Answer Key For The California Mathematics Standards Grade 4

Introduction: Summary of Goals

GRADE FOUR

By the end of grade four, students understand large numbers and addition, subtraction, multiplication, and division of whole numbers. They describe and compare simple fractions and decimals. They understand the properties of, and the relationships between, plane geometric figures. They collect, represent, and analyze data to answer questions.

Answer Key For The California Mathematics Standards
Grade 4

Number Sense 1.0: Students understand the place of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.

NS 1.1: Students read and write whole numbers in the millions.

Write as numbers:

a. three million two hundred fifty-five thousand — `3,255,000`

b. seventy million — `70,000,000`

c. eight million two hundred thousand — `8,200,000`

d. four million eight hundred sixty-two thousand three hundred ten — `4,862,310`

Number Sense 1.0: Students understand the place of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.

NS 1.2: Students order and compare whole numbers and decimals to two decimal places.

Write the letter that corresponds to each number that represents the quantity on the number line:
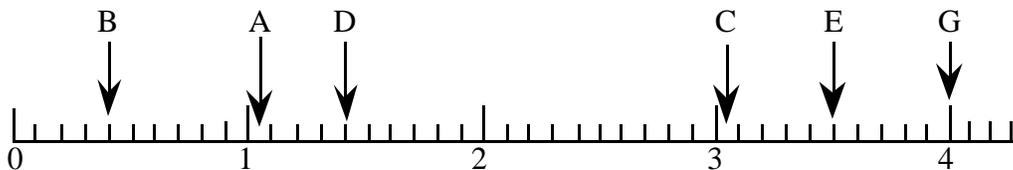
1. **A** 1.04   4. **B** 0.40

2. **C** 3.05   5. **E** 3.50

3. **G** 4.0   6. **D** 1.4

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Number Sense 1.0: Students understand the place of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.

NS 1.3: Students round whole numbers through the millions to the nearest ten, hundred, thousand, ten thousand, or hundred thousand.

a. Round off 5,185,924 to the nearest hundred: 5,185,900

b. Round off 5,185,924 to the nearest hundred thousand: 5,200,000

c. Round off 5,185,924 to the nearest thousand: 5,186,000

Number Sense 1.0: Students understand the place of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.

NS 1.4: Students decide when a rounded solution is called for and explain why such a solution may be appropriate.

Buses need to be rented for 27 children going on a field trip. Each bus can take 12 children in addition to the driver. How many buses must be rented?

3 buses: Two buses will take only 24 children. One more bus must be rented to take the 3 remaining children.

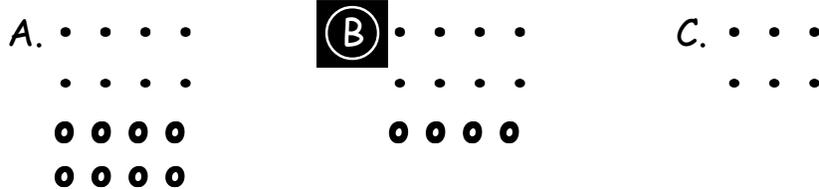# Answer Key For The California Mathematics Standards
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Number Sense 1.0: Students understand the place of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.

NS 1.5: Students explain different interpretations of fractions: for example, parts of a whole, parts of a set, and division of whole numbers by whole numbers; explain equivalents of fractions (see Standard 4.0).

a.   Circle the picture below that shows $\frac{3}{4}$ shaded
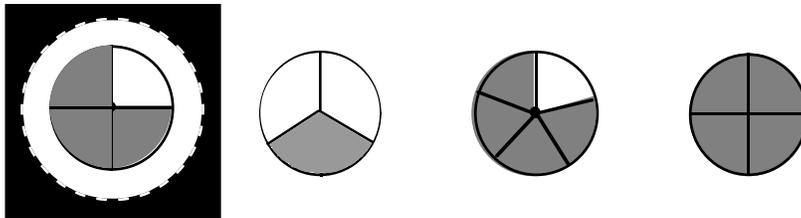
b. Circle the picture below in which 2/3 of the dots are small.

Number Sense 1.0: Students understand the place of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.

NS 1.5: Students explain different interpretations of fractions: for example, parts of a whole, parts of a set, and division of whole numbers by whole numbers; explain equivalents of fractions (see Standard 4.0).

[CONTINUED]

c. Circle True or False

1. $\frac{1}{3} > 2.5$ True   (False) $\frac{1}{3} < 2.5$

2. $\frac{5}{2} < 2.7$ (True)   False $2.5 < 2.7$

3. $\frac{8}{12} = \frac{2}{3}$ (True)   False $\frac{2}{3} \times \frac{4}{4} = \frac{8}{12}$

4. $\frac{3}{7} < \frac{10}{21}$ (True)   False $\frac{3}{7} \times \frac{3}{3} = \frac{9}{21} < \frac{10}{21}$

Number Sense 1.0: Students understand the place of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.

NS 1.6: Students write tenths and hundredths in decimal and fraction notations and know the fraction and decimal equivalents for halves and fourths (e.g., $\frac{1}{2}$ = 0.5 or .50; $\frac{7}{4}$ = $1\frac{3}{4}$ = 1.75).

Write each fraction or mixed number as a decimal.

a. $\frac{1}{2}$ = .5

b. $\frac{3}{10}$ = .3

c. $11\frac{2}{100}$ = 11.02

d. $\frac{1}{4}$ = .25

e. $1\frac{25}{100}$ = 1.25

Number Sense 1.0: Students understand the place of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.
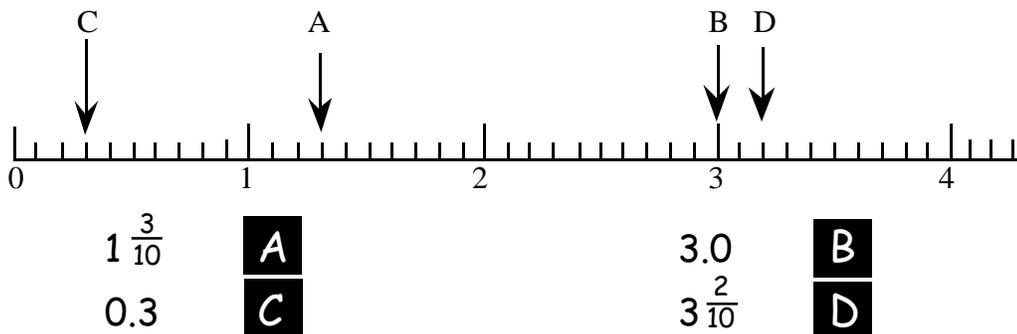
NS 1.7: Students write the fraction represented by a drawing of parts of a figure; represent a given fraction by using drawings; and relate a fraction to a simple decimal on a number line.

a. Represent the fraction 3/5 using the figure below.
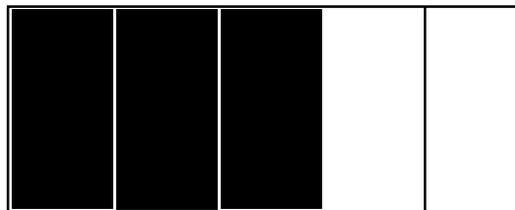
This is one way of showing 3/5

b. Write the letter that shows where each number goes on the number line:

C   A   B D

0   1   2   3   4

$1\frac{3}{10}$ A   3.0   B

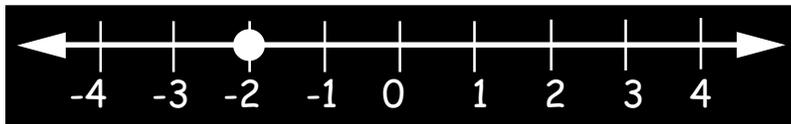0.3   C $3\frac{2}{10}$ D

Answer Key For The California Mathematics Standards
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Number Sense 1.0: Students understand the place of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.

NS 1.8: Students use concepts of negative numbers (e.g., on a number line, in counting, in temperature, in "owing").

Draw a number line and show -2 on it.

Number Sense 1.0: Students understand the place of whole numbers and decimals to two decimal places and how whole numbers and decimals relate to simple fractions. Students use the concepts of negative numbers.

NS 1.9: Students identify on a number line the relative position of positive fractions, positive mixed numbers, and positive decimals to two decimal places.

Write the letter that represents where each number would go on the number line:

a. $1\frac{1}{4}$ ___E___   b. 2.50 ___J___   c. $\frac{3}{4}$ ___C___
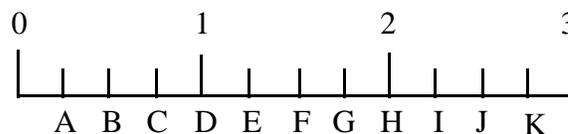
Answer Key For The California Mathematics Standards
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Number Sense 2.0: Students extend their use and understanding of whole numbers to the addition and subtraction of simple decimals.

NS 2.1: Students estimate and compute the sum or difference of whole numbers and positive decimals to two places.

a. 14 - 3.21 = 10.79   b. 7.4 + 0.34 + 51 = 58.74

Number Sense 2.0: Students extend their use and understanding of whole numbers to the addition and subtraction of simple decimals.

NS 2.2: Students round two-place decimals to one decimal or the nearest whole number and judge the reasonableness of the rounded answer.

a. Round 3.19 to the nearest tenth.   3.2

b. Round 3.19 to the nearest whole number.   3

Answer Key For The California Mathematics Standards
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Number Sense 3.0: Students solve problems involving addition, subtraction, multiplication, and division of whole numbers and understand the relationships among the operations.

NS 3.1: Students demonstrate an understanding of, and the ability to use, standard algorithms for the addition and subtraction of multidigit numbers.

a. 60,000 - 241 = **59,759**

b. 4,863 - 376 = **4,487**

Number Sense 3.0: Students solve problems involving addition, subtraction, multiplication, and division of whole numbers and understand the relationships among the operations.

NS 3.2: Students demonstrate an understanding of, and the ability to use, standard algorithms for multiplying a multidigit number by a two-digit number and for dividing a multidigit number by a one-digit number; use relationships between them to simplify computations and to check results.

a. 37 x 302 = **11,174**

b. 4 $\overline{)2,416}$ = **604**

Answer Key For The California Mathematics Standards
Grade 4

Number Sense 3.0: Students solve problems involving addition, subtraction, multiplication, and division of whole numbers and understand the relationships among the operations.

NS 3.3: Students solve problems involving multiplication of multidigit numbers by two-digit numbers.

There are bags of sand on a truck. Each bag of sand weighs 124 pounds. How many pounds do 38 bags weigh? 4,712 pounds.

Multiply the weight of 1 bag times the number of bags.
124 x 38 = 4,712 pounds

Number Sense 3.0: Students solve problems involving addition, subtraction, multiplication, and division of whole numbers and understand the relationships among the operations.

NS 3.4: Students solve problems involving division of multidigit numbers by one-digit numbers.

There are 5,064 marbles that need to be packed in boxes. There are 6 boxes. We want to put the same number of marbles in each box. How many marbles will fit into each box?   844

Divide the number of marbles by the number of boxes.
5,064 ÷ 6 = 844

Number Sense 4.0: Students know how to factor small whole numbers.

NS 4.1: Students understand that many whole numbers break down in different ways (e.g., 12 = 4 x 3 = 2 x 6 = 2 x 2 x 3).

You know that 1 x 30 = 30. List three *other* ways that you can write 30 as the product of two or more numbers:

5×6 = 30 3×10 = 30 2×15 = 30

Number Sense 4.0: Students know how to factor small whole numbers.

NS 4.2: Students know that numbers such as 2, 3, 5, 7 and 11 do not have any factors except 1 and themselves and that such numbers are called prime numbers.

List all the prime numbers between 2 and 14:

3, 5, 7, 11, 13

Answer Key For The California Mathematics Standards
Grade 4

Algebra and Functions 1.0: Students use and interpret variables, mathematical symbols, and properties to write and simplify expressions and sentences.

AF 1.1: Students use letters, boxes or other symbols to stand for any number in simple expressions or equations (e.g., demonstrate an understanding and the use of the concept of a variable).

Tanya has read the first 78 pages of a 130 page book. Write an expression to show the number of pages Tanya must read in order to finish the book. Use a variable in your expression.

Let p be the number of pages left to read.
Then 78 + p = 130

Algebra and Functions 1.0: Students use and interpret variables, mathematical symbols, and properties to write and simplify expressions and sentences.

AF 1.2: Students interpret and evaluate mathematical expressions that now use parentheses.

If $x = (a - b) - c$ and a is 10, b is 3 and C is 4, what is the value of x?

$x = 3$

$x = (10 - 3) - 4$
$x = 7 - 4$
$x = 3$

Answer Key For The California Mathematics Standards
Grade 4

Algebra and Functions 1.0: Students use and interpret variables, mathematical symbols, and properties to write and simplify expressions and sentences.

AF 1.3: Students use parentheses to indicate which operation to perform first when writing expressions containing more than two terms and different operations.

28 x (10 - 8) = 56

28 x 2 = 56

Algebra and Functions 1.0: Students use and interpret variables, mathematical symbols, and properties to write and simplify expressions and sentences.

AF 1.4: Students use and interpret formulas (e.g., area = length xc width or *A = lw*) to answer questions about quantities and their relationships.

Area = length x width.

a.   The length of a rectangle is 10 meters. The width is 4 meters.
     What is the area? 40 square meters

     Area = (10 x 4) m²

     = 40m²

b.   The area of a rectangle is 200 square meters. The width is 10
     meters. What is the length? 20 meters

     A = L x W

     200 = L x 10

     L = (200 ÷ 10) meters

     L = 20 meters

Answer Key For The California Mathematics Standards
Grade 4

Algebra and Functions 1.0: Students use and interpret variables, mathematical symbols, and properties to write and simplify expressions and sentences.

AF 1.5: Students understand that an equation such as $y = 3x + 5$ is a prescription for determining a second number when a first is given.

Find y if $y = 3x + 5$ and $x = 4$.

y = 17

$y = 3x + 5$

$= 3 \cdot 4 + 5$

$= 12 + 5$

$= 17$

"3x" means 3 times x. Write the operation symbol when the variable is replaced by a number. The order of operations states that multiplication is done before addition.

Algebra and Functions 2.0: Students know how to manipulate equations.

AF 2.1: Students know and understand that equals added to equals are equal.

Circle the statement that is true:

(A) $5 + \dfrac{4}{4} = 5 + (7 - 6)$

$\begin{aligned} 5 + 1 &= 5 + (1) \\ 6 &= 6 \end{aligned}$

B. $5 + \dfrac{5}{4} = 5 + (5 - 4)$

C. $5 + \dfrac{4}{4} = 5 + (4 + 4)$

Algebra and Functions 2.0: Students know how to manipulate equations.

AF 2.2: Students know and understand that equals multiplied by equals are equal.

Circle the statement that is true:

A. 5 (3 - 1) = 5 × 3 - 1

B. 5 (3 - 1) = 5 (1 + 1)

5(2) = 5(2)
10 = 10

C. 5 (3 - 1) = 5 + 3 + 1

Measurement and Geometry 1.0: Students understand perimeter and area.

MG 1.1: Students measure the area of rectangular shapes by using appropriate units, such as square centimeter (cm^2), square meter (m^2), square kilometer (km^2), square inch (in^2), square yard (yd^2), or square mile (mi^2).

Find the area of a rectangle that is 45 cm wide and 55 cm long:

Area   2,475cm²
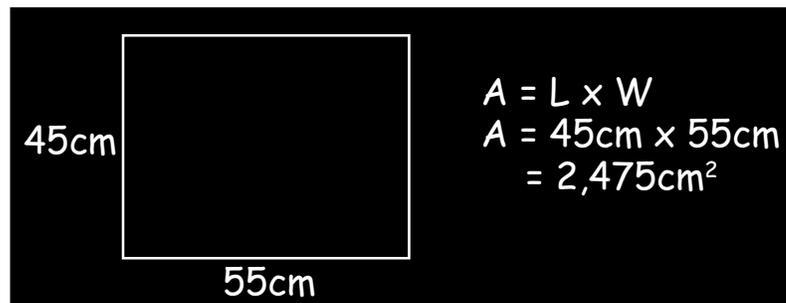
45cm

55cm

A = L × W
A = 45cm × 55cm
  = 2,475cm²

Measurement and Geometry 1.0: Students understand perimeter and area.

MG 1.2: Students recognize that rectangles that have the same area can have different perimeters.

Do two rectangles with the same area necessarily have the same perimeter? Give an example to support your answer.
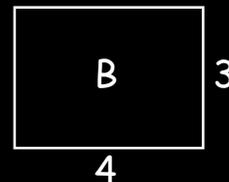
No. Here are two examples. There are many others.

Both rectangles have equal areas

Area of A = 1 x 12

= 12 sq. units

Area of B = 3 x 4

= 12 sq. units

A	1
12	

B	3
4	

$$P = 2(L + W)$$

Perimeter of A = 2(12 + 1)
= 2(13)
= 26

Perimeter of B = 2(4 + 3)
= 2(7)
= 14

Measurement and Geometry 1.0: Students understand perimeter and area.

MG 1.3: Students understand that rectangles that have the same perimeter can have different areas.

No. Here are two examples. There are many others.

A   5

10

B   3

12
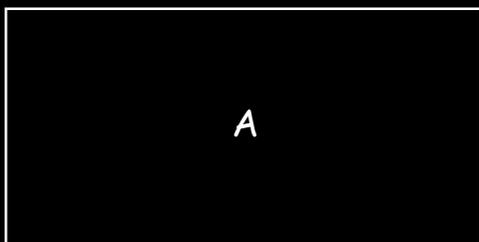
P = 2(5 + 10)
  = 2(15)
  = 30

P = 2(3 + 12)
  = 2(15)
  = 30

Both rectangles have equal perimeters.

Area of A = L x W
          = 10 x 5
          = 50 sq. units

Area of B = L x W
          = 12 x 3
          = 36 sq. units

Answer Key For The California Mathematics Standards
Grade 4

Measurement and Geometry 1.0: Students understand perimeter and area.

MG 1.4: Students understand and use formulas to solve problems involving perimeters and areas of rectangles and squares; use those formulas to find the areas of more complex figures by dividing the figures into basic shapes.
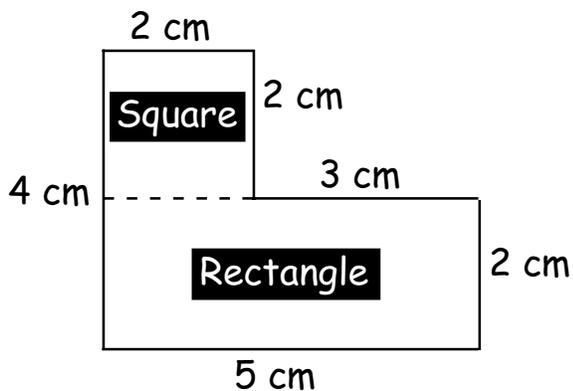
a. Use a formula to find the area of this rectangle.

Area = **91 sq. mm**

h = 7mm

b = 13 mm

$A = h \times b$
$= 7 \times 13$
$= 91mm^2$
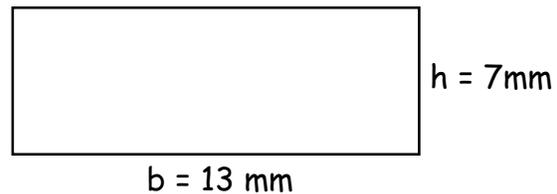
b. Find the area of the figure below. All angles are right angles.

2 cm

2 cm

Square

4 cm

3 cm

Rectangle

2 cm

5 cm

Area = 14 sq. cm

One way is to divide the figure into a square and a rectangle.

Area of square = 2 x 2
$= 4cm^2$

Area of rectangle = 5 x 2
$= 10cm^2$

Total area = 4 + 10 = $14cm^2$

Measurement and Geometry 2.0: Students use two-dimensional coordinate grids to represent points and graph lines and simple figures.

MG 2.1: Students draw the points corresponding to linear relationships on graph paper (e.g., draw 10 points on the graph of the equation $y = 3x$ and connect them by using a straight line).

On the graph, draw the first three points for the equation $y = 3x$ using 2, 3 and 4 as the values of x. Connect the points using a straight line.

Organize the information in a table.

x	3x	y
2	3·2	6
3	3·3	9
4	3·4	12

Then graph the points (2,6), (3,9) and (4,12). Connect with a straight line.
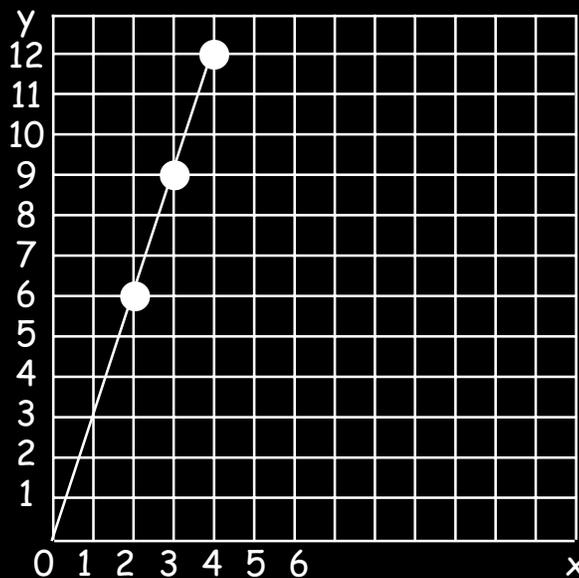
Answer Key For The California Mathematics Standards
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Measurement and Geometry 2.0: Students use two-dimensional coordinate grids to represent points and graph lines and simple figures.

MG 2.2: Students understand that the length of a horizontal line segment equals the difference of the *x*-coordinates.

What is the length of the line segment joining the points

(6, -4) and (21, -4)?   **15**

Since the y-coordinates are equal, the length will be the difference in the x-coordinates.
21 - 6 = 15

Measurement and Geometry 2.0: Students use two-dimensional coordinate grids to represent points and graph lines and simple figures.

MG 2.3: Students understand that the length of a vertical line segment equals the difference of the *y*-coordinates.

What is the length of the line segment joining the points

(121, 3) to (121, 17)?   **14**

Since the x-coordinates are equal, the length will be the difference in the y-coordinates.
17 - 3 = 14

Answer Key For The California Mathematics Standards
Grade 4

Measurement and Geometry 3.0: Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.

MG 3.1: Students identify lines that are parallel and perpendicular.

Write the word *parallel* under the lines that are parallel.

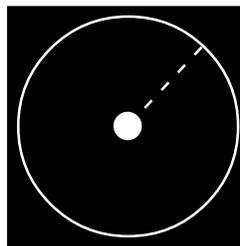Write the word *perpendicular* under the lines that are perpendicular.

perpendicular   parallel

Measurement and Geometry 3.0: Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.
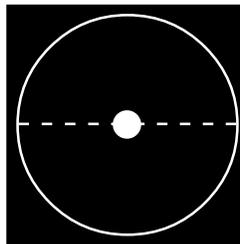
MG 3.2: Students identify the radius and diameter of a circle.

a.   In the circle below, draw a radius:

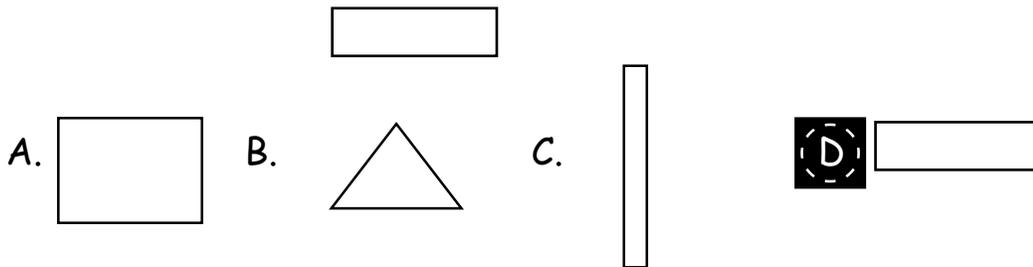Here is one example.

b.   In the circle below, draw a diameter:

Here is one example.

Measurement and Geometry 3.0: Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.

MG 3.3: Students identify congruent figures.

Write the letter of the figure that is congruent with this figure:
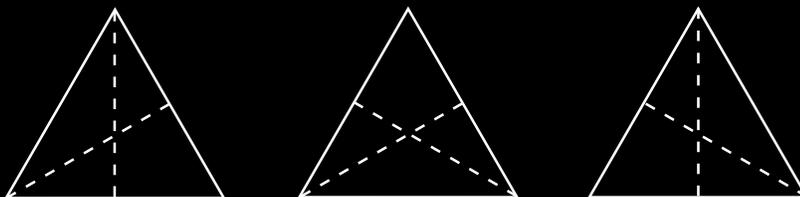
A.   B. △   C.   D.

Measurement and Geometry 3.0: Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.

MG 3.4: Students identify figures that have bilateral and rotational symmetry.

Draw two lines of symmetry
through the equilateral triangle.
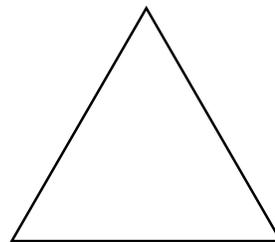
There are three lines of symmetry. Here are the possible
combinations of two lines of symmetry:

Measurement and Geometry 3.0: Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.

MG 3.5: Students know the definitions of a right angle, an acute angle, and an obtuse angle; understand that 90°, 180°, 270° and 360° are associated, respectively, with ¼, ½, ¾, and full turns.

a.   An angle of less than 90 degrees is:

___ a right angle.

X an acute angle.

___ an obtuse angle.

b.   An angle of 1/4 turn is:

X   90°

___   180°

___   270°

___   360°

Measurement and Geometry 3.0: Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.

MG 3.6: Students visualize, describe, and make models of geometric solids (e.g., prisms, pyramids) in terms of the number and shape of faces, edges, and vertices; interpret two-dimensional representations of three-dimensional objects; and draw patterns (of faces) for a solid that, when cut and folded, will make a model of the solid.
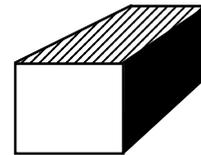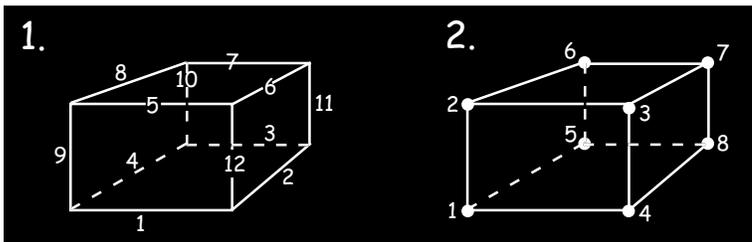
a.

1. How many edges does a rectangular prism have? **12**

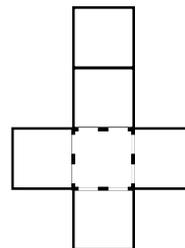2. How many vertices does a rectangular prism have? **8**

b.

When this flat figure is folded to make a three-dimensional figure, the shape will be a:

X cube

___ pyramid

___ cylinder

Measurement and Geometry 3.0: Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.

MG 3.7: Students know the definitions of different triangles (e.g., equilateral, isosceles, scalene) and identify their attributes.

A.

B.

C.
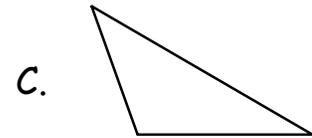
Match the name with the triangle

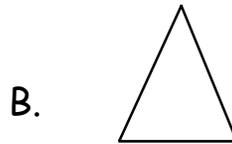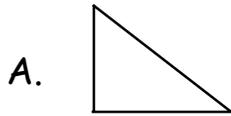|	
Scalene	C
Isoceles	B
Right	A

Answer Key For The California Mathematics Standards
Grade 4

Measurement and Geometry 3.0: Students demonstrate an understanding of plane and solid geometric objects and use this knowledge to show relationships and solve problems.

MG 3.8: Students know the definition of different quadrilaterals (e.g., rhombus, square, rectangle, parallelogram, trapezoid.

Mark each statement as true or false. Explain your answer:

a.   All squares are rectangles: **X** T   ___ F

   A square is a rectangle with all sides congruent.

b.   All rectangles are squares: ___ T   **X** F

   Not all rectangles have all sides congruent.

c.   All parallelograms are rectangles: ___ T   **X** F

   A parallelogram does not have to have all angles congruent.

d.   Every rhombus is a parallelogram: **X** T   ___ F

   A rhombus is a parallelogram with all sides congruent.

e.   All parallelograms are squares: ___ T   **X** F
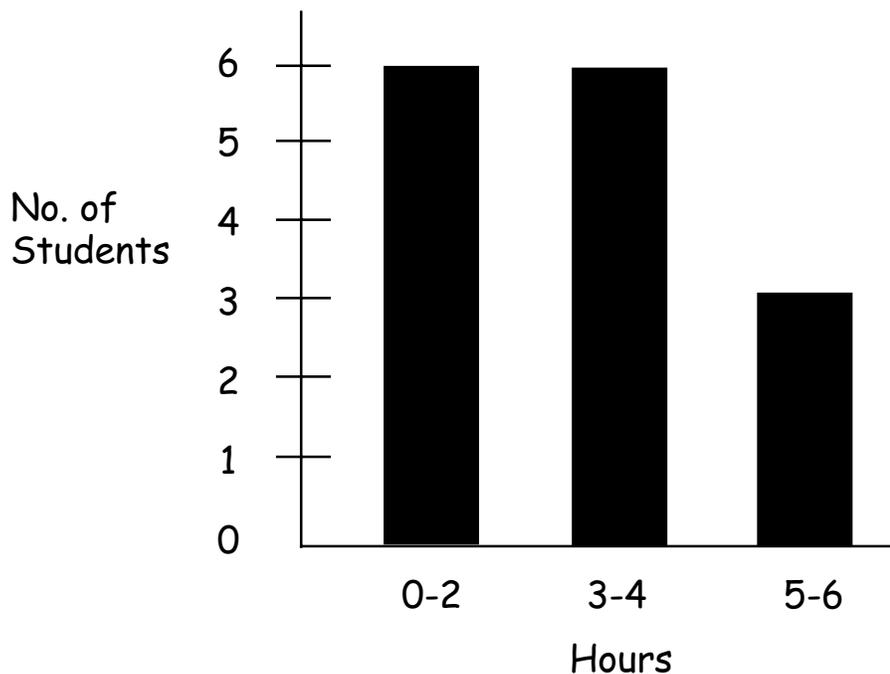
   Parallelograms do not have to have all sides congruent.

Statistics, Data Analysis, and Probability 1.0: Students organize, represent, and interpret numerical and categorical data and clearly communicate their findings.

S 1.1: Students formulate survey questions; systematically collect and represent data on a number line; and coordinate graphs, tables, and charts.

These are the number of hours students did homework over the weekend. Draw a bar graph to summarize the information.

student	AR	JC	MT	FR	GS	TB	LM	SG	RT	AL	JS	DC	GN	CL	JN
hours	4	5	4	5	4	2	1	4	0	2	5	4	3	2	1

No. of Students

6 —
5 —
4 —
3 —
2 —
1 —
0

0-2   3-4   5-6

Hours

0-2	3-4	5-6	Tally the hours. Then
卌 I	卌 I	III	construct a bar graph.

Statistics, Data Analysis, and Probability 1.0: Students organize, represent, and interpret numerical and categorical data and clearly communicate their findings.

S 1.2: Students identify the mode(s) for sets of categorical data and the mode(s), median, and any apparent outliers for numerical data sets.

Here are Jason's scores on tests this term:

82   78   77   82   81

a. What is the median score?   81

b. What is the mode score?   82

Statistics, Data Analysis, and Probability 1.0: Students organize, represent, and interpret numerical and categorical data and clearly communicate their findings.

S 1.3: Students interpret one- and two-variable data graphs to answer questions about a situation.

Bill's Work in
School and at Home

■ = hours of school work
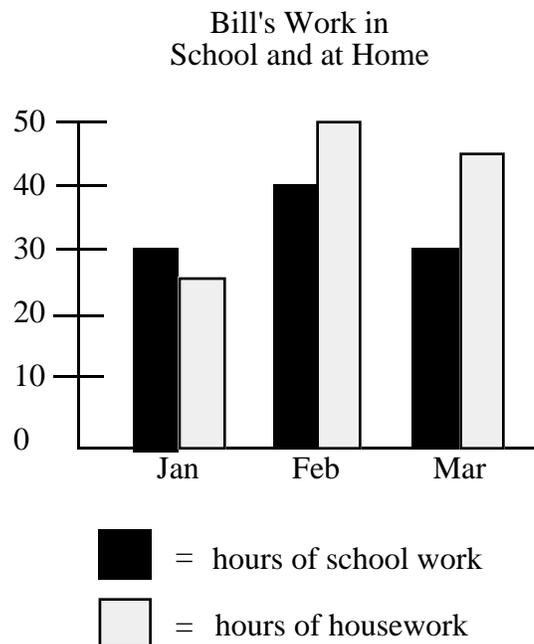
□ = hours of housework

a. How many hours of school work did Bill do in February?

40

b. In which month did Bill do more school work than housework?

January

Statistics, Data Analysis, and Probability 2.0: Students make predictions for simple probability situations.

S 2.1: Students represent all possible outcomes for a simple probability situation in an organized way (e.g., tables, grids, tree diagrams).

Bill flips a coin and tosses a die. List all the possible outcomes.

Make a chart or tree diagram

Coin	Die
H	1
H	2
H	3
H	4
H	5
H	6

Coin	Die
T	1
T	2
T	3
T	4
T	5
T	6

OR

Statistics, data analysis, and probability 2.0: Students make predictions for simple probability situations.

S 2.2: Students express outcomes of experimental probability situations verbally and numerically (e.g., 3 out of 4;   ).

Jason tossed a coin repeatedly. Heads resulted from 32 of the tosses. Tails resulted from 37 of the tosses. Write a fraction for the ratio of heads to coin tosses.

$$\frac{heads}{all\ tosses} = \frac{32}{heads + tails} = \frac{32}{32 + 37} = \frac{32}{69}$$