

Answer Key For The California Mathematics Standards Grade 5

Introduction: Summary of Goals

GRADE FIVE

By the end of grade five, students increase their facility with the four basic arithmetic operations applied to fractions, decimals, and positive and negative numbers. They know and use common measuring units to determine length and area and know and use formulas to determine the volume of simple geometric figures. Students know the concept of angle measurement and use a protractor and compass to solve problems. They use grids, tables, graphs, and charts to record and analyze data.

Answer Key For The California Mathematics Standards Grade 5

Number Sense 1.0: Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.

NS 1.1: Students estimate, round, and manipulate very large (e.g., millions) and very small (e.g., thousandths) numbers.

- a. 1. Round 4.123 to the nearest hundredth. **4.12**

4.12 $\boxed{3}$. Since $3 < 5$ we leave 2 and drop the rest.

2. Round 13.082 to the nearest tenth. **13.1**

13.0 $\boxed{8}$ 2. Since $8 > 5$ we round 0 up to 1.

- b. 1. Round off 6,296,942 to nearest million: **6,000,000**

6, $\boxed{2}$ 96,942. Since $2 < 5$ we leave 6 and keep 0s as place holders.

2. Round off 6,296,942 to nearest hundred thousand: **6,300,000**

6,2 $\boxed{9}$ 6,942. Since $9 > 5$ we round 2 up to 3 and use 0s as place holders.

Answer Key For The California Mathematics Standards Grade 5

Number Sense 1.0: Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.

NS 1.2: Students interpret percents as a part of a hundred; find decimal and percent equivalents for common fractions and explain why they represent the same value; compute a given percent of a whole number.

a. 1. Write each value as a decimal:

i. $17/1000 = \frac{17}{1000} = .017$

ii. $3/20 = \frac{3}{20} = 0.15$ Since $20 \overline{)3.00}$
 $\frac{20}{100}$
 $\frac{100}{100}$

iii. $6\% = 0.06$

2. Write each value as a fraction:

i. $0.03 = \frac{3}{100}$

ii. $1.111 = 1 \frac{111}{1000}$

iii. $8\% = .08 = \frac{8}{100} = \frac{2}{25}$ Since in $\frac{8}{100}$ numerator and denominator both divisible by 4.

iv. $21 = \frac{21}{1}$

Answer Key For The California Mathematics Standards Grade 5

Number Sense 1.0: Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.

NS 1.2: Students interpret percents as a part of a hundred; find decimal and percent equivalents for common fractions and explain why they represent the same value; compute a given percent of a whole number.

[CONTINUED]

a. 3. Write each value as a percent:

i. $0.07 =$ **7%**

ii. $0.165 =$ **16.5%**

iii. $17/20 =$ **.85 = 85%** Since $20 \overline{)17.00}$

$$\begin{array}{r} .85 \\ 20 \overline{)17.00} \\ \underline{160} \\ 100 \\ \underline{100} \\ 0 \end{array}$$

iv. $1/8 =$ **.125 = 12.5%** Since $8 \overline{)1.000}$

$$\begin{array}{r} 125 \\ 8 \overline{)1.000} \\ \underline{8} \\ 20 \\ \underline{16} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

Answer Key For The California Mathematics Standards Grade 5

Number Sense 1.0: Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.

NS 1.2: Students interpret percents as a part of a hundred; find decimal and percent equivalents for common fractions and explain why they represent the same value; compute a given percent of a whole number.

[CONTINUED]

b. 1. What is 30% of 20?

6

$$\begin{aligned}\frac{30}{100} &= \frac{x}{20} \\ 600 &= 100x \\ 6 &= x\end{aligned}$$

2. What is 25% of 48?

12

$$\begin{aligned}\frac{25}{100} &= \frac{x}{48} \\ 1,200 &= 100x \\ 12 &= x\end{aligned}$$

3. What is 150% of 30?

45

$$\begin{aligned}\frac{150}{100} &= \frac{x}{30} \\ 4,500 &= 100x \\ 45 &= x\end{aligned}$$

Answer Key For The California Mathematics Standards

Grade 5

Number Sense 1.0: Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.

NS 1.3: Students understand and compute positive integer powers of non-negative integers; compute examples as repeated multiplication.

Fill in the blank with a whole number:

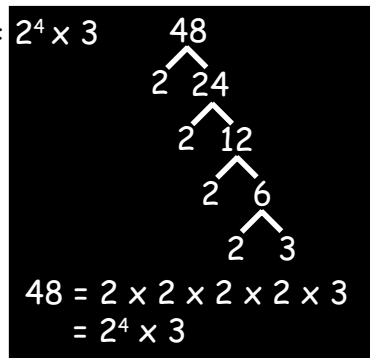
$$5^4 = 5 \times 5 \times 5 \times 5 = 625$$

Number Sense 1.0: Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.

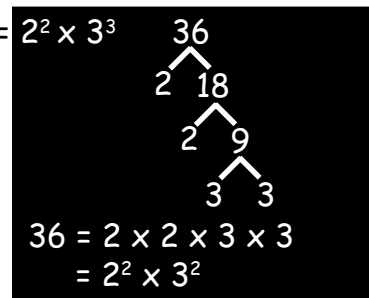
NS 1.4: Students determine the prime factors of all numbers through 50 and write the numbers as the product of their prime factors by using exponents to show multiples of a factor (e.g., $24 = 2 \times 2 \times 2 \times 3 = 2^3 \times 3$).

Write these numbers as the product of their prime factors, using exponents to show multiples of a factor if needed:

a. $48 = 2^4 \times 3$



b. $36 = 2^2 \times 3^2$

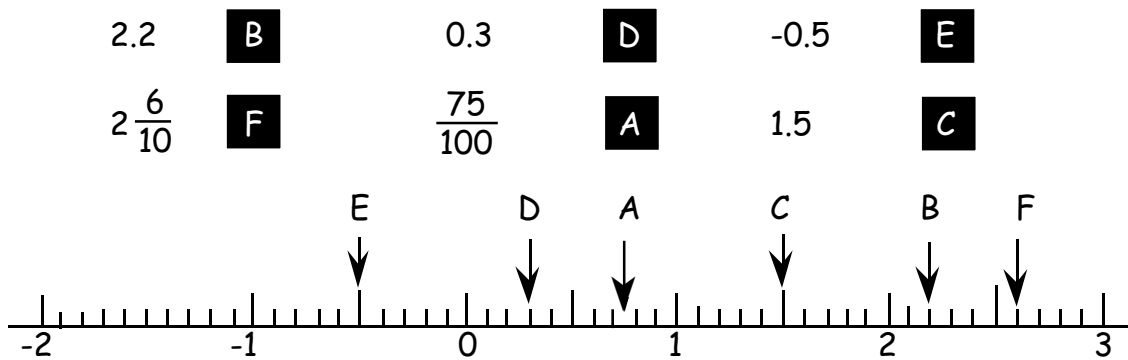


Answer Key For The California Mathematics Standards Grade 5

Number Sense 1.0: Students compute with very large and very small numbers, positive integers, decimals, and fractions and understand the relationship between decimals, fractions, and percents. They understand the relative magnitudes of numbers.

NS 1.5: Students identify and represent on a number line decimals, fractions, mixed numbers, and positive and negative integers.

Write the letter for each number that represents the quantity on the number line.



Answer Key For The California Mathematics Standards Grade 5

Number Sense 2.0: Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals.

NS 2.1: Students add, subtract, multiply, and divide with decimals; add with negative integers; subtract positive integers from negative integers; and verify the reasonableness of the results.

Write the answers:

a. 1. $3.20 \times 0.05 =$ **0.16**

$$\begin{array}{r} 3.20 \\ \times 0.05 \\ \hline .1600 \end{array}$$

3. $18 - 0.342 =$ **17.658**

2. $20 \div 0.05 =$ **400**

$$\begin{array}{r} 400. \\ 5 \overline{) 2000.} \end{array}$$

4. $8.1 + 0.054 + 7 =$ **15.154**

$$\begin{array}{r} 8.100 \\ +0.054 \\ \hline 7.000 \\ \hline 15.154 \end{array}$$

b. 1. $-4 - 3 =$ **-7**

4. $-4 + (-3) =$ **-7**

2. $-7 + 3 =$ **-4**

5. $-2 + (-7) =$ **-9**

3. $-3 + 7 =$ **4**

6. $-2 - (-7) =$ **5**

Answer Key For The California Mathematics Standards Grade 5

Number Sense 2.0: Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals.

NS 2.2: Students demonstrate proficiency with division, including division with positive decimals and long division with multidigit divisors.

a. $45 \overline{)32,694} =$

$$\begin{array}{r} 726\overset{24}{45} = 726\overset{8}{15} \\ 45 \overline{)32,694} \\ \underline{315} \\ 119 \\ \underline{90} \\ 294 \\ \underline{270} \\ 24 \end{array}$$

b. $504 \div 2.1 =$

$$\begin{array}{r} 240 \\ 2.1 \overline{)504.0} \\ \underline{42} \\ 84 \\ \underline{84} \\ 0 \\ \underline{0} \\ 0 \end{array}$$

c. $1,324 \div 20 =$

$$\begin{array}{r} 66.2 \\ 20 \overline{)1,324.0} \\ \underline{120} \\ 124 \\ \underline{120} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

Answer Key For The California Mathematics Standards Grade 5

Number Sense 2.0: Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals.

NS 2.3: Students solve simple problems, including ones arising in concrete situations, involving the addition and subtraction of fractions and mixed numbers (like and unlike denominators of 20 or less), and express answers in the simplest form.

Write the answers:

a. $\frac{3}{4} + \frac{2}{3} =$

b. $2 - \frac{1}{3} = 1\frac{3}{3} - \frac{1}{3} = 1\frac{2}{3}$

LCM is 12

$$\frac{9}{12} + \frac{8}{12} = \frac{17}{12} = 1\frac{5}{12}$$

c. $3\frac{4}{5} + 2\frac{7}{10} =$

d. $3\frac{5}{12} - 1\frac{3}{18} =$

$$3\frac{4}{5} + 2\frac{7}{10} =$$

$$3\frac{8}{10} + 2\frac{7}{10} =$$

$$5\frac{15}{10} = 6\frac{5}{10} = 6\frac{1}{2}$$

$$3\frac{5}{12} - 1\frac{3}{18} =$$

$$3\frac{15}{36} - 1\frac{6}{36} =$$

$$2\frac{9}{36} = 2\frac{1}{4}$$

Answer Key For The California Mathematics Standards Grade 5

Number Sense 2.0: Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals.

NS 2.4: Students understand the concept of multiplication and division of fractions.

Write the answers:

a. $\frac{3}{4} \times \frac{8}{9} = \frac{2}{3}$

b. $\frac{2}{5} \div \frac{1}{2} = \frac{4}{5}$

$$\begin{aligned}\frac{3}{4} \times \frac{8}{9} &= \frac{24}{36} \\ &= \frac{2}{3}\end{aligned}$$

4 and 8 have a
common factor of 4.
3 and 9 have a
common factor of 3.

$$\frac{\cancel{3}^1}{\cancel{4}_1} \times \frac{\cancel{8}^2}{\cancel{9}_3} = \frac{2}{3}$$

$$\begin{aligned}\frac{2}{5} \div \frac{1}{2} &= \\ \frac{2}{5} \times \frac{2}{1} &= \frac{4}{5}\end{aligned}$$

Answer Key For The California Mathematics Standards Grade 5

Number Sense 2.0: Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals.

NS 2.5: Students compute and perform simple multiplication and division of fractions and apply these procedures to solving problems.

- a. A ribbon is 40 inches long. We want to cut the ribbon into pieces. Each piece will be $\frac{2}{3}$ of an inch. How many pieces will we have?

$$\begin{aligned} 40 \div \frac{2}{3} \\ = 40 \times \frac{3}{2} \\ = \frac{20\cancel{4}0}{1} \times \frac{3}{\cancel{2}1} \\ = 60 \end{aligned}$$

40 and 2 have a common factor of 2

60 pieces

- b. There are 20 bottles in a box. Each bottle weighs $1\frac{3}{4}$ pounds. How many pounds do all the bottles weigh together?

$$\begin{aligned} 20 \times 1\frac{3}{4} \\ = \frac{20}{1} \times \frac{7}{4} \\ = \frac{5}{1} \times \frac{7}{1} = 35 \end{aligned}$$

20 and 4 have a common factor of 4.

35 pounds

Answer Key For The California Mathematics Standards Grade 5

Number Sense 2.0: Students perform calculations and solve problems involving addition, subtraction, and simple multiplication and division of fractions and decimals.

NS 2.5: Students compute and perform simple multiplication and division of fractions and apply these procedures to solving problems.

[CONTINUED]

- c. Richard has a large pizza. He gives away $\frac{1}{3}$ of it, then he gives away $\frac{1}{2}$ of what he has. How much pizza does Richard have left?

$$1 - \frac{1}{3} = \frac{3}{3} - \frac{1}{3} = \frac{2}{3} \text{ remaining of the pizza after } \frac{1}{3} \text{ was given away.}$$

$$\text{Then } \frac{2}{3} - \frac{1}{2}\left(\frac{2}{3}\right)$$

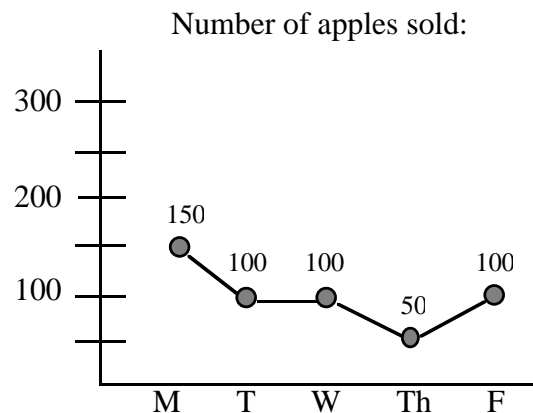
$$= \frac{2}{3} - \frac{1}{3}$$

$$= \frac{1}{3} \text{ of the pizza is left.}$$

Answer Key For The California Mathematics Standards Grade 5

Algebra and Functions 1.0: Students use variables in simple expressions, compute the value of the expression for specific values of the variable, and plot and interpret the results.

AF 1.1: Students use information taken from a graph or equation to answer questions about a problem situation.



a. How many apples were sold this week?

500 apples

b. How many more apples were sold on Monday than on Friday?

50 more

Algebra and Functions 1.0: Students use variables in simple expressions, compute the value of the expression for specific values of the variable, and plot and interpret the results.

AF 1.2: Students use a letter to represent an unknown number; write and evaluate simple algebraic expressions in one variable by substitution.

a. A number y is five times greater than two added to a number x . Write an expression for y in terms of x . If $x = 3$, what is y ?

$y = 5(x + 2)$

**When $x = 3$
 $y = 5(3 + 2)$
 $= 5(5)$
 $= 25$**

b. $y = 3x + 2$, what is y if x is 7?

**$y = 3x + 2$ when $x = 7$
 $y = 3(7) + 2$
 $= 21 + 2$
 $= 23$**

Answer Key For The California Mathematics Standards Grade 5

Algebra and Functions 1.0: Students use variables in simple expressions, compute the value of the expression for specific values of the variable, and plot and interpret the results.

AF 1.3: Students know and use the distributive property in equations and expressions with variables.

$$3(4y - 2) =$$

A. $7y - 2$

B. $7y + 6$

C. $12y - 5$

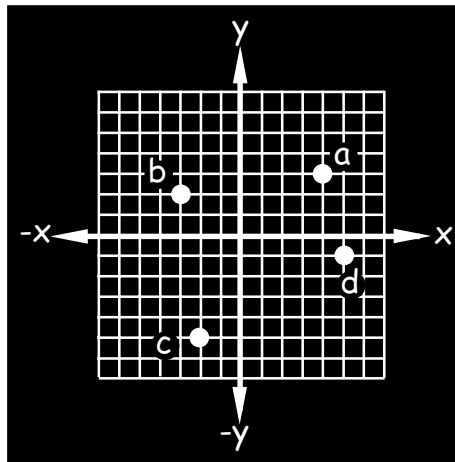
D $12y - 6$

$$\begin{aligned} 3(4y - 2) &= 3 \cdot 4y - 3 \cdot 2 \\ &= 12y - 6 \end{aligned}$$

Algebra and Functions 1.0: Students use variables in simple expressions, compute the value of the expression for specific values of the variable, and plot and interpret the results.

AF 1.4: Students identify and graph ordered pairs in the four quadrants of the coordinate plane.

Plot these points: a. (4, 3) b. (-3, 2) c. (-2, -5) d. (5, -1)



Answer Key For The California Mathematics Standards Grade 5

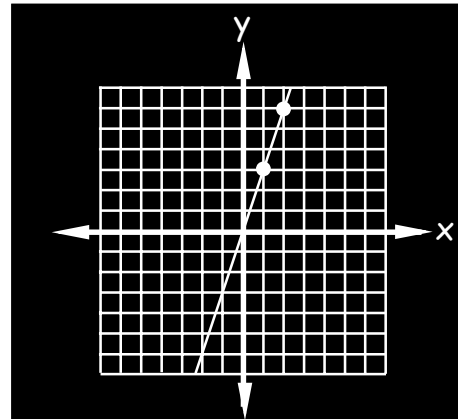
Algebra and Functions 1.0: Students use variables in simple expressions, compute the value of the expression for specific values of the variable, and plot and interpret the results.

AF 1.5: Students solve problems involving linear functions with integer values; write the equation; and graph the resulting ordered pairs of integers on a grid.

Every car is charged \$3 to park. Write the equation for the total charges y if there are x number of cars. Complete the table and plot the points from the table onto the graph.

x	y
1	3
2	6

Which leads to equation
 $y = 3x$



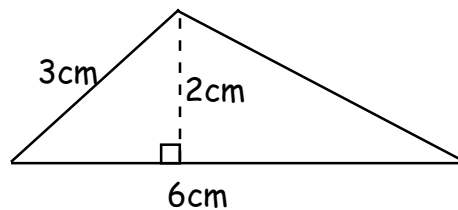
Where y is the total charges for parking and where x is the total number of cars.

Answer Key For The California Mathematics Standards Grade 5

Measurement and Geometry 1.0: Students understand and compute the volumes and areas of simple objects.

MG 1.1: Students derive and use the formula for the area of a triangle and of a parallelogram by comparing it with the formula for the area of a rectangle (i.e., two of the same triangles make a parallelogram with twice the area; a parallelogram is compared with a rectangle of the same area by cutting and pasting a right triangle on the parallelogram).

- a. What is the area of this triangle?



$$\begin{aligned} A &= \frac{1}{2} bh \\ &= \frac{1}{2} (6)(2) \\ &= \frac{1}{2} \cdot \frac{2}{1} \cdot \frac{6}{1} \\ &= 6\text{cm}^2 \end{aligned}$$

- b. What is the area of this parallelogram?



$$\begin{aligned} A &= bh \\ &= (5)(2) \\ &= 10\text{cm}^2 \end{aligned}$$

Answer Key For The California Mathematics Standards Grade 5

Measurement and Geometry 1.0: Students understand and compute the volumes and areas of simple objects.

MG 1.2: Students constructs a cube and rectangular box from two-dimensional patterns and use these patterns to compute the surface area for these objects.

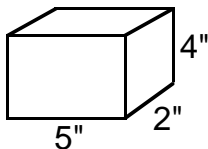
What is the surface area of a cube whose edges each measure 3 inches?

A cube has 6 faces.	$SA = 6s^2$
Each face has area	$= 6(3)^2$
side x side, or s^2 .	$= 6(9) = 54$ square inches

Measurement and Geometry 1.0: Students understand and compute the volumes and areas of simple objects.

MG 1.3: Students understand the concept of volume and use the appropriate units in common measuring systems (i.e., cubic centimeter [cm^3], cubic meter [m^3], cubic inch [in^3], cubic yard [yd^3]) to compute the volume of rectangular solids.

What is the volume of this block?



$$\begin{aligned} V &= l \cdot w \cdot h \\ &= (5)(2)(4) \\ &= 40\text{in}^3 \end{aligned}$$

$$\begin{aligned} \text{Where } l &= 5 \\ w &= 2 \\ h &= 4 \end{aligned}$$

Answer Key For The California Mathematics Standards Grade 5

Measurement and Geometry 1.0: Students understand and compute the volumes and areas of simple objects.

MG 1.4: Students differentiate between, and use appropriate units of measures for, two- and three-dimensional objects (i.e., find the perimeter, area, volume).

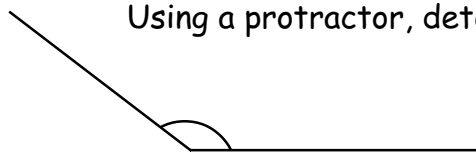
Identify the statements below as relating to length, area or volume.

- | | | |
|----|---|--------|
| a. | The perimeter of a triangle | length |
| b. | The amount of water a barrel will hold | volume |
| c. | The amount of astroturf to cover a football field | area |
| d. | The number of bricks to pave a path | area |

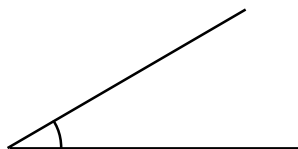
Measurement and Geometry 2.0: Students identify, describe, and classify the properties of, and the relationships between, plane and solid geometric figures.

MG 2.1: Students measure, identify, and draw angles, perpendicular and parallel lines, rectangles, and triangles by using appropriate tools (e.g., straightedge, ruler, compass, protractor, drawing software).

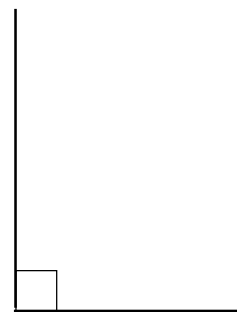
Using a protractor, determine the number of degrees in each angle.



a. **142°**



b. **38°**



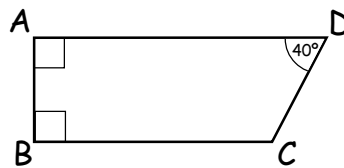
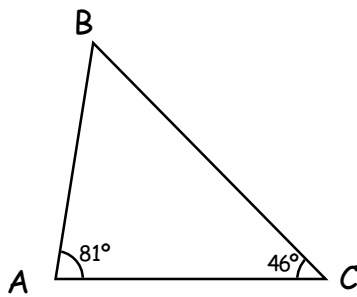
c. **90°**

Answer Key For The California Mathematics Standards Grade 5

Measurement and Geometry 2.0: Students identify, describe, and classify the properties of, and the relationships between, plane and solid geometric figures.

MG 2.2: Students know that the sum of the angles of any triangle is 180° and the sum of the angles of any quadrilateral is 360° and use this information to solve problems.

Examine the figures and answer the questions:



a. $m\angle B = 53^\circ$

b. How many degrees in angle BCD? 140°

$$m\angle A + m\angle B + m\angle C = 180^\circ$$

$$81^\circ + m\angle B + 46^\circ = 180^\circ$$

$$m\angle B + 127^\circ = 180^\circ$$

$$m\angle B = 53^\circ$$

$$m\angle A + m\angle B + m\angle C + m\angle D = 360^\circ$$

$$90^\circ + 90^\circ + m\angle C + 40^\circ = 360^\circ$$

$$m\angle C + 220^\circ = 360^\circ$$

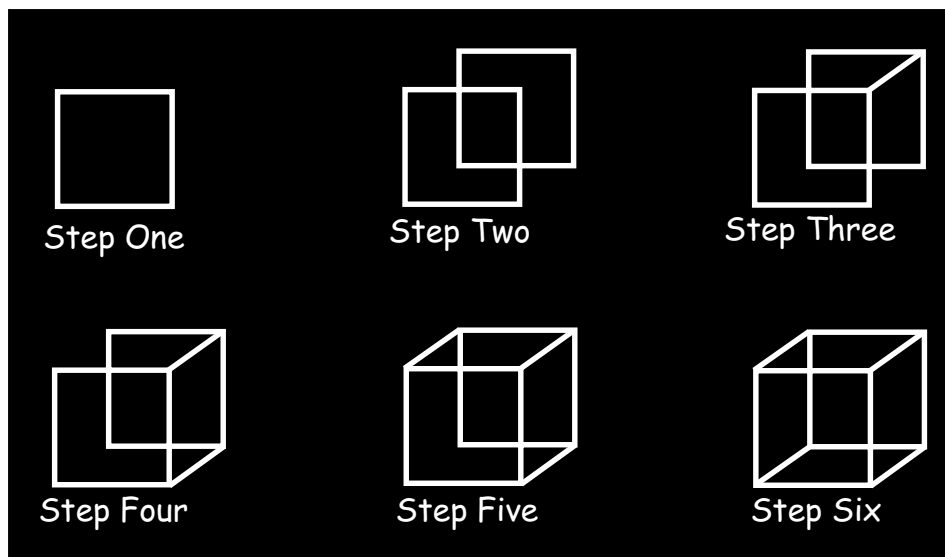
$$m\angle C = 140^\circ$$

Answer Key For The California Mathematics Standards Grade 5

Measurement and Geometry 2.0: Students identify, describe, and classify the properties of, and the relationships between, plane and solid geometric figures.

MG 2.3: Students visualize and draw two-dimensional views of three-dimensional objects made from rectangular solids.

Draw a cube.



Answer Key For The California Mathematics Standards Grade 5

Statistics, Data Analysis, and Probability 1.0: Students display, analyze, compare and interpret different data sets, including data sets of different sizes.

S 1.1: Students know the concepts of mean, median, and mode; compute and compare simple examples to show that they may differ.

Here are Jason's scores on science tests this year.

test	1	2	3	4	5	6	7	8	9	10	11
score	85	91	48	98	99	91	90	84	91	87	80

a. What is his median score?

90

48 80 84 85 87 90 91 91 91 98 99

b. What is the mode for all these scores?

91 is the mode since it is listed three times, more than any other number

c. What is the mean of Jason's first five scores?

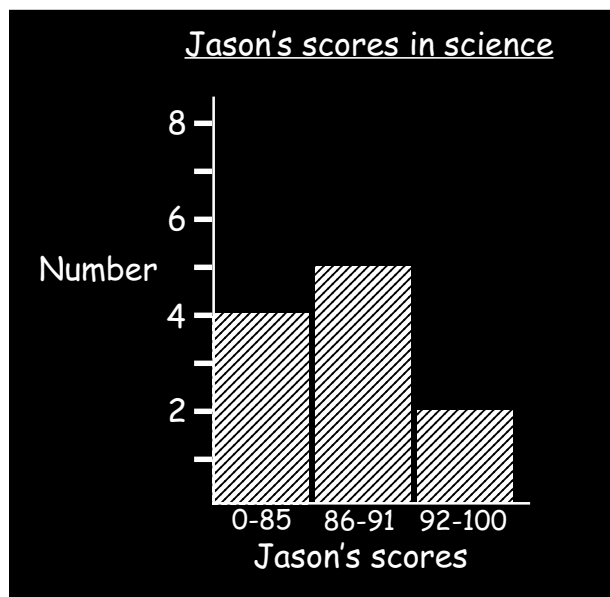
$$\frac{85 + 91 + 48 + 98 + 99}{5} = \frac{421}{5} = 84.2$$

Answer Key For The California Mathematics Standards Grade 5

Statistics, Data Analysis, and Probability 1.0: Students display, analyze, compare, and interpret different data sets, including data sets of different sizes.

S 1.2: Students organize and display single-variable data in appropriate graphs and representations (e.g., histogram, circle graphs) and explain which types of graph are appropriate for various data sets.

For Jason's marks in science (see question S 1.1 on previous page), create a histogram for these ranges of scores: 0-85, 86-91, 92-100.



Answer Key For The California Mathematics Standards Grade 5

Statistics, Data Analysis, and Probability 1.0: Students display, analyze, compare, and interpret different data sets, including data sets of different sizes.

S 1.3: Students use fractions and percentages to compare data sets of different sizes.

In Ms. Jones' class, 21 of 30 children passed the math test. In Ms. Tyler's class, 18 of 25 children passed the math test.

a. In which class did a higher percentage of students pass?

Ms. Jones' class

$$\begin{aligned}\frac{x}{100} &= \frac{21}{30} \\ 30x &= 2,100 \\ x &= 70\%\end{aligned}$$

Ms. Tyler's class

$$\begin{aligned}\frac{x}{100} &= \frac{18}{25} \\ 25x &= 1,800 \\ x &= 72\%\end{aligned}$$

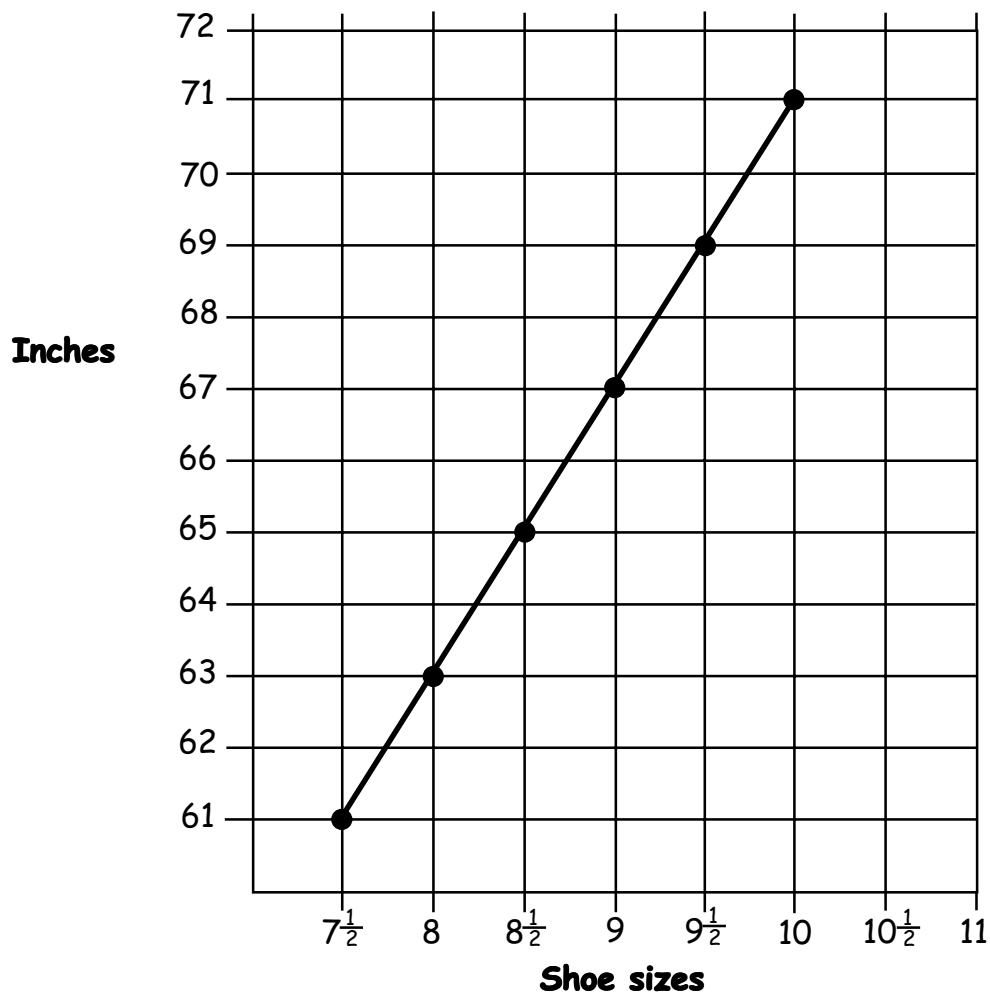
b. By how many more percentage points?

$$72\% - 70\% = 2\% \text{ more}$$

Answer Key For The California Mathematics Standards Grade 5

Statistics, Data Analysis, and Probability 1.0: Students display, analyze, compare, and interpret different data sets, including data sets of different sizes.

S 1.4: Students identify ordered pairs of data from a graph and interpret the meaning of the data in terms of the situation depicted by the graph.



This graph show the relationship between height and shoe size. According to the data depicted above, what shoe size does a man 71 inches tall wear?

Size 10

Answer Key For The California Mathematics Standards Grade 5

Statistics, Data Analysis, and Probability 1.0: Students display, analyze, compare, and interpret different data sets, including data sets of different sizes.

S 1.5: Students know how to write ordered pairs correctly; for example, (x, y) .

Referring to question S 1.4, which comes first in the ordered pairs, height or shoe size?

Shoe size