

**Texas Assessment of Knowledge
and Skills
(TAKS)**

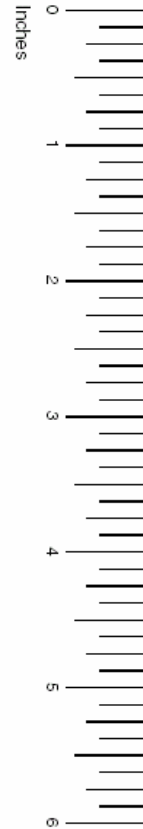
7th Grade

Grade 7

Mathematics Chart



LENGTH	
Metric	Customary
1 kilometer = 1000 meters	1 mile = 1760 yards
1 meter = 100 centimeters	1 mile = 5280 feet
1 centimeter = 10 millimeters	1 yard = 3 feet
	1 foot = 12 inches
CAPACITY AND VOLUME	
Metric	Customary
1 liter = 1000 milliliters	1 gallon = 4 quarts
	1 gallon = 128 ounces
	1 quart = 2 pints
	1 pint = 2 cups
	1 cup = 8 ounces
MASS AND WEIGHT	
Metric	Customary
1 kilogram = 1000 grams	1 ton = 2000 pounds
1 gram = 1000 milligrams	1 pound = 16 ounces
TIME	
1 year = 365 days	
1 year = 12 months	
1 year = 52 weeks	
1 week = 7 days	
1 day = 24 hours	
1 hour = 60 minutes	
1 minute = 60 seconds	



Continued on other side

Grade 7 Mathematics Chart

Perimeter	square	$P = 4s$
	rectangle	$P = 2l + 2w$ or $P = 2(l + w)$
Circumference	circle	$C = 2\pi r$ or $C = \pi d$
Area	square	$A = s^2$
	rectangle	$A = lw$ or $A = bh$
	triangle	$A = \frac{1}{2}bh$ or $A = \frac{bh}{2}$
	trapezoid	$A = \frac{1}{2}(b_1 + b_2)h$ or $A = \frac{(b_1 + b_2)h}{2}$
	circle	$A = \pi r^2$
Volume	cube	$V = s^3$
	rectangular prism	$V = lwh$ or $V = Bh^*$
	cylinder	$V = \pi r^2 h$ or $V = Bh^*$
<i>*B represents the area of the Base of a solid figure.</i>		
Pi	π	$\pi \approx 3.14$ or $\pi = \frac{22}{7}$

Grade 7 Mathematics
TAKS Objectives and TEKS Student Expectations

TAKS Objective 1

The student will demonstrate an understanding of numbers, operations, and quantitative reasoning.

- (7.1) **Number, operation, and quantitative reasoning.** The student represents and uses numbers in a variety of equivalent forms. The student is expected to
- (A) compare and order integers and positive rational numbers;
 - (B) convert between fractions, decimals, whole numbers, and percents mentally, on paper, [or with a calculator]; and
 - (C) represent squares and square roots using geometric models.
- (7.2) **Number, operation, and quantitative reasoning.** The student adds, subtracts, multiplies, or divides to solve problems and justify solutions. The student is expected to
- (A) represent multiplication and division situations involving fractions and decimals with [concrete] models, pictures, words, and numbers;
 - (B) use addition, subtraction, multiplication, and division to solve problems involving fractions and decimals;
 - (C) use models to add, subtract, multiply, and divide integers and connect the actions to algorithms;
 - (D) use division to find unit rates and ratios in proportional relationships such as speed, density, price, recipes, and student-teacher ratio;
 - (E) simplify numerical expressions involving order of operations and exponents;
 - (F) select and use appropriate operations to solve problems and justify the selections; and
 - (G) determine the reasonableness of a solution to a problem.

Objective I—For Your Information

At the seventh grade, students should be able to:

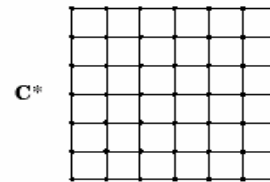
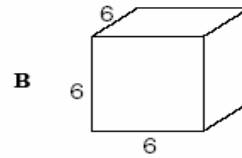
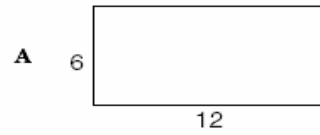
- ◆ Round numbers before performing any computations when estimating (the use of compatible numbers may be necessary); and
- ◆ Use information given in the form of numbers or ranges of numbers when working problems.

Objective 1 Sample Items

1 Identify the group that does NOT contain equivalent fractions, decimals, and percents.

- A $\frac{1}{20}$, 0.05, 5%
- B $\frac{7}{10}$, 0.7, 70%
- C $\frac{1}{8}$, 0.125, 12.5%
- D* $\frac{3}{100}$, 0.3, 3%

2 Which of these best represents 6^2 ?



3 Raúl works at Planoville Music Store. He earns a 10% commission on each guitar and a 15% commission on each keyboard he sells. In two weeks he sold 5 guitars that cost \$260 each and 2 keyboards that cost \$420 each. How much commission did he earn on these seven items?

Record your answer and fill in the bubbles on your answer document. Be sure to use the correct place value.

	2	5	6	.		
0	0	0	0		0	0
1	1	1	1		1	1
2	<input checked="" type="radio"/>	2	2		2	2
3	3	3	3		3	3
4	4	4	4		4	4
5	5	<input checked="" type="radio"/>	5		5	5
6	6	6	<input checked="" type="radio"/>		6	6
7	7	7	7		7	7
8	8	8	8		8	8
9	9	9	9		9	9

This item specifically asks for an answer in money. On griddable items, students do not grid dollar signs. The correct answer is 256. It is acceptable, although not necessary, to bubble in the zeros in front of the two and/or after the decimal. These zeros will not affect the value of the correct answer.

TAKS Objective 2

The student will demonstrate an understanding of patterns, relationships, and algebraic reasoning.

- (7.3) **Patterns, relationships, and algebraic thinking.** The student solves problems involving proportional relationships. The student is expected to
- (A) estimate and find solutions to application problems involving percent; and
 - (B) estimate and find solutions to application problems involving proportional relationships such as similarity, scaling, unit costs, and related measurement units.
- (7.4) **Patterns, relationships, and algebraic thinking.** The student represents a relationship in numerical, geometric, verbal, and symbolic form. The student is expected to
- (A) generate formulas involving conversions, perimeter, area, circumference, volume, and scaling;
 - (B) graph data to demonstrate relationships in familiar concepts such as conversions, perimeter, area, circumference, volume, and scaling; and
 - (C) describe the relationship between the terms in a sequence and their positions in the sequence.
- (7.5) **Patterns, relationships, and algebraic thinking.** The student uses equations to solve problems. The student is expected to
- (A) use [concrete] models to solve equations and use symbols to record the actions; and
 - (B) formulate a possible problem situation when given a simple equation.

Objective 2—For Your Information

At the seventh grade, students should be able to:

- ◆ Match a description of a proportional situation with a ratio, which may or may not be expressed in lowest terms;
- ◆ Write an expression to find the n th term where n represents the position of the term in the sequence;
- ◆ Identify the expression when given terms in a sequence, and vice versa;
- ◆ Match a relationship represented by an equation or written description with the same relationship shown in pairs of numbers; and
- ◆ Generate and/or match an equation with a solution strategy for an application situation.

Objective 2 Sample Items

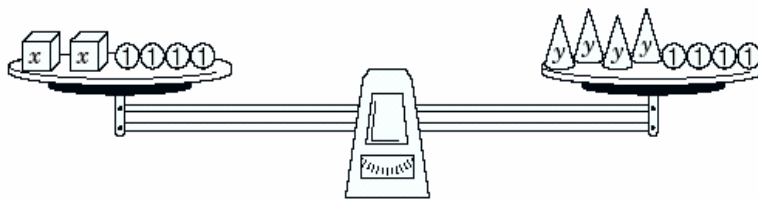
- 1 Which expression can be used to find the n th term in this sequence?

9

- 3 Which problem situation matches the equation below?

$$\frac{(80 + 90 + 88 + 100 + x)}{5} = 90$$

- 2 The model represents the equation $2x + 4 = 4y + 4$.



What is the value of x ?

- A* $x = 2y$
- B $x = 4y$
- C $x = 2y + 4$
- D $x = 4y + 8$

Students should begin working with models in equations by removing equivalent values from each side of the scale to maintain the balance. For this test item, when one side of the scale has 2 x 's and the other side has 4 y 's, the students must equally divide the y 's to find the value of 1 x .

TAKS Objective 3

The student will demonstrate an understanding of geometry and spatial reasoning.

(7.6) **Geometry and spatial reasoning.** The student compares and classifies shapes and solids using geometric vocabulary and properties. The student is expected to

(A) use angle measurements to classify pairs of angles as complementary or supplementary;

(B) use properties to classify shapes including triangles, quadrilaterals, pentagons, and circles;

(C) use properties to classify solids, including pyramids, cones, prisms, and cylinders; and

(D) use critical attributes to define similarity.

(7.7) **Geometry and spatial reasoning.** The student uses coordinate geometry to describe location on a plane. The student is expected to

(A) locate and name points on a coordinate plane using ordered pairs of integers; and

(B) graph translations on a coordinate plane.

(7.8) **Geometry and spatial reasoning.** The student uses geometry to model and describe the physical world. The student is expected to

(A) sketch a solid when given the top, side, and front views;

(B) make a net (two-dimensional model) of the surface area of a solid; and

(C) use geometric concepts and properties to solve problems in fields such as art and architecture.

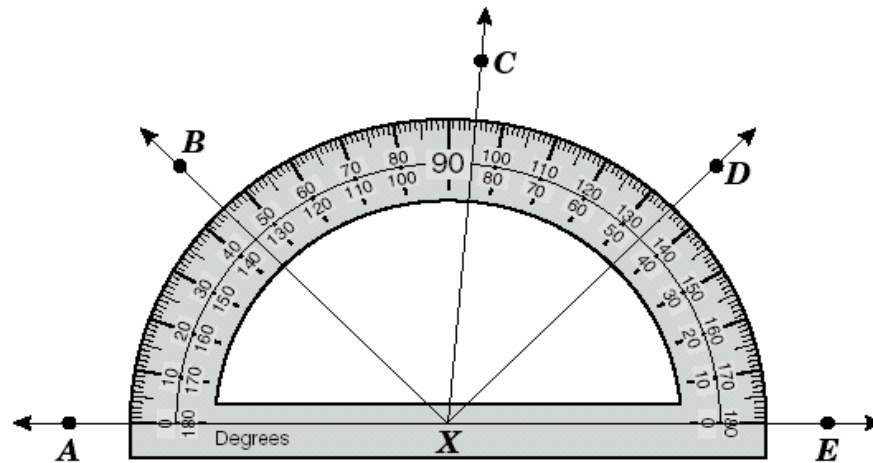
Objective 3—For Your Information

At the seventh grade, students should be able to:

- ◆ Use formal geometric terms correctly;
- ◆ Identify geometric models presented as a simple figure or as part of a more-complex figure; and
- ◆ Graph points on coordinate grids using all four quadrants.

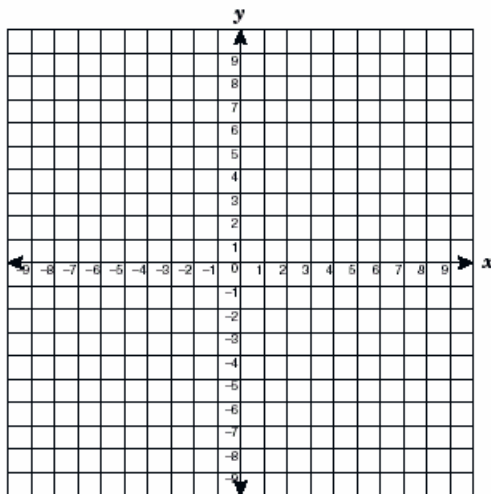
Objective 3 Sample Items

- 1 Use the protractor in the diagram to read the measure of each angle.



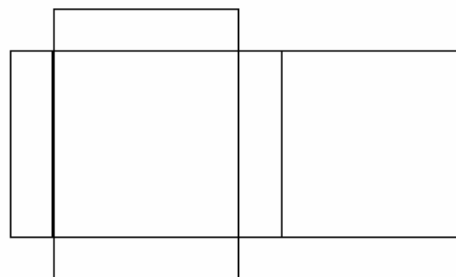
The complementary angles are —

- A $\angle DXE$ and $\angle BXC$
 - B $\angle AXC$ and $\angle CXE$
 - C* $\angle DXE$ and $\angle AXB$
 - D $\angle CXD$ and $\angle AXB$
- 2 Angela wants to translate polygon $ABCD$ so that vertex D is moved from coordinates $(3, 2)$ to coordinates $(-3, -1)$. Identify the steps that can be used for the translation.



- A* Move each vertex 6 units to the left and 3 units down
- B Move each vertex 6 units down and 3 units to the left
- C Move each vertex 3 units down and 1 unit to the left
- D Move each vertex 6 units to the left and 1 unit down

- 3 Identify the three-dimensional figure that can be formed from this net.



- A A cube
- B A rectangular pyramid
- C A triangular prism
- D* A rectangular prism

TAKS Objective 4

The student will demonstrate an understanding of the concepts and uses of measurement.

(7.9) **Measurement.** The student solves application problems involving estimation and measurement. The student is expected to

(A) estimate measurements and solve application problems involving length (including perimeter and circumference), area, and volume.

Objective 4—For Your Information

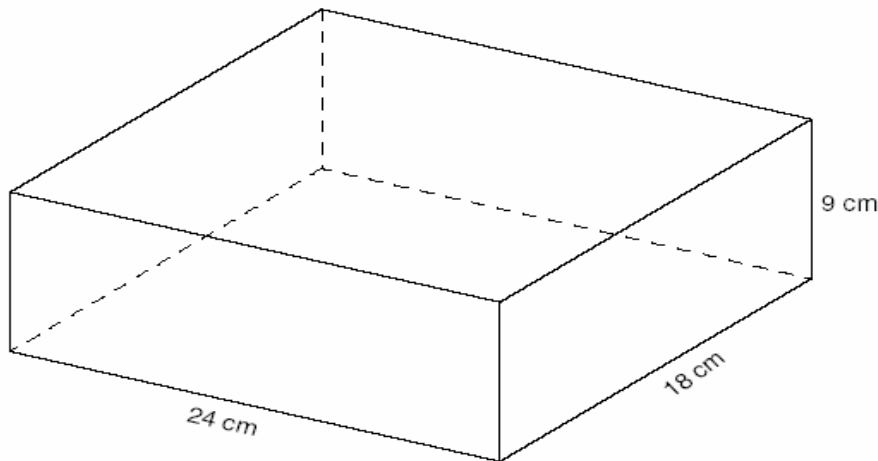
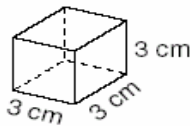
At the seventh grade, students should be able to:

At the seventh grade, students should be able to:

- ◆ Measure with the ruler on the Mathematics Chart **only if** the item specifically instructs students to use the ruler; and
- ◆ Use the given measurements of a figure to solve problems.

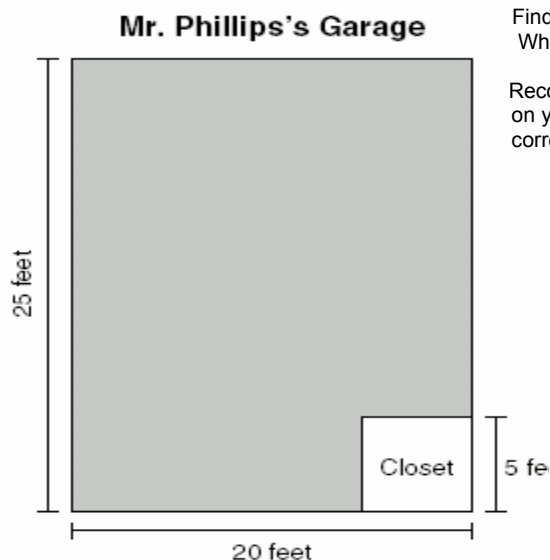
Objective 4 Sample Items

- 1 Find the exact number of cubes measuring 3 centimeters on an edge that will fill a box shaped like a rectangular prism that measures 24 centimeters by 18 centimeters by 9 centimeters.



- A 48 cubes
- B* 144 cubes
- C 432 cubes
- D 1,296 cubes

2. Mr. Phillips plans to convert his rectangular garage into a bedroom. He plans to put carpet on the floor except on the square formed by the close.



Find the area, in square feet, of the floor on which he plans to put carpet.

Record your answer and fill in the bubbles on your answer document. Be sure to use correct place value.

	4	7	5	.		
0	0	0	0		0	0
1	1	1	1		1	1
2	2	2	2		2	2
3	3	3	3		3	3
4	●	4	4		4	4
5	5	5	●		5	5
6	6	6	6		6	6
7	7	●	7		7	7
8	8	8	8		8	8
9	9	9	9		9	9

This item specifically requests the area in square feet. On griddable items, students do not grid the units. The correct answer is 475. It is acceptable, although not necessary, to bubble in the zeros in form of the four and/or after the decimal. These zeros will not affect the value of the correct answer.

TAKS Objective 5

The student will demonstrate an understanding of probability and statistics.

(7.10) **Probability and statistics.** The student recognizes that a physical or mathematical model can be used to describe the probability of real-life events. The student is expected to

(A) construct sample spaces for compound events (dependent and independent).

(7.11) **Probability and statistics.** The student understands that the way a set of data is displayed influences its interpretation. The student is expected to

(A) select and use an appropriate representation for presenting collected data and justify the selection; and

(B) make inferences and convincing arguments based on an analysis of given or collected data.

(7.12) **Probability and statistics.** The student uses measures of central tendency and range to describe a set of data. The student is expected to

(A) describe a set of data using mean, median, mode, and range; and

(B) choose among mean, median, mode, or range to describe a set of data and justify the choice for a particular situation.

Objective 5—For Your Information

At seventh grade, students should be able to:

- ◆ Match a situation with a sample space that lists all possible combinations or select the missing portion of a given sample space;

- ◆ Determine whether the graphical representation of the given data is appropriate and/or accurate;
- ◆ Understand and distinguish among mean, median, mode, and range to determine which is most appropriate for a particular purpose;
- ◆ Match the mean, median, mode, and/or range with a given data set, which may be listed in the text of the item or presented in graphical form; and
- ◆ Given an incomplete data set, identify the piece of missing data that will produce a target mean, median, mode, and/or range for the completed data set.

Objective 5 Sample Items

- 1 There are 3 red marbles, 3 blue marbles, and 1 green marble in a bag. A marble is drawn at random from the bag and not replaced. Then a second marble is drawn.

Which choice shows all possible outcomes?

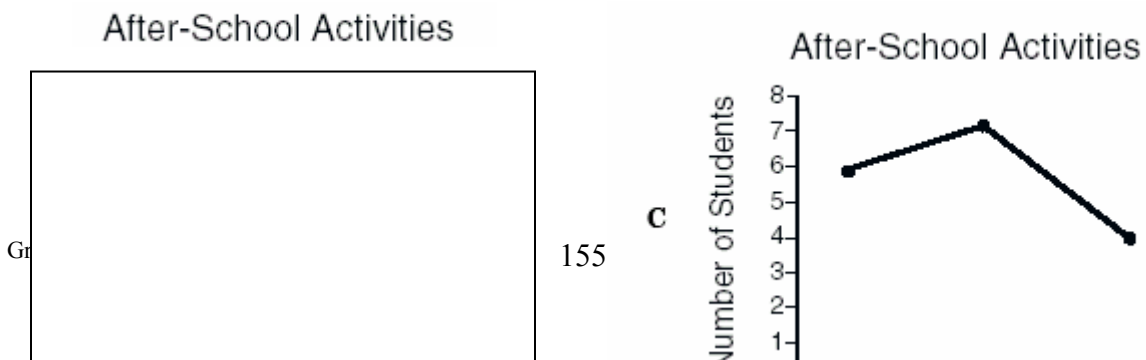
- A Red/blue, red/green, blue/red, blue/green, green/red, green/blue
- B Red/red, red/blue, red/green, blue/red, blue/blue, blue/green, green/red, green/blue, green/green
- C Red/blue, red/green, blue/red, blue/green, green/red, green/blue, green/green
- D* Red/red, red/blue, red/green, blue/red, blue/blue, blue/green, green/red, green/blue

- 2 Star Junior High offers sports, clubs, and tutoring after school. Darnell surveyed 12 students to find out how many of these activities each student participated in. The results of the survey are shown in the table.

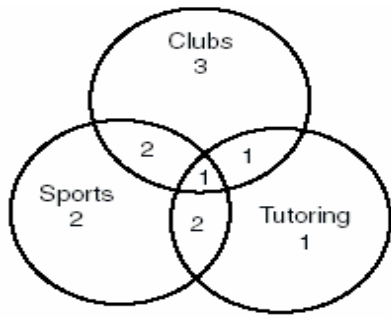
After-School Activities

Name	Activity		
	Sports	Clubs	Tutoring
Bob	✓		
Mary		✓	
Dan		✓	
Julio	✓	✓	
Cathy	✓		✓
Sara		✓	✓
Cindy	✓	✓	✓
Margarita		✓	
Ed	✓		
Maria	✓	✓	
George			✓
Shanda	✓		✓

Which graphic display best represents the data in the table?



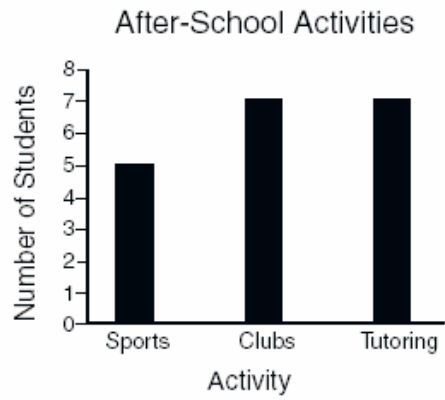
A *



B

Activity	Number of Students
Sports only	2
Clubs only	2
Tutoring only	1
Sports and clubs only	2
Sports and tutoring only	1
Clubs and tutoring only	1
Sports, clubs, and tutoring	3

D



- 3 Coach Reyna recorded the times of six of her runners in the 100-meter dash. The results are shown below.

Runner	Time (seconds)
L. Chávez	11.92
M. Hines	11.34
S. Williams	12.01
J. Smith	12.15
P. Madison	11.82
T. Montes	11.34

What is the range of the times and the median time for these six runners?

- A Range = 0.58 sec
Median = 12.08 sec
- B Range = 0.58 sec
Median = 11.34 sec
- C Range = 0.81 sec
Median = 11.76 sec
- D* Range = 0.81 sec
Median = 11.87 sec

TAKS Objective 6

The student will demonstrate an understanding of the mathematical processes and tools used in problem solving.

(7.13) **Underlying processes and mathematical tools.** The student applies Grade 7 mathematics to solve problems connected to everyday experiences, investigations in other disciplines, and activities in and outside of school. The student is expected to

(A) identify and apply mathematics to everyday experiences, to activities in and outside of school, with other disciplines, and with other mathematical topics;

(B) use a problem-solving model that incorporates understanding the problem, making a plan, carrying out the plan, and evaluating the solution for reasonableness; and

(C) select or develop an appropriate problem-solving strategy from a variety of different types, including drawing a picture, looking for a pattern, systematic guessing and checking, acting it out, making a table, working a simpler problem, or working backwards to solve a problem.

(7.14) Underlying processes and mathematical tools. The student communicates about Grade 7 mathematics through informal and mathematical language, representations, and models. The student is expected to

(A) communicate mathematical ideas using language, efficient tools, appropriate units, and graphical, numerical, physical, or algebraic mathematical models.

(7.15) Underlying processes and mathematical tools. The student uses logical reasoning to make conjectures and verify conclusions. The student is expected to

(A) make conjectures from patterns or sets of examples and nonexamples; and

(B) validate his/her conclusions using mathematical properties and relationships.

Objective 6—For Your Information

At the seventh grade, students should be able to:

- ◆ Select the description of a mathematical situation when provided a written or pictorial prompt;
- ◆ Identify the information that is needed to solve a problem;
- ◆ Select or describe the next step or a missing step that would be most appropriate in a problem-solving situation;
- ◆ Match informal language to mathematical language and/or symbols;
- ◆ Identify the question that is being asked or answered;
- ◆ Draw a conclusion by investigating patterns and/or sets of examples and non-examples, which can be defined as counterexamples; and
- ◆ Choose the correct supporting information for a given conclusion.

Objective 6 Sample Items

- 1 Identify the equation below that models $a^b \cdot a^c = a^{b+c}$.

A $3^2 \cdot 3^4 = 9^6$
B $3 + 3 + 3 + 3 + 3 + 3 = 3^6$
C $3 \cdot 3 + 3 \cdot 3 \cdot 3 \cdot 3 = 3^6$
D* $3^2 \cdot 3^4 = 3^6$

- 2 Manny made a rectangular garden in his backyard. The garden was 24 feet long and 10 feet wide. Manny used $\frac{1}{3}$ of the garden space to grow vegetables. He built a 3-foot-high fence around the garden to keep his dog out of the garden. Determine which of the following questions could NOT be answered with the information provided.

A What was the perimeter of the garden?
B What was the total area of the garden?
C* What was the volume of dirt in the garden?
D What was the area of space used for growing vegetables?

- 3 Mrs. Flores gave her seventh-grade math class two sets of numbers that were sorted according to a certain rule. The numbers that followed the rule were put in Set A, and the numbers that did not follow the rule were put in Set B.

Set A	34.23, 42.65, 430.17, 101.49, 1,635.09
Set B	216.1, 2.365, 2.2, 6,465, 949.508

Based on this information, all the numbers in Set A —

- A have exactly four non-zero digits
B include the digit 2
C have odd numbers in the ones place
D* are written to the hundredths place

In this item, Set A is a list of examples, and Set B is a list of nonexamples, or counterexamples.