

Assessment For The California Mathematics Standards Grade 6

Introduction: Summary of Goals

GRADE SIX

By the end of grade six, students have mastered the four arithmetic operations with whole numbers, positive fractions, positive decimals, and positive and negative integers; they accurately compute and solve problems. They apply their knowledge to statistics and probability. Students understand the concepts of mean, median, and mode of data sets and how to calculate the range. They analyze data and sampling processes for possible bias and misleading conclusions they use addition and multiplication of fractions routinely to calculate the probabilities for compound events. Students conceptually understand and work with ratios and proportions; they compute percentages (e.g., tax, tips, and interest). Students know about π and the formulas for the circumference and area of a circle. They use letters for numbers in formulas involving geometric shapes and in ratios to represent an unknown part of an expression. They solve one-step linear equations.

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Number Sense

NS 1.1

- a. After each number, write the letter that corresponds to the place it would be on the number line:

$$\frac{-13}{10} \quad \underline{\hspace{2cm}}$$

$$1.8 \quad \underline{\hspace{2cm}}$$

$$-0.5 \quad \underline{\hspace{2cm}}$$

$$0.6 \quad \underline{\hspace{2cm}}$$

$$2.40 \quad \underline{\hspace{2cm}}$$

$$-2.4 \quad \underline{\hspace{2cm}}$$

F

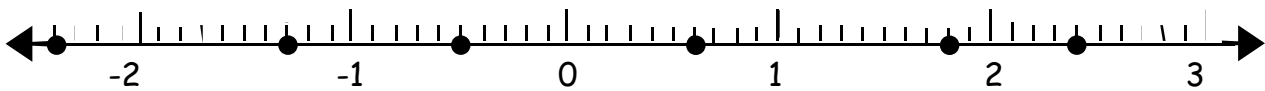
B

D

A

E

C



- b. List these values from lowest to highest: 2.3, -1.3, 1.8, -0.2

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NS 1.2

- a. Write the following:
1. The ratio of tricycles to tricycle wheels: _____
 2. The ratio of hands to fingers: _____
- b. If there are 6 tricycle wheels, how many tricycles are there? _____
- c. If there are 45 fingers, how many hands are there? _____
- d. If the ratio of boys to girls on the team is 2:3 and there are 12 girls, how many boys are there? _____

NS 1.3

a. Solve for n : $\frac{8}{12} = \frac{n}{3}$ $n = \underline{\quad}$

b. Solve for n : $\frac{5}{6} = \frac{n}{12}$ $n = \underline{\quad}$

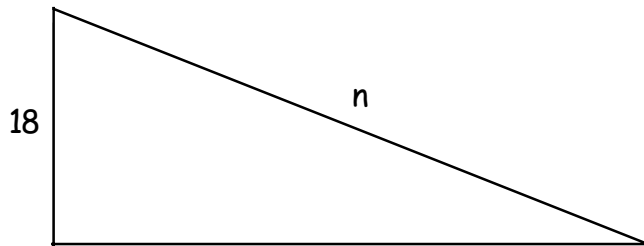
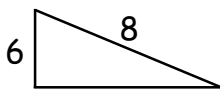
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NS 1.3

- c. Make a proportion and solve for the unknown.

A car went 70 miles in 4 hours. If it continues going the same speed, how long will it take to go 175 miles? _____

- d. Here are two triangles whose corresponding sides are in proportion (i.e., the triangles are similar).



Find n , the length of the longest side in the larger triangle. $n =$ _____

- e. Joe can type 11 words in 8 seconds. At this rate, how many words can he type in two minutes? _____

- f. We made a bowl of punch using lemonade and soda pop. The ratio of lemonade to soda pop is 2:3. If there are 25 gallons of punch, how much lemonade is needed? _____ gallons.

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NS 1.4

- a. A coat usually costs \$45. During a sale, its price was reduced 20%.
What is the price during the sale? _____

- b. A car cost \$12,000. During a sale, it will cost only \$10,920
What percent was the price reduced? _____

- c. A meal cost \$15. We gave the waiter \$18 and told him that the
difference was his tip. What percent of the cost of the meal was the
tip we gave? _____

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NS 2.1

Calculate and reduce to lowest terms:

a. $3\frac{5}{12} + 2\frac{1}{2} + 3\frac{4}{15} =$ _____

b. $124 \div 3\frac{1}{2} =$ _____

c. $9\frac{2}{3} - 4\frac{1}{2} =$ _____

NS 2.2

a. Half of the children in our school watch television every night. Three-fourths of those children watch for more than an hour. What fraction of the total children watch for more than an hour a night? _____

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[CONTINUED]

NS 2.2

b. A fraction $\frac{m}{n}$ satisfies the equation $\frac{m}{n} \times \frac{3}{5} = \frac{138}{415}$

Find $\frac{138}{415} \div \frac{m}{n} =$ _____

It is not necessary to solve $\frac{m}{n}$.

NS 2.3

Find integer solutions:

a. $-16(-8 + 9) =$ _____

b. $(-8)(-4)(12) =$ _____

c. $-20 \div 5 =$ _____

d. $-12 + (3 + 6) =$ _____

e. In Alaska the temperature was -15°F in the morning; by noon the temperature had increased by 20°F ; by 9:00 p.m. the temperature had dropped 30°F . What temperature was it at 9:00 p.m.? _____

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NS 2.4

a. Reduce to lowest common terms:

$$\frac{96}{128} = \underline{\hspace{2cm}}$$

b. What is the least common multiple of 12 and 15?

Algebra and Functions

AF 1.1

$y + 4 = 10$. What is y ?

AF 1.2

a. Write the following as algebraic expressions

(let n be some number):

1. a number increased by 33:
2. The product of a number and (-7) :
3. 8 decreased by some number:
4. Some number squared divided by 7:

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[CONTINUED]

AF 1.2

b. If $n = 2$, evaluate:

$$(-5)n + n^2 =$$

c. $x = 3$ $y = 4$ $z = 5$

Evaluate: $2x + 3y + z^2 =$ _____

AF 1.3

a. Evaluate the following expressions, showing each step.

1. $5(3 + 7) - 2$

2. $5 + 3 \times 7$

b. Justify each of the following equations using one of: the commutative property of addition, the commutative property of multiplication, the associative property of addition, the associative property of multiplication or the distributive property.

1. $3(4 \times 5) = (3 \times 4) 5$ _____

2. $3 \times 7 = 7 \times 3$ _____

3. $5 + (2 + 1) = (5 + 2) + 1$ _____

4. $5(6 + 4) = 5 \times 6 + 5 \times 4$ _____

5. $3 + 7 = 7 + 3$ _____

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AF 1.4

Evaluate the following expressions, showing each step.

a. $\frac{4(12 - 3^2)}{6} =$ _____

b. $2(4 + 8) \times 6(8 - 3) =$ _____

AF 2.1

a. How many hours are there in 7 days? _____

b. How many centimeters are there in 5 inches? _____

[1 inch = 2.54 cm]

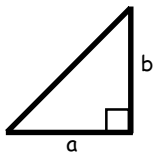
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AF 2.2
2.3

- a. Marcus took a train from San Francisco to San Jose, which is a distance of 54 miles. The train took 45 minutes for the trip. What was the average speed of the train expressed in miles per hour?
- b. At 8:00 a.m. the temperature was 40°F . At 3:00 p.m. the temperature was 75°F . What was the average temperature change per hour?

AF 3.1

What is the area of the triangle below; express the answer algebraically:



AF 3.2

A rectangle has width w . Its length is one more than 3 times its width. Find the perimeter of the rectangle.
(Your answer will be expressed in terms of w .)

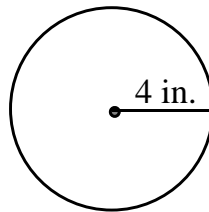
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Measurement and Geometry

MG 1.1

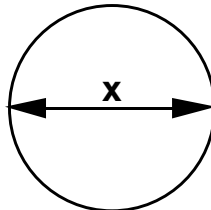
Give exact answers to these questions.

- a. What is the circumference of this circle? _____
- b. What is the area of this circle? _____



MG 1.2

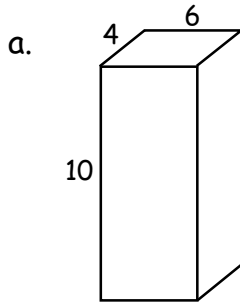
How many segments "x" will fit on the circumference of this circle?
Express your answer to the nearest hundredth. _____

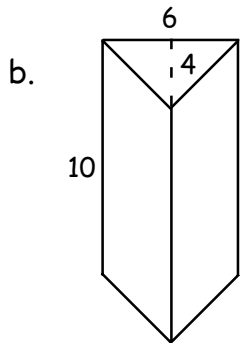


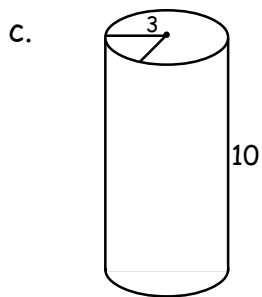
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MG 1.3

Find the volumes (dimensions are cm):





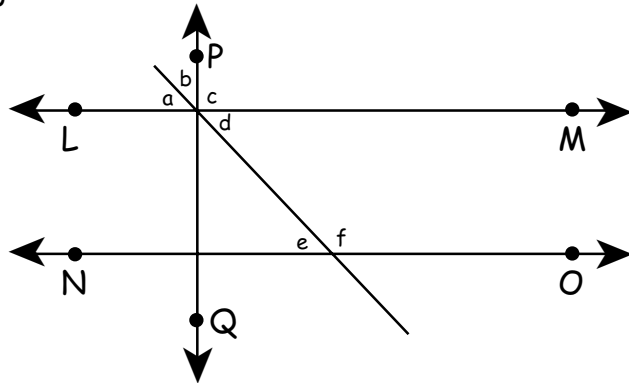


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MG 2.1

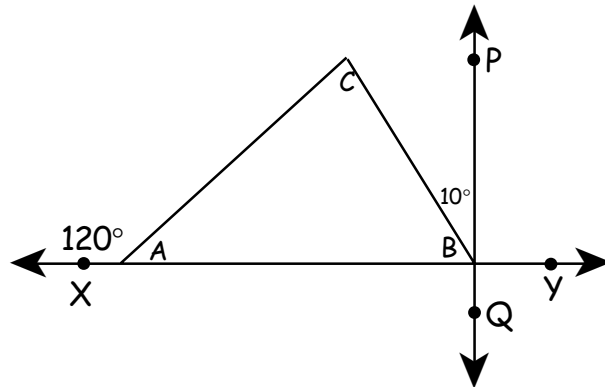
Line LM is parallel to Line NO. Line PQ is perpendicular to line LM and line NO.

- Identify the complimentary angles _____
- Identify ONE pair of supplementary angles _____
- Identify a pair of vertical angles



MG 2.2

Line PQ is perpendicular to line XY.



- How many degrees in angle A? _____
- How many degrees in angle B? _____
- How many degrees in angle C? _____

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MG 2.3

a. Draw a quadrilateral that has equal sides and no right angles:

b. Draw an obtuse, scalene triangle:

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S 1.1

Statistics, Data Analysis, and Probability

Below are the test scores of nine students on the science test:

50 50 50 50 51 89 90 90 90

a. What is the mean score? _____

b. What is the median score? _____

c. What is the mode? _____

d. What is the range? _____

S 1.2
1.3

If a tenth student in the class above scored only a 10 on the test, would that increase, decrease, or leave unchanged the mean score? _____

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S 1.4

The annual incomes for employees at Unfair, Inc. are \$20,000, \$30,000, \$32,000 and \$2,525,627. Which of the median or mean income would *best* characterize the income of a typical employee at Unfair, Inc.? _____

S 2.1

I have seven friends who are on the football team with me. I'll ask them what kind of music they like. This information will help me find out what kind of music the students in our school like best. What is wrong with the last statement?

S 2.2

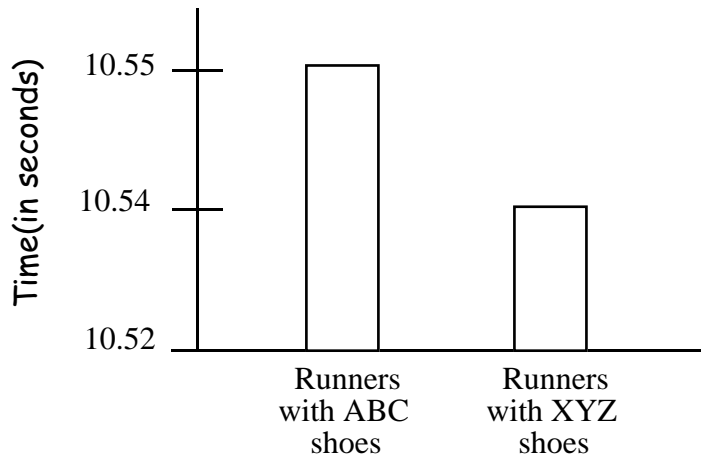
You don't have time to ask all the students in your school about music. Which method of sampling would work best to help you? _____

- A) Ask your friends
- B) Ask the best dressed students
- C) Randomly select names from a list of students

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S 2.3

Time to run 100 meters:



Explain how a conclusion from these data might be influenced by the way the data are presented.

S 2.4

A group of people were given a survey about the importance of health care for the elderly. The table below lists the percentages of people surveyed in different age groups. For example, 18% of the people surveyed were between 14 and 23 years of age.

Percent:	18%	30%	30%	18%	2%	2%
Ages:	14-23	24-33	34-43	44-53	54-63	64-73

Why might the sample be biased?

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S 2.5

Refer to the data from the previous question. A survey using that sample found that health care for older people is not very important to the American people. How valid is that claim? Explain your answer.

S 3.1

a. Represent all possible outcomes of flipping one coin and rolling one six-sided die. Label your representation clearly.

b. What is the probability of each outcome in item a? Express your answer as both a fraction and a decimal rounded to the nearest thousandth.

Fraction _____

Decimal _____

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S 3.1
cont.

c. A man has 3 shirts and 2 ties. Make a tree diagram to show all possible ways of choosing a shirt and tie.

d. Assume the man in item c has no preference for specific shirt-and-tie combinations, and all his shirts and ties are available. What is the probability of each possibility in item c?

Express your answer as a fraction. _____

e. Make an organized list of all possible outcomes for flipping a penny, a dime, and quarter.

	Penny	Dime	Quarter

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S 3.2

A basketball player took 25 shots at the basket. He made 12 of the shots. If he keeps shooting at the same rate, how many shots will he make if he takes 300 shots? _____

S 3.3

a. 1. You have two dice. If you throw the dice at the same time, you might have one of many possible combinations. List all those possible combinations:

2. What chance do you have of getting a total of 7 dots showing for the two dice? Express the answer as a percent: _____

b. Use p to represent your answer to part a. What is the probability that you do NOT get a total of 7 dots showing for the two dice? _____

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S 3.4

An oil prospecting firm plans to drill two exploratory wells. Past data is used to assess the following possible outcomes:

	<u>Probability</u>
• Neither well produces oil or gas.	.80
• Exactly one of the wells produces oil or gas	.18
• Both wells produce oil or gas	.02

a. What is the probability that at least one well will produce oil or gas?

b. What is the probability that neither well will produce oil or gas?

c. What is the probability that at most one will produce oil or gas?

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S 3.5

a. What is the probability of tossing a die and observing an even number on the upper face of the die? _____

b. A person is blindfolded and asked to draw an object from a bag. In the bag are 2 red balls and 3 green balls. After each draw the chosen ball's color is recorded and it is returned to the bag.

Are subsequent draws dependent or independent of the first draw?

c. If a green ball is picked on the first draw (and returned to the bag), what is the probability of picking a red ball on the second draw?

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S 3.5

[CONTINUED]

- e. Consider a situation where the set of objects in the bag is the same (2 red balls, 3 green balls), but after an object is drawn and its color is recorded it is not returned to the bag.

Are results of subsequent draws dependent or independent of the first draw?

- f. If a green ball is picked on the first draw (and not returned to the bag), what is the probability of picking a red ball on the second draw?
