms
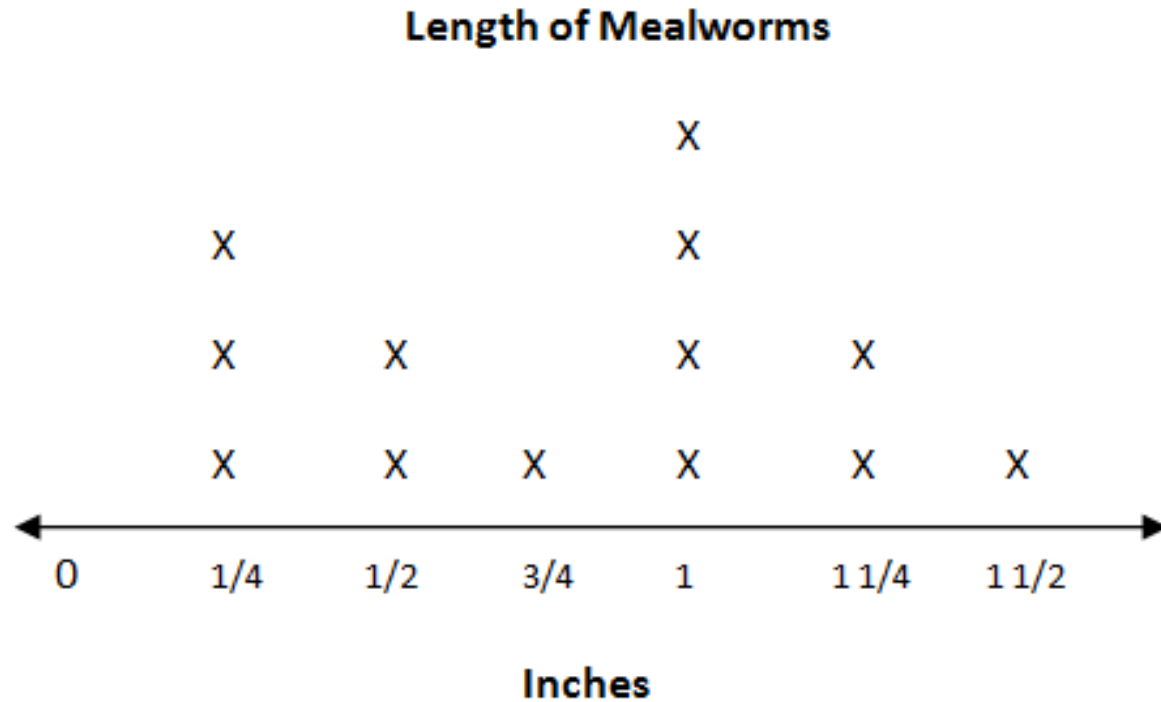
Inches

According to this line plot, what was the length of the longest mealworm?

A. 1/4 inch
B. ¾ inch
C. 1 inch
D. 1 ½ inches

CORRECT ANSWER AND EXPLANATION

- The correct answer is D. 1 ½ inches.

- Students must understand how to read a line plot and know that the smallest meal worm was ¼ inches.

- Explain to the students that the measurements on the line plot are the different size meal worms.

STANDARD

- **MGSE5. MD.2** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Use operations on fractions for this grade to solve problems involving information presented in line plots. For example, given different measurements of liquid in identical beakers, find the amount of liquid each beaker would contain if the total amount in all the beakers were redistributed equally.

Practice Problems

The line plot shows the weights of ten eggs laid by one hen.

EGGS LAID BY ONE HEN

```
            X
            X
   X    X   X
   X    X   X    X    X
  ←──┼────┼────┼────┼────→
    1½        2       2½
```
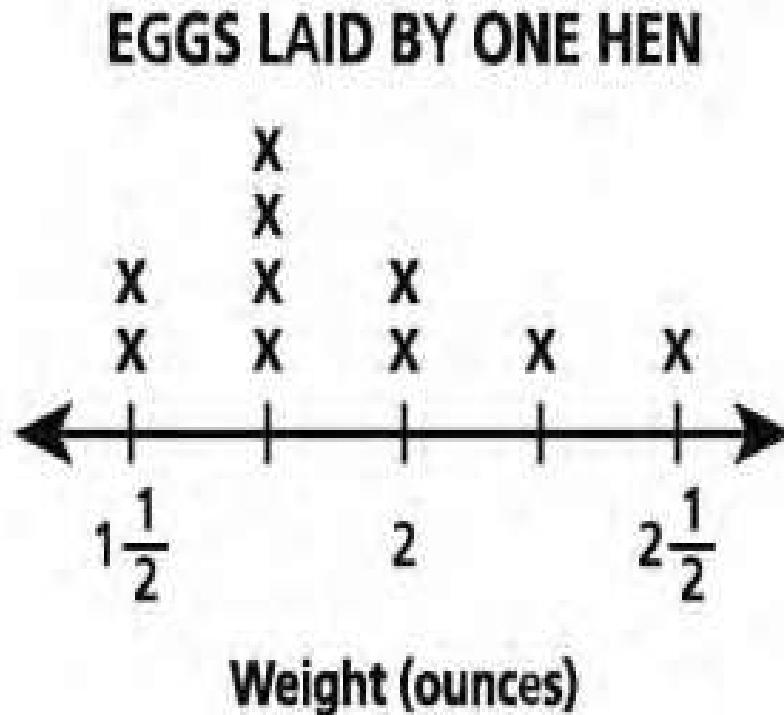
Weight (ounces)

What is the total weight, in ounces, of the four heaviest eggs?

A 4

B 7

C $8\frac{1}{2}$

D $8\frac{3}{4}$

CORRECT ANSWER AND EXPLANATION

- The correct answer is D.

- Students must be able to determine which are the heaviest eggs. (2 ounces, 2 ¼ ounces, and 2 ½ ounces)

- Students will add all weights of the 4 eggs together.

- 2 eggs weigh 2 ounces 2 + 2 = 4

- 1 egg weighs 2 ¼

- 1 egg weighs 2 ½

- 2 + 2 + 2 ¼ + 2 ½ = (find common denominator and add to find the answer 8 ¾

Standard

- **MGSE5.MD.3** Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

- a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.

- b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.

Practice Problem

In her math class, Carla used unit cubes to build a right rectangular prism with a volume of 24 cubic units. The height of the prism was two units. Which figure could be the bottom layer of the prism?
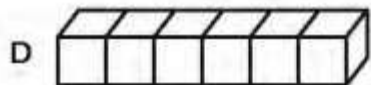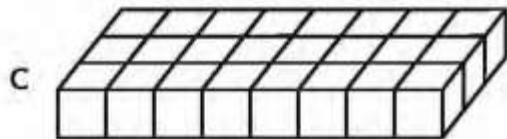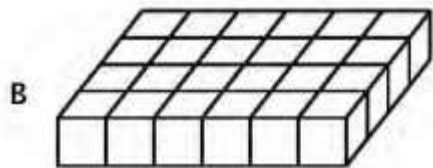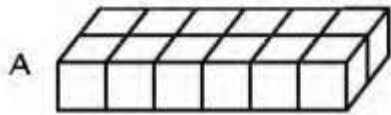
CORRECT ANSWER AND EXPLANATION

- The correct answer is A.

- Students must understand that B is a cube and not a rectangular prism.

- C would be incorrect because it is a single layer with the volume of 24 so the height could not be 2.

- D would not work because the length is only 6.

Standard

- **MGSE5.MD.3** Recognize volume as an attribute of solid figures and understand concepts of volume measurement.

- a. A cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume, and can be used to measure volume.

- b. A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units.

Practice Problems

The two right rectangular prisms below have different volumes.

KEY

= 1 cubic foot
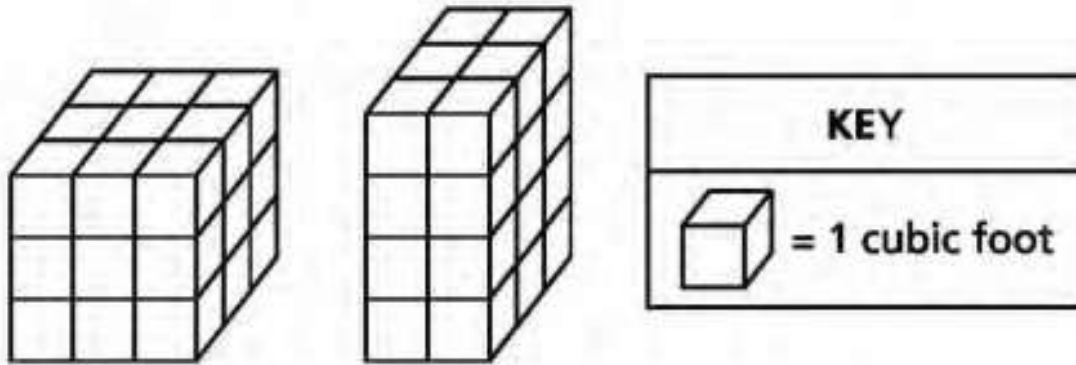
What is the difference in volume, in cubic feet, of the two prisms?

A   1

B   3

C   6

D   9

CORRECT ANSWER AND EXPLANATION

- The correct answer is B.

- Students will determine the volume for each rectangular prism and then subtract to find the difference of the 2.

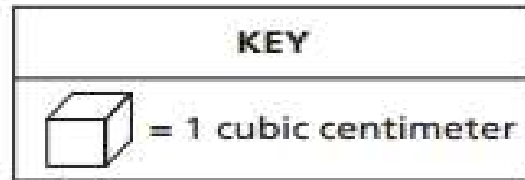- The first prism has the volume of 27 and the second has the volume of 24.

- 27-24 = 3

Standard

MGSE5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units

Practice Problems

Prism X is shown below. The volume of Prism Y is 10 cubic centimeters greater than the volume of Prism X.

Prism X

KEY
= 1 cubic centimeter
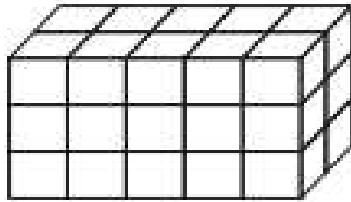
What is the volume of Prism Y?

Answer _____ cubic centimeters

What could be the length, width, and height of Prism Y?

CORRECT ANSWER AND EXPLANATION

- This question asks the student to find the volume of Prism Y given a model of Prism X in

- unit cubes. Then the student is asked to determine possible lengths for the length, width, and height of Prism Y.

- The determining factor in demonstrating a thorough understanding is using mathematically sound procedures

- to lead to a correct response.

- The answers are 40 cubic cm and any valid set of numbers for length, width, and height, such as:

- 1, 1, 40

- 1, 2, 20

- 1, 4, 10

- 1, 5, 8

- 2, 2, 10

- 2, 4, 5

- 2, 2.5, 8

Standard

MGSE5.MD.4 Measure volumes by counting unit cubes, using cubic cm, cubic in, cubic ft, and improvised units

Practice Problems

What is the volume, in cubic centimeters, of the figure below?
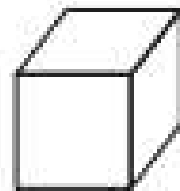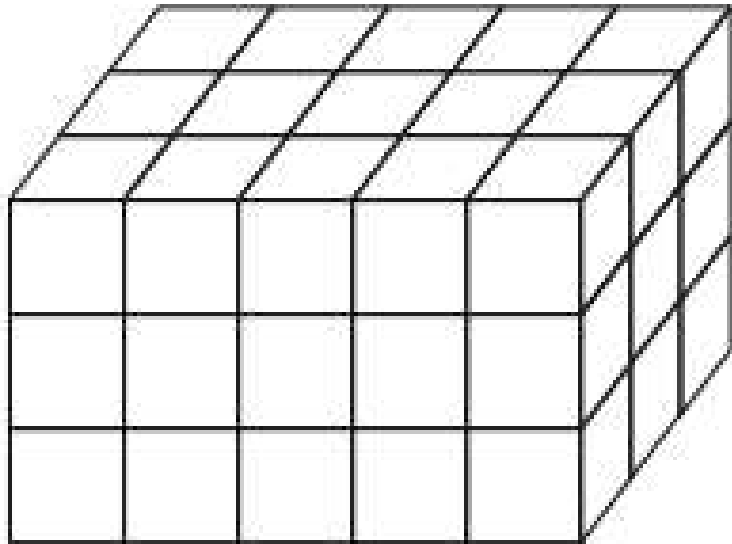
= 1 cubic centimeter

A   15

B   24

C   30

D   45

CORRECT ANSWER AND EXPLANATION

- Correct Answer D.

- This response represents the correct volume of the figure. The student may have counted the number of unit cubes in one layer of the rectangular prism and then used addition or multiplication to determine the total number of unit cubes as the volume, in cubic centimeters, of the figure. Alternatively, the student may have applied the formula for volume of a rectangular prism, using the length, width, and height values determined by counting the number of unit cubes along each dimension of the figure. $5 \times 3 \times 3 = 45$
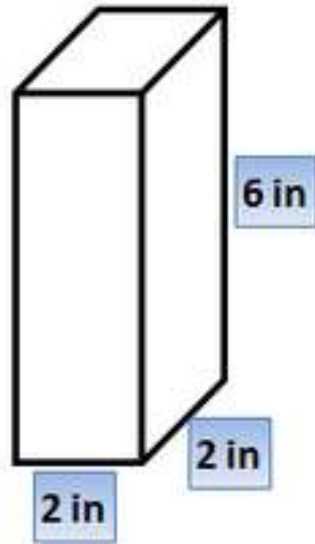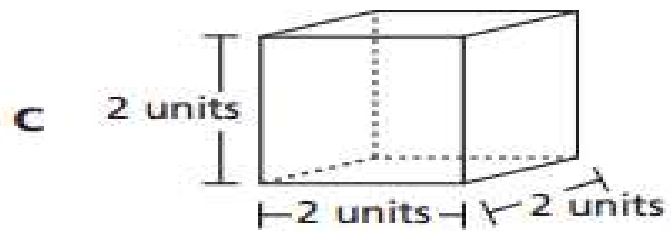
Standard

MGSE5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

- a. Find the volume of a right rectangular prism with whole- number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.

- b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.

- c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

PRACTICE PROBLEM

Which of the following equations could be used to calculate the volume of this rectangular prism?

6 in

2 in

2 in

a. $V = 2 + 2 + 6$
b. $V = 1/2 \ (2 \times 6)$
c. $V = 2 \times 2 \times 6$
d. $V = (2 \times 2) + 6$

CORRECT ANSWER AND EXPLANATION

The correct answer is choice (C) V = 2 x 2 x 6.

- Students should understand that to find the volume they will multiply the length times the width times the height.
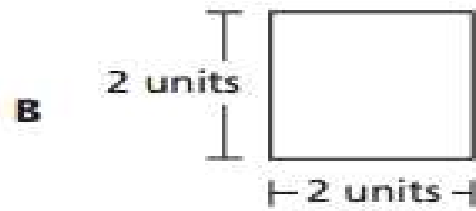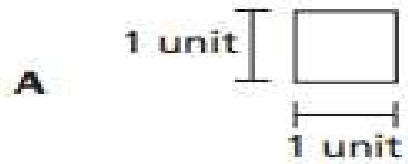
Standard

MGSE5.MD.5 Relate volume to the operations of multiplication and addition and solve real world and mathematical problems involving volume.

- a. Find the volume of a right rectangular prism with whole- number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.

- b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real world and mathematical problems.

- c. Recognize volume as additive. Find volumes of solid figures composed of two non-overlapping right rectangular prisms by adding the volumes of the non-overlapping parts, applying this technique to solve real world problems.

Practice Problems

134050060_4

Which diagram represents a volume of one cubic unit?

A — 1 unit (height), 1 unit (width): a square

B — 2 units (height), 2 units (width): a square

C — 2 units (height), 2 units, 2 units: a rectangular prism

D — 1 unit (height), 1 unit, 1 unit: a cube

CORRECT ANSWER AND EXPLANATION

- Answer D.

- This is the correct response that shows a diagram that represents 1 cubic unit. The student who selects this response understands that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume. Answer choices A, B, and C are plausible but incorrect. They represent common student errors made when recognizing that a cube with side length 1 unit, called a "unit cube," is said to have "one cubic unit" of volume.

5th Grade Math

Geometry

STANDARD

Graph points on the coordinate plane to solve real-world and mathematical problems.
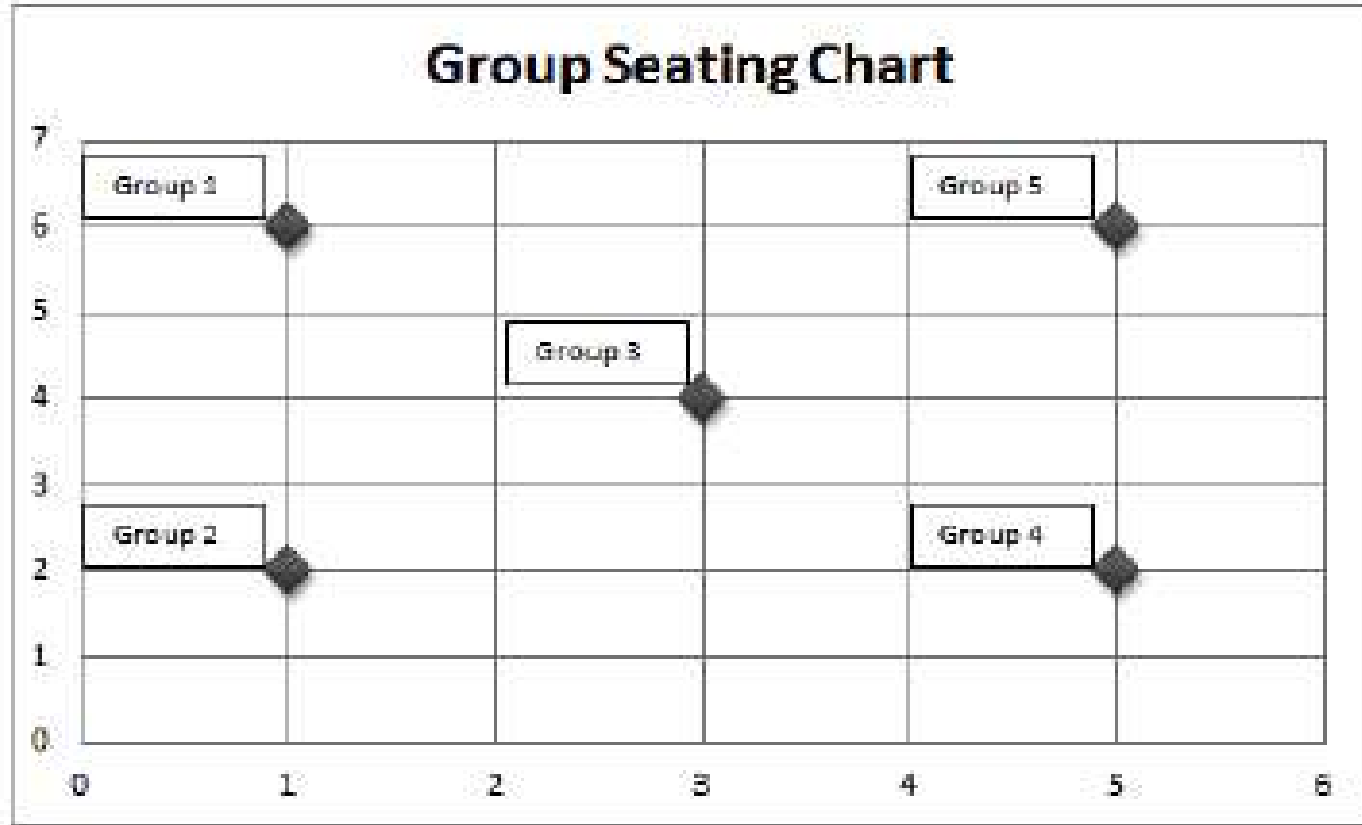
MGSE.5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate)

STANDARD

Graph points on the coordinate plane to solve real-world and mathematical problems.

MGSE.5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Practice Problem

Group Seating Chart

Aaron's teacher assigned each student to a new group. She posted this diagram to help everyone locate their group's tables.

Aaron's group sits at coordinates (5, 6). At which group table would Aaron sit?

A) He sits with Group 1.

B) He sits with Group 3.

C) He sits with Group 4.

D) He sits with Group 5.

CORRECT ANSWER AND EXPLANATION

Answer: D

Explanation: To locate Aaron's group, move to coordinate 5 on the x-axis. Then, move up to coordinate 6 on the y-axis.

STANDARD

Graph points on the coordinate plane to solve real-world and mathematical problems.

MGSE.5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate)
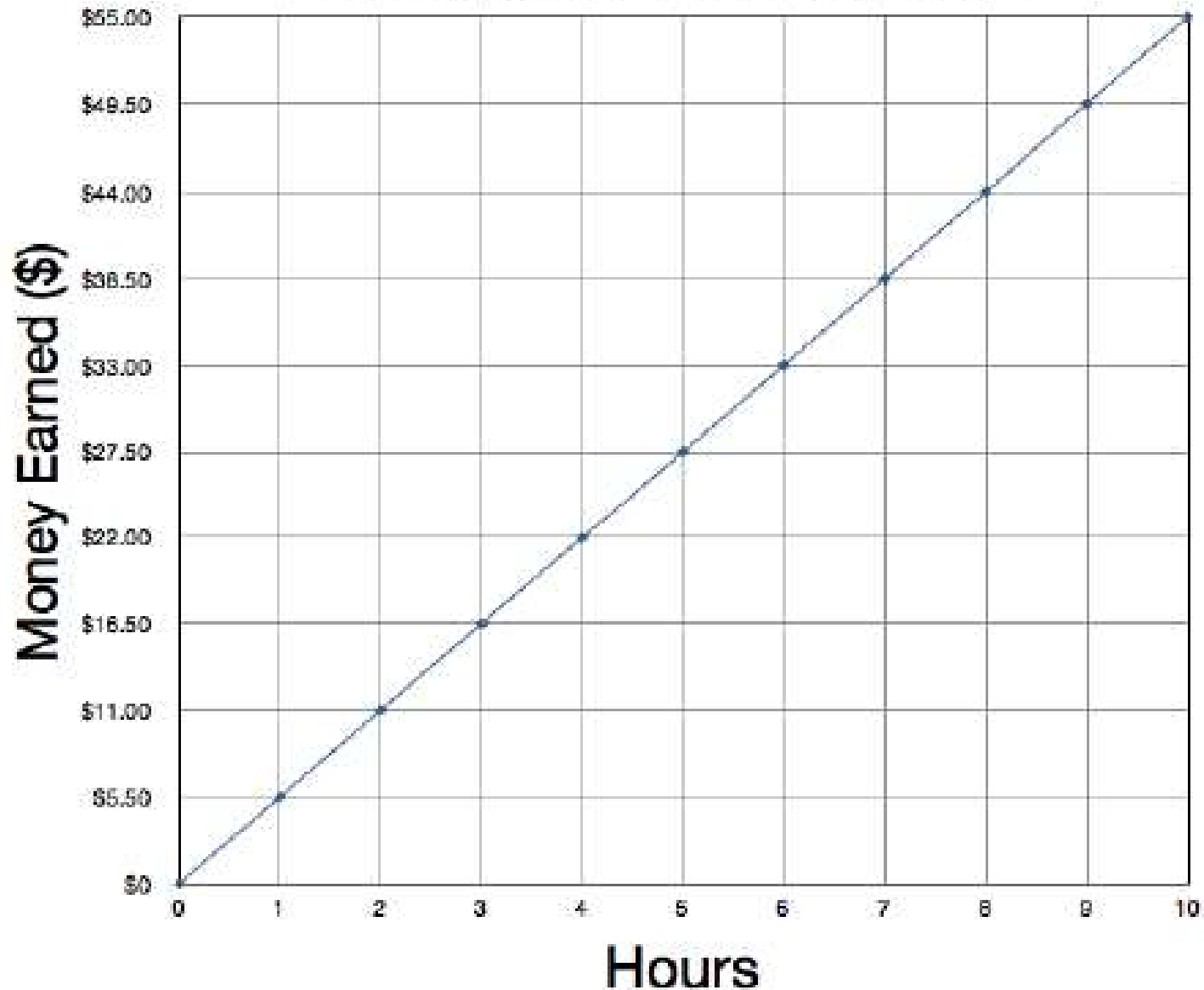
STANDARD

Graph points on the coordinate plane to solve real-world and mathematical problems.

MGSE.5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Practice Problem

Money Earned for Doing Chores

Casey's mom pays her $5.50 per hour for doing chores around the house. The graph shows how much money she can earn by doing chores. How much money will Casey earn if she works 2.5 hours?

Answer: _____

CORRECT ANSWER AND EXPLANATION

Answer: $13.75

Explanation: We can see on the graph that Casey will earn $11 for working 2 hours. She will earn $16.50 for working 3 hours. $13.75 is halfway between these two values, so that is how much money she will earn if she works 2.5 hours.

STANDARD

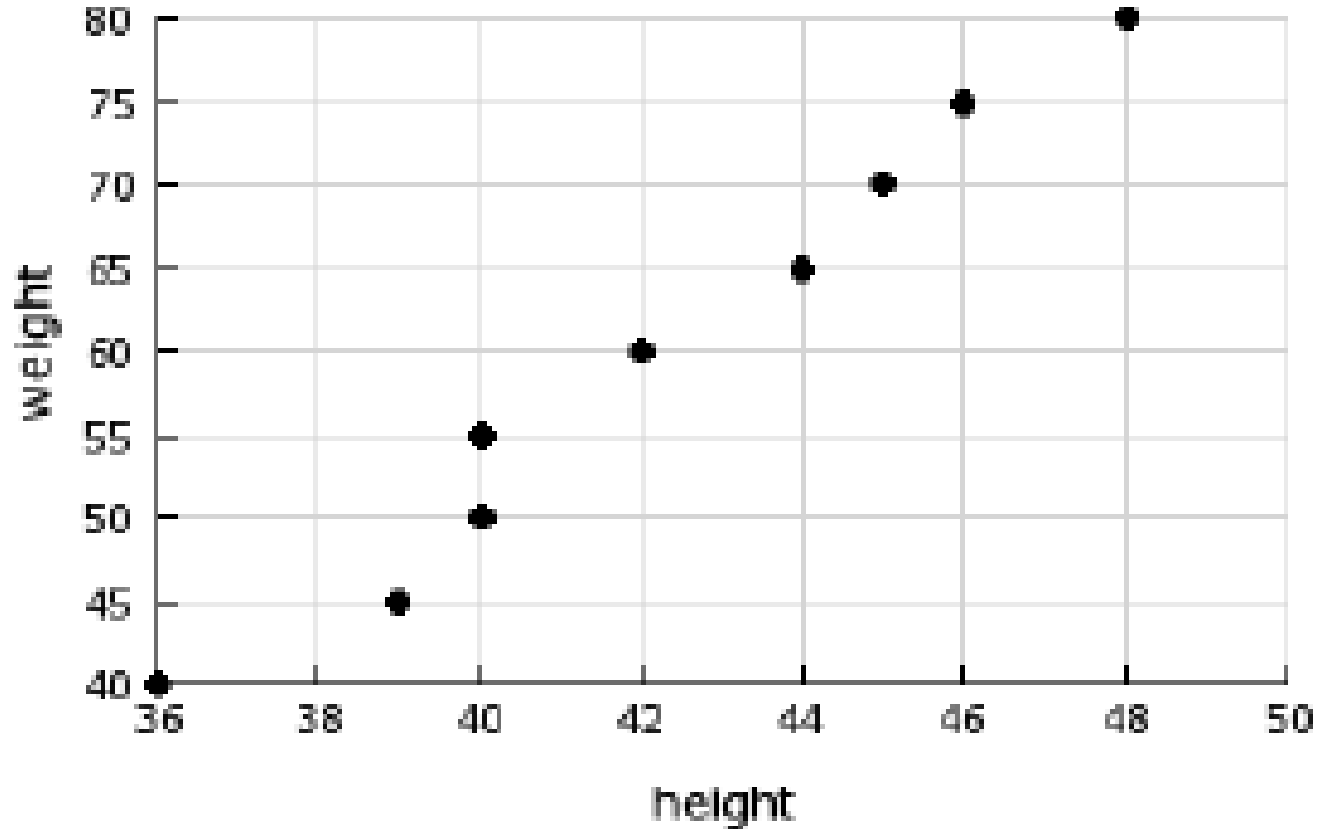**Graph points on the coordinate plane to solve real-world and mathematical problems.**

MGSE.5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate)

STANDARD

Graph points on the coordinate plane to solve real-world and mathematical problems.

MGSE.5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Practice Problem

A pediatrician plotted the heights and weights of 9 random kids that came through her office.

What is the height difference between the tallest and shortest kid?

A) 9 inches

B) 12 inches

C) 15 inches

D) 22 inches

CORRECT ANSWER AND EXPLANATION

Answer: B

Explanation: The tallest kids is 48 inches and the shortest kids is 36 inches. The difference is 12 inches

STANDARD

Graph points on the coordinate plane to solve real-world and mathematical problems.
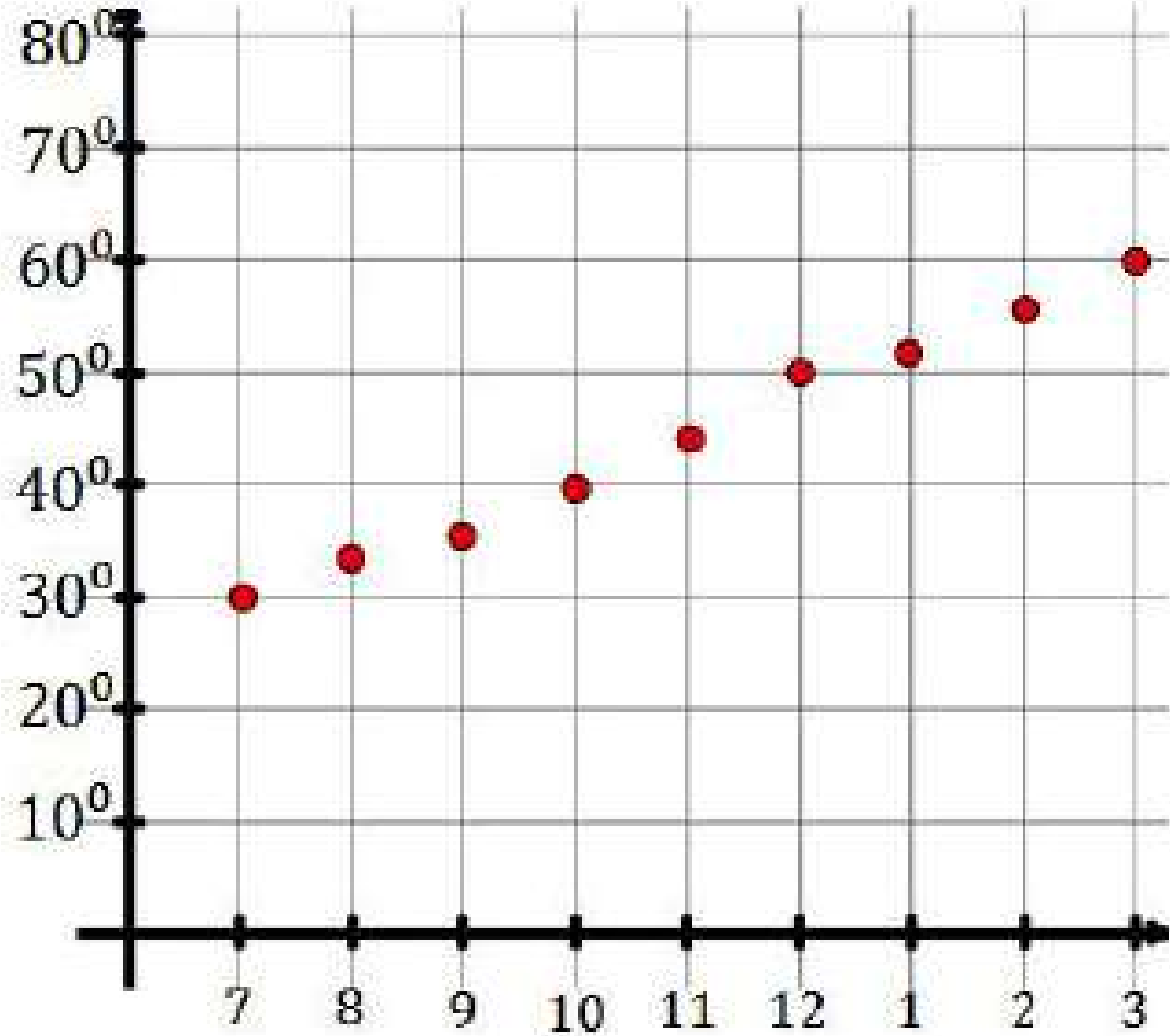
MGSE.5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate)

STANDARD

Graph points on the coordinate plane to solve real-world and mathematical problems.

MGSE.5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Practice Problem

Samaria plotted coordinate points that represent the temperature at the given time of day, between 7 am and 3 pm.

What was the temperature at 2 pm?

A) 47°

B) 51 °

C) 54 °

D) 56 °

CORRECT ANSWER AND EXPLANATION

Answer: D

Explanation: The value of the y-coordinate is 5 6 when the x-value is 2. At 2 pm it was 56 °.

STANDARD

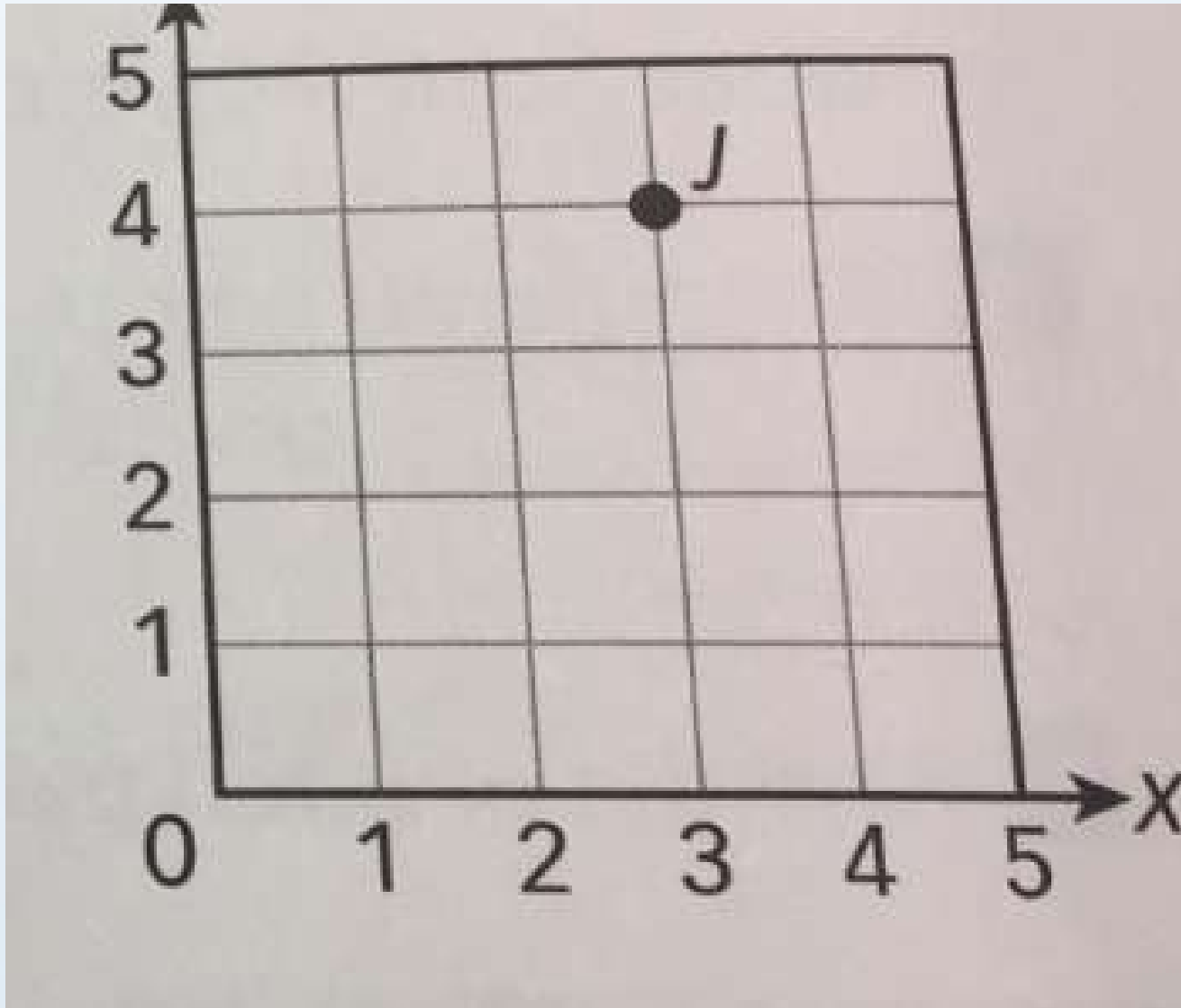**Graph points on the coordinate plane to solve real-world and mathematical problems.**

MGSE.5.G.1 Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate)

STANDARD

Graph points on the coordinate plane to solve real-world and mathematical problems.

MGSE.5.G.2 Represent real world and mathematical problems by graphing points in the first quadrant of the coordinate plane, and interpret coordinate values of points in the context of the situation.

Practice Problem

Irvin identified the ordered pair for point J on the coordinate plane as (4,3). Explain what is wrong with Irvin's ordered pair.

CORRECT ANSWER AND EXPLANATION

Answer: (3,4)

Explanation: Irvin went up 4 on the y-axis and across 3 on the x-axis.

STANDARD

Classify two-dimensional figures into categories based on their properties.

MGSE.5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles*

PRACTICE PROBLEM

What attribute do a rectangle, parallelogram, rhombus, and square have in common?

A) two equal sides

B) four equal sides

C) four right angles

D) two sets of parallel sides

CORRECT ANSWER AND EXPLANATION

Answer: D

Explanation: All four shapes must have two sets of parallel sides.

STANDARD

Classify two-dimensional figures into categories based on their properties.

MGSE.5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles*

PRACTICE PROBLEM

Which shape or shapes have 4 congruent sides, two sets of parallel sides, and at least one right angle?

A) square

B) rhombus

C) rhombus and square

D) rectangle, rhombus, and square
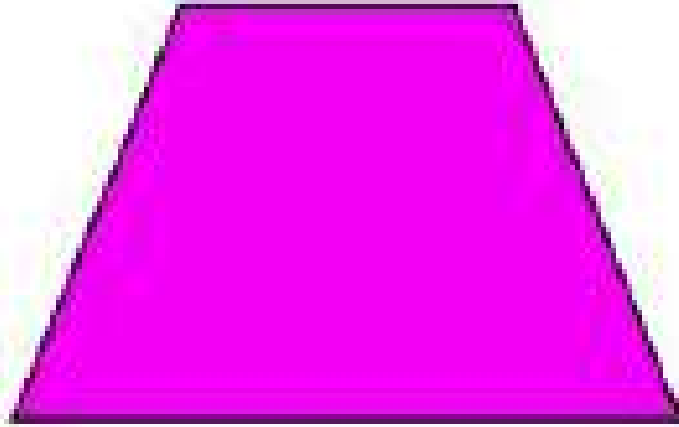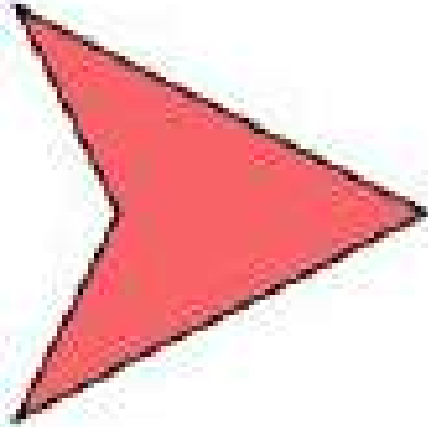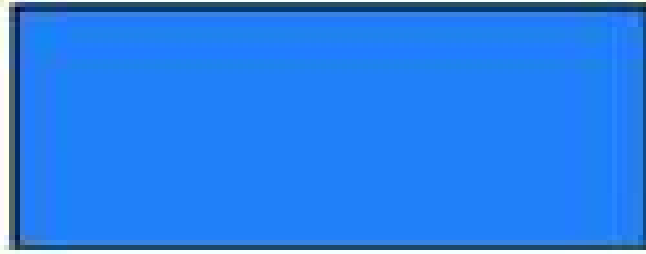
CORRECT ANSWER AND EXPLANATION
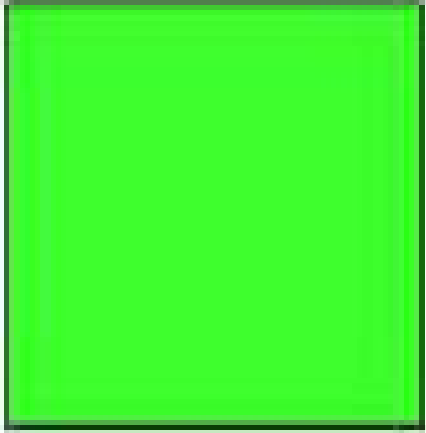
Answer: A

Explanation: Both a square and a rhombus have 4 congruent sides and two sets of parallel sides, but only a square has a right angle

STANDARD

Classify two-dimensional figures into categories based on their properties.

MGSE.5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles*

Practice Problem

The figures in the picture are all _____.

Answer:

CORRECT ANSWER AND EXPLANATION
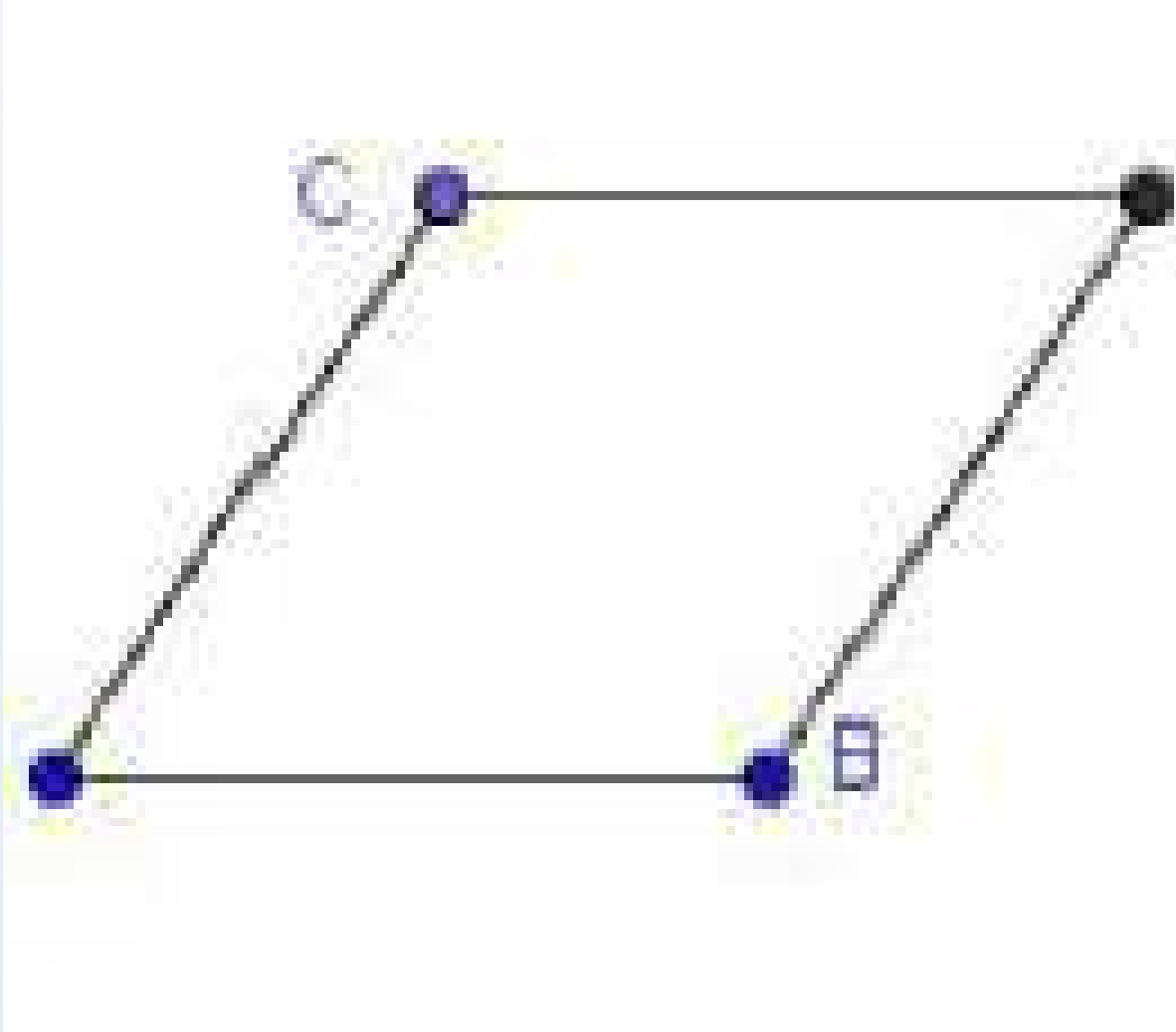
Answer: quadrilateral

Explanation: A quadrilateral is a four sided figure.

STANDARD

Classify two-dimensional figures into categories based on their properties.

MGSE.5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles*

Practice Problem

The rhombus shown here is also a:

A) parallelogram.

B) rectangle.

C) square.

D) trapezoid.

CORRECT ANSWER AND EXPLANATION

Answer: A

Explanation: It is a parallelogram. It has two pairs of parallel sides.

STANDARD

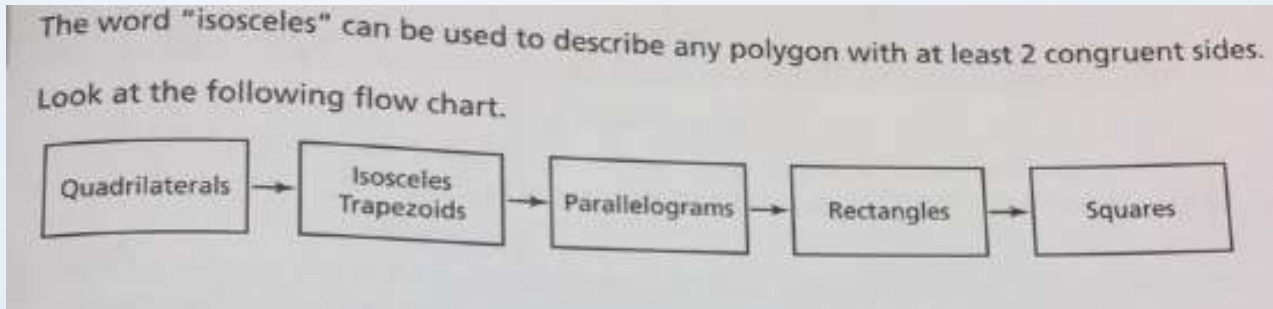**Classify two-dimensional figures into categories based on their properties.**

MGSE.5.G.3 Understand that attributes belonging to a category of two-dimensional figures also belong to all subcategories of that category. *For example, all rectangles have four right angles and squares are rectangles, so all squares have four right angles*

STANDARD

Classify two-dimensional figures into categories based on their properties.

MGSE.5.G.4. Classify two-dimensional figures in a hierarchy based on properties (*polygons, triangles, and quadrilaterals*).

Practice Problem

The word "isosceles" can be used to describe any polygon with at least 2 congruent sides.

Look at the following flow chart.

Quadrilaterals → Isosceles Trapezoids → Parallelograms → Rectangles → Squares

Part A:

Draw an example of an isosceles trapezoid

Part B:

Explain how isosceles trapezoids relate to parallelogram.

Part C:

Can you use the term isosceles to describe a rectangle? Explain your reasoning.

CORRECT ANSWER AND EXPLANATION

Answer: answers may vary

Explanation:

Isosceles: At least two sides are equal

Parallelogram: a parallelogram is a quadrilateral in which both pairs of opposite sides are parallel. Opposite sides of a parallelogram have the same length, and opposite angles have the same measure.

Rectangle: a rectangle is a parallelogram with four right angles.

STANDARD

Analyze patterns and relationships

MGSE.5.OA.3 Generate two numerical patterns using a given rule. Identify apparent relationships between corresponding terms by completing a function table or input/output table. Using the terms created, form and graph ordered pairs on a coordinate plane

Use the graph to complete the input-output table. List the answer in the format of x,y.
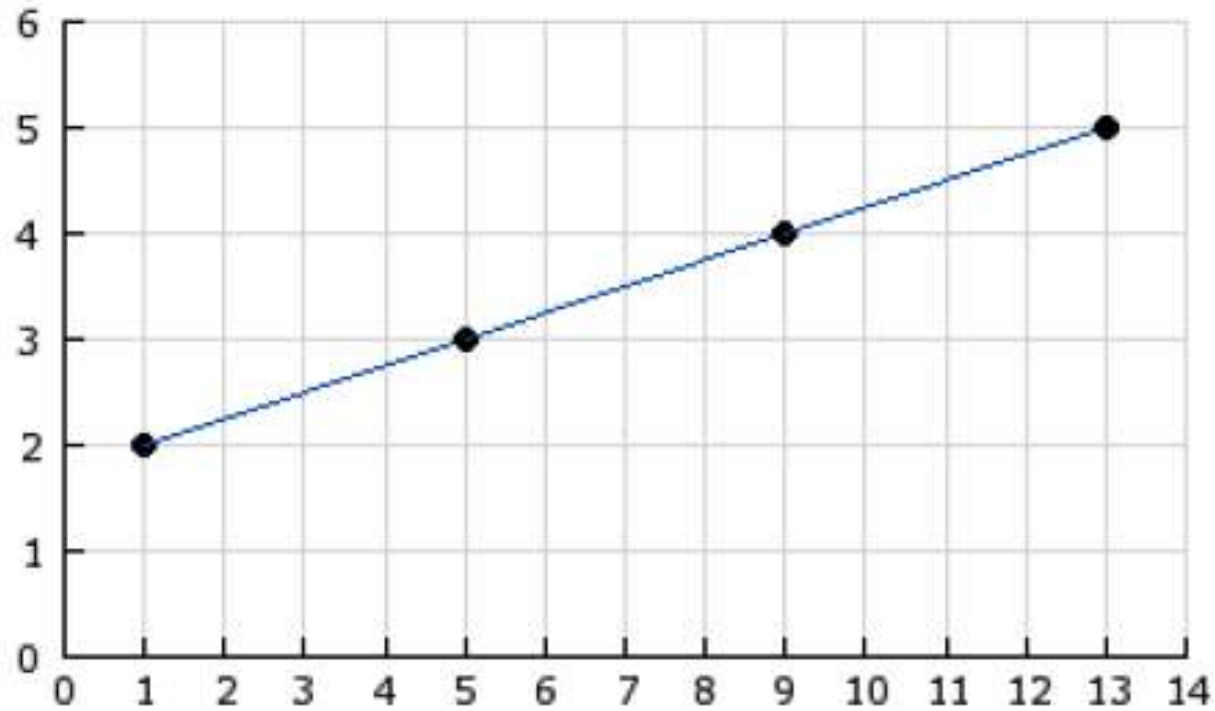
Input	Output
1	x
5	3
13	y

CORRECT ANSWER AND EXPLANATION

Answer: 2,5

Explanation: The answer is 2, 5. The point (1, 2) is on the graph; when the Input is 1, the Output is 2. Also, the point (13, 5) is on the graph; when the Input is 13, the Output is 5.