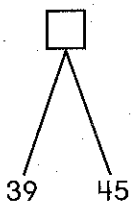
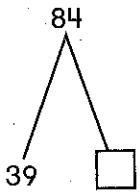
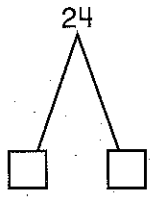
Problem Types

	Result Unknown	Change Unknown	Start Unknown
Add To	Aisha has 46 stamps in her collection. Then her grandfather gives her 29 stamps. How many stamps does she have now? *Situation and Solution Equation*[1]*:* $46 + 29 = \square$	Aisha has 46 stamps in her collection. Then her grandfather gives her some stamps. Now she has 75 stamps. How many stamps did her grandfather give her? *Situation Equation:* $46 + \square = 75$ *Solution Equation:* $\square = 75 - 46$	Aisha has some stamps in her collection. Then her grandfather gives her 29 stamps. Now she has 75 stamps. How many stamps did she have to start? *Situation Equation:* $\square + 29 = 75$ *Solution Equation:* $\square = 75 - 29$
Take From	A store has 43 bottles of water at the start of the day. During the day, the store sells 25 bottles. How many bottles do they have at the end of the day? *Situation and Solution Equation:* $43 - 25 = \square$	A store has 43 bottles of water at the start of the day. The store has 18 bottles left at the end of the day. How many bottles does the store sell? *Situation Equation:* $43 - \square = 18$ *Solution Equation:* $\square = 43 - 18$	A store sells 25 bottles of water during one day. At the end of the day 18 bottles are left. How many bottles did the store have at the beginning of the day? *Situation Equation:* $\square - 25 = 18$ *Solution Equation:* $\square = 25 + 18$

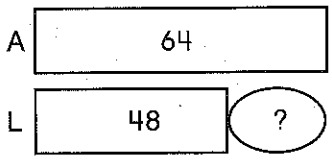
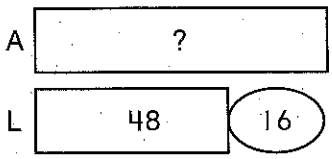
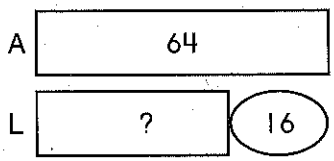
[1]A situation equation represents the structure (action) in the problem situation. A solution equation shows the operation used to find the answer.

Problem Types continued

Problem Types (continued)

	Total Unknown	Addend Unknown	Both Addends Unknown
Put Together/ Take Apart	A clothing store has 39 shirts with short sleeves and 45 shirts with long sleeves. How many shirts does the store have in all? *Math Drawing*[2]*:*  *Situation and Solution Equation:* $39 + 45 = \square$	Of the 84 shirts in a clothing store, 39 have short sleeves. The rest have long sleeves. How many shirts have long sleeves? *Math Drawing:*  *Situation Equation:* $84 = 39 + \square$ *Solution Equation:* $84 - 39 = \square$	Pam has 24 roses. How many can she put in her red vase and how many in her blue vase? *Math Drawing:*  *Situation Equation:* $24 = \square + \square$

[2]These math drawings are called Math Mountains in Grades 1–3 and break-apart drawings in Grades 4 and 5.

	Difference Unknown	Greater Unknown	Smaller Unknown
Compare[1]	Alex has 64 trading cards. Lucy has 48 trading cards. How many more trading cards does Alex have than Lucy? Lucy has 48 trading cards. Alex has 64 trading cards. How many fewer trading cards does Lucy have than Alex? *Math Drawing:*  *Situation Equation:* 48 + ☐ = 64 or ☐ = 64 − 48 *Solution Equation:* ☐ = 64 − 48	**Leading Language** Lucy has 48 trading cards. Alex has 16 more trading cards than Lucy. How many trading cards does Alex have? **Misleading Language** Lucy has 48 trading cards. Lucy has 16 fewer trading cards than Alex. How many trading cards does Alex have? *Math Drawing:*  *Situation and Solution Equation:* 48 + 16 = ☐	**Leading Language** Alex has 64 trading cards. Lucy has 16 fewer trading cards than Alex. How many trading cards does Lucy have? **Misleading Language** Alex has 64 trading cards. Alex has 16 more trading cards than Lucy. How many trading cards does Lucy have? *Math Drawing:*  *Situation Equation:* ☐ + 16 = 64 or ☐ = 64 − 16 *Solution Equation:* ☐ = 64 − 16

[1]A comparison sentence can always be said in two ways. One way uses *more*, and the other uses *fewer* or *less*. Misleading language suggests the wrong operation. For example, it says *Lucy has 16 fewer trading cards than Alex*, but you have to add 16 cards to the number of cards Lucy has to get the number of cards Alex has.

Glossary

5-groups


tens in 5-groups


ones in 5-groups

A

add

4 + 2 = 6

addend

5 + 6 = 11

addends

Adding Up Method (for Subtraction)

$$\begin{array}{r} 144 \\ -\ 68 \\ \hline 76 \end{array}$$

68 + 2 = 70
70 + 30 = 100
100 + 44 = 144

76

addition doubles

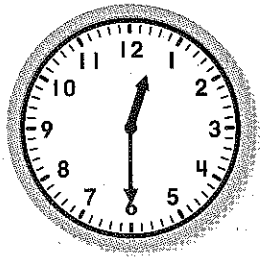
Both addends (or partners) are the same.

4 + 4 = 8

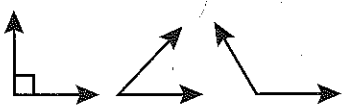
A.M.

Use A.M. for times between midnight and noon.

analog clock

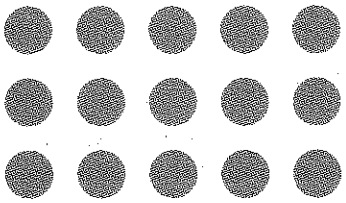


angle



These are angles.

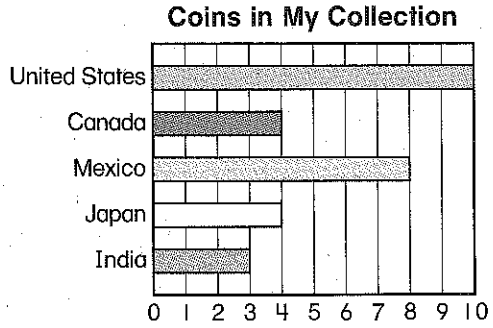
array



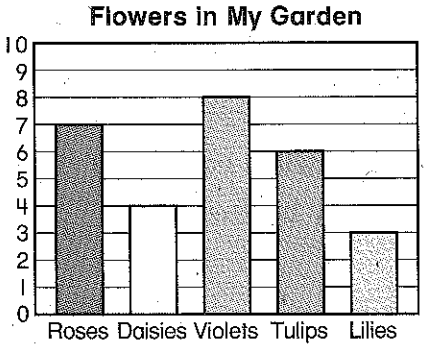
This rectangular array has 3 rows and 5 columns.

B

bar graph



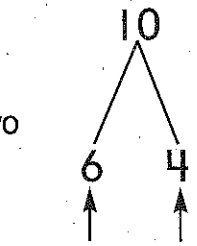
horizontal bar graph



vertical bar graph

break-apart

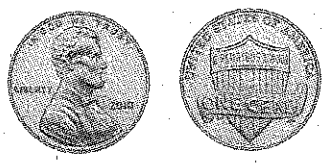
You can break apart a larger number to get two smaller amounts called break-aparts.



break-aparts of 10

C

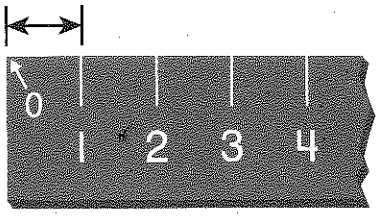
cent



front back

1 cent or 1¢ or $0.01

centimeter (cm)



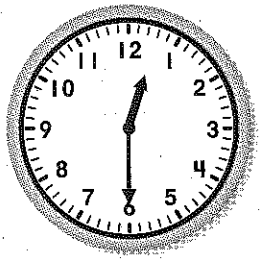
cent sign

56¢

cent sign

clock

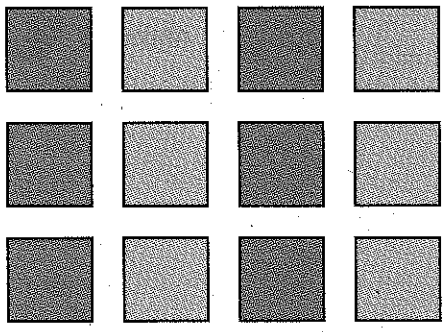
analog clock



digital clock

column

This rectangular array has 4 columns with 3 tiles in each column.



compare numbers

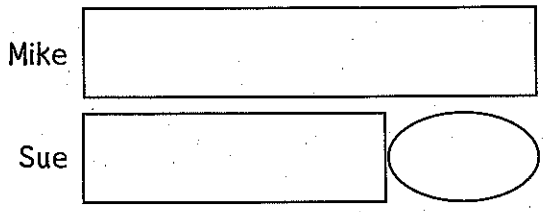
Compare numbers using >, <, or =.

$52 > 25$

$25 < 52$

$25 = 25$

comparison bars

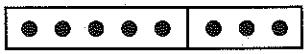


You can add labels and fill in numbers to help you solve *Compare* problems.

count all

$5 + 3 = \square$

1 2 3 4 5 6 7 8



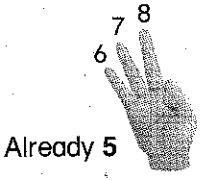
$5 + 3 = 8$

count on

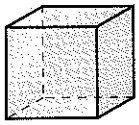
$5 + 3 = 8$

$5 + 3 = 8$

$8 - 5 = 3$



cube



D

data

	Sisters	Brothers
Kendra	2	1
Scott	2	0
Ida	0	1

data

The data in the table show how many sisters and how many brothers each child has.

decade numbers

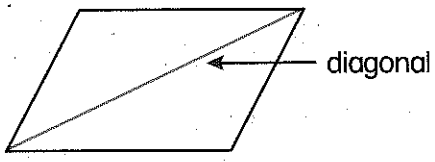
10, 20, 30, 40, 50, 60, 70, 80, 90

decimal point

$4.25

decimal point

diagonal



difference

$11 - 3 = 8$

$$\begin{array}{r} 11 \\ -\ 3 \\ \hline 8 \end{array}$$

difference → 8

digital clock

digits

0, 1, 2, 3, 4, 5, 6, 7, 8, 9

15 is a 2-digit number.

The 1 in 15 means 1 ten.

The 5 in 15 means 5 ones.

dime

front

back

10 cents or 10¢ or $0.10

dollar

100 cents or

100¢ or $1.00

front

back

dollar sign

$4.25

dollar sign

doubles minus 1

7 + 7 = 14, so

7 + 6 = 13, 1 less than 14.

doubles minus 2

7 + 7 = 14, so

7 + 5 = 12, 2 less than 14.

doubles plus 1

6 + 6 = 12, so

6 + 7 = 13, 1 more than 12.

doubles plus 2

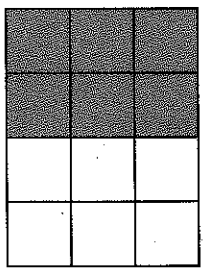
6 + 6 = 12, so

6 + 8 = 14, 2 more than 12.

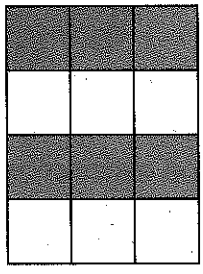
E

equal shares

2 halves



4 fourths



equal to (=)

$5 + 3 = 8$

5 plus 3 is equal to 8.

equation

$4 + 3 = 7$ $\quad 7 = 4 + 3$

$9 - 5 = 4$ $\quad 4 + 5 = 8 + 1$

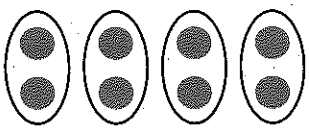
An equation must have an = sign.

equation chain

$3 + 4 = 5 + 2 = 8 - 1 = 7$

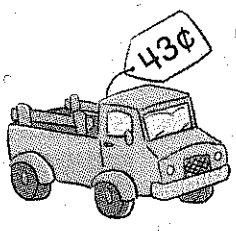
even number

A number is even if you can make groups of 2 and have none left over.



8 is an even number.

exact change



I will pay with 4 dimes and 3 pennies. That is the exact change. I won't get any money back.

expanded form

$283 = 200 + 80 + 3$

Expanded Method (for Addition)

$$\begin{array}{rcl} 78 & = & 70 + 8 \\ +\,57 & = & 50 + 7 \\ \hline & & 120 + 15 = 135 \end{array}$$

Expanded Method (for Subtraction)

$$\begin{array}{rcl} & & {\scriptstyle 50 \quad 14} \\ 64 & = & \cancel{60} + \cancel{4} \\ -\,28 & = & 20 + 8 \\ \hline & & 30 + 6 = 36 \end{array}$$

extra information

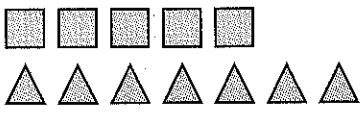
Franny has 8 kittens and 2 dogs. 4 kittens are asleep. How many kittens are awake?

$8 - 4 = \boxed{4}$

The number of dogs is extra information. It is not needed to solve the problem.

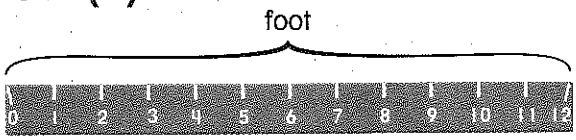
F

fewer



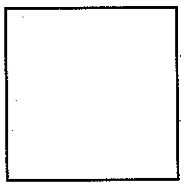
There are fewer □ than △.

foot (ft)

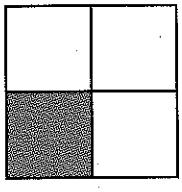


12 inches = 1 foot (not drawn to scale)

fourth



square



The picture shows 4 fourths. A fourth of the square is shaded.

G

greater than (>)

34 > 25

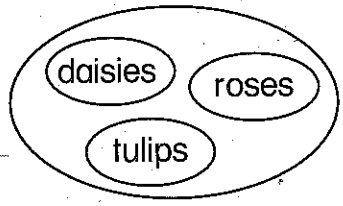
34 is greater than 25.

greatest

25 41 63

63 is the greatest number.

group name

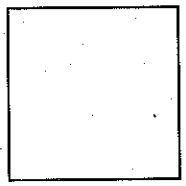


flowers

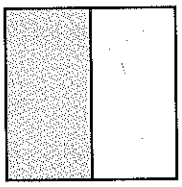
group name

H

half

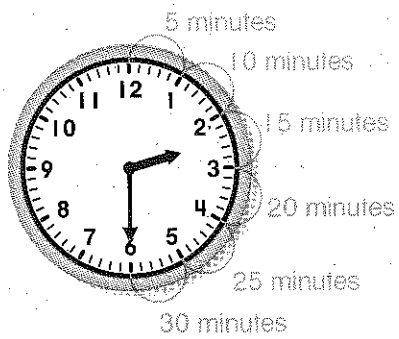


square



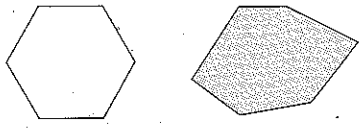
The picture shows 2 halves. A half of the square is shaded.

half hour



30 minutes = 1 half hour

hexagon



A hexagon has 6 sides and 6 angles.

hidden information

Heather bought a dozen eggs. She used 7 of them to make breakfast. How many eggs does she have left?

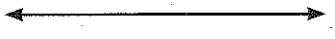
$12 - 7 = \boxed{5}$

The hidden information is that a dozen means 12.

horizontal

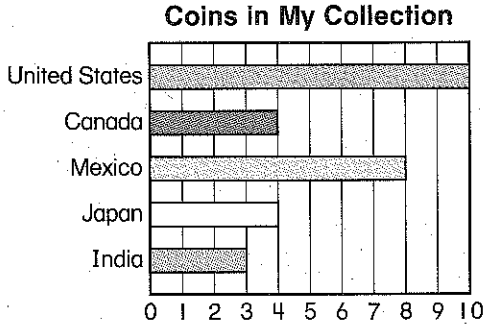
$4 + 5 = 9$

horizontal form

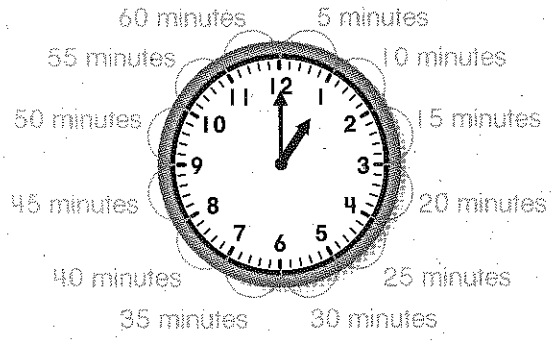


horizontal line

horizontal bar graph

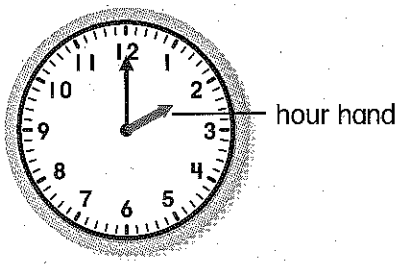


hour

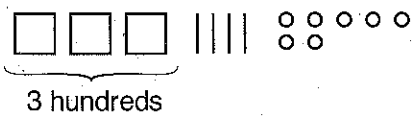


60 minutes = 1 hour

hour hand



hundreds

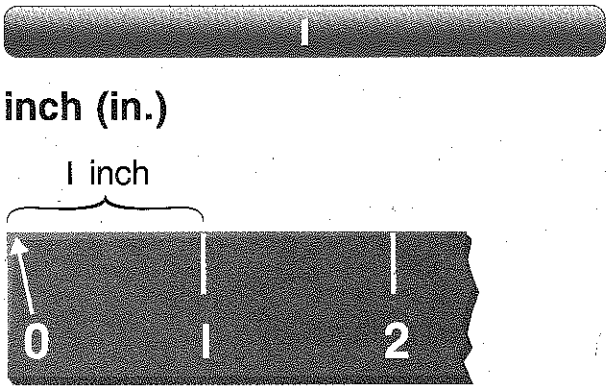


3 hundreds

347 has 3 hundreds.

hundreds

inch (in.)



least

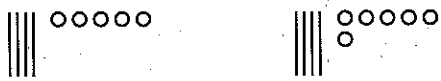
14 7 63

7 is the least number.

length

The length of the pencil is about 17 cm.
(not to scale)

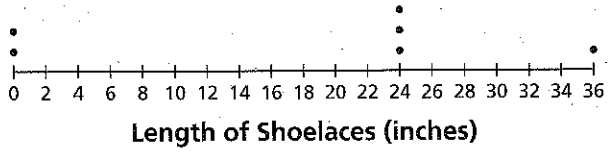
less than (<)



45 < 46

45 is less than 46.

line plot



line segment

M

make a ten

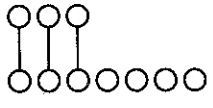
$8 + 6 = \square$

8 ●● | ●●●●

$10 + 4$

$10 + 4 = 14$,
so $8 + 6 = 14$

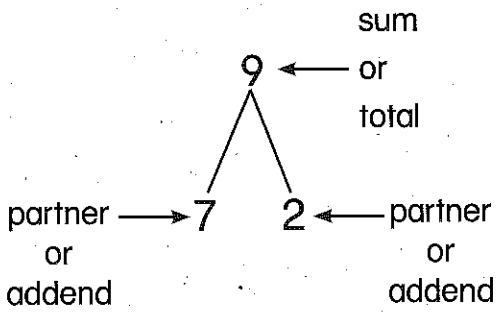
matching drawing



fewer

more

Math Mountain



meter(m)

100 centimeters = 1 meter
(not drawn to scale)

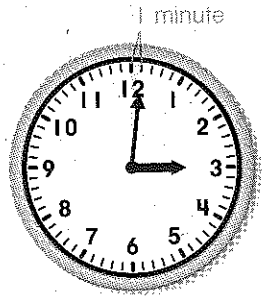
minus

$8 - 3 = 5$

8 minus 3 equals 5.

$$\begin{array}{r} 8 \\ -\ 3 \\ \hline 5 \end{array}$$

minute

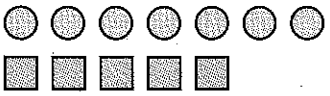


60 seconds = 1 minute

minute hand

minute hand: points to the minutes

more



There are more ○ than □.

N

New Groups Above Method

$$\begin{array}{r} {\scriptstyle 1} \\ 56 \\ +\ 28 \\ \hline 84 \end{array}$$

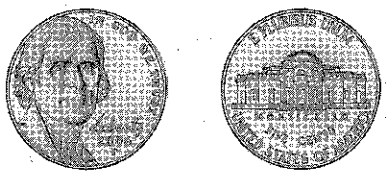
6 + 8 = 14
The 1 new ten in 14 goes up to the tens place.

New Groups Below Method

$$\begin{array}{r} 56 \\ +\ 28 \\ \hline 84 \end{array}$$

6 + 8 = 14
The 1 new ten in 14 goes below in the tens place.

nickel



front back

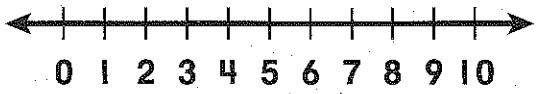
5 cents or 5¢ or $0.05

not equal to (≠)

$6 + 4 \neq 8$

6 + 4 is not equal to 8.

number line diagram



This is a number line diagram.

number name

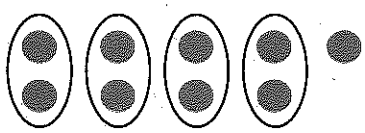
12

twelve ← number name

O

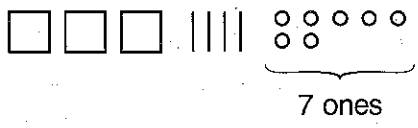
odd number

A number is odd if you can make groups of 2 and have one left over.



9 is an odd number.

ones



347 has 7 ones.
↑
ones

opposite operations

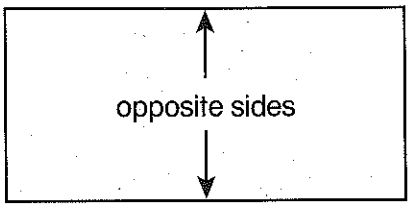
Addition and subtraction are opposite operations.

$5 + 9 = 14$

$14 - 9 = 5$

Use addition to check subtraction. Use subtraction to check addition.

opposite sides



order

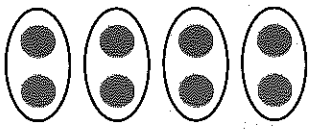
2, 5, 6

The numbers 2, 5, and 6 are in order from least to greatest.

P

pair

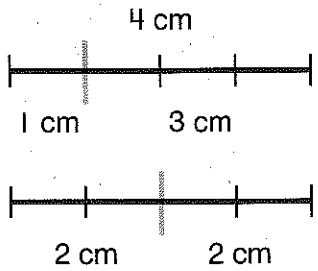
A group of 2 is a pair.



The picture shows 4 pairs of counters.

partner lengths

partner lengths of 4 cm



partners

$9 + 6 = 15$

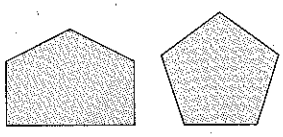
partners (addends)

penny

front back

1 cent or 1¢ or $0.01

pentagon



A pentagon has 5 sides and 5 angles.

picture graph

Flowers	
Vases	

plus

$3 + 2 = 5$

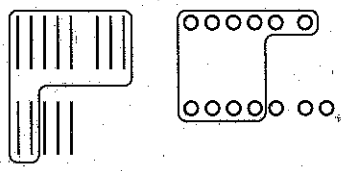
3 plus 2 equals 5.

$$\begin{array}{r} 3 \\ +\,2 \\ \hline 5 \end{array}$$

P.M.

Use P.M. for times between noon and midnight.

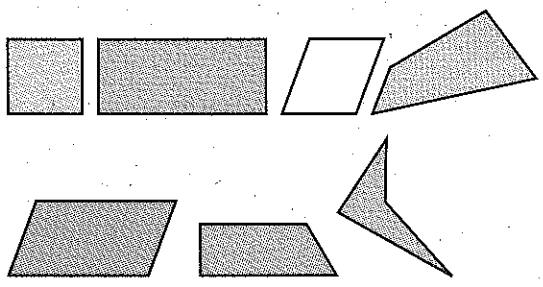
proof drawing



$86 + 57 = 143$

Q

quadrilateral



A quadrilateral has 4 sides and 4 angles.

quarter

front

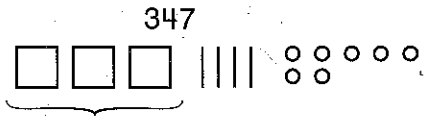
back

25 cents or 25¢ or $0.25

A quarter is another name for a fourth.

A quarter is a fourth of a dollar.

quick hundreds



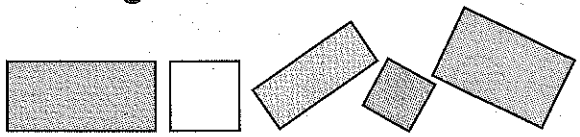
quick hundreds

quick tens

quick tens

R

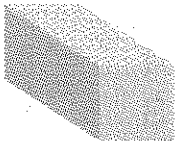
rectangle



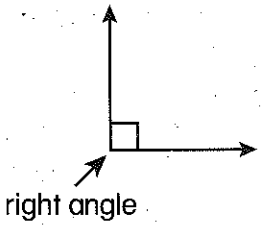
A rectangle has 4 sides and 4 right angles.

Opposite sides have the same length.

rectangular prism

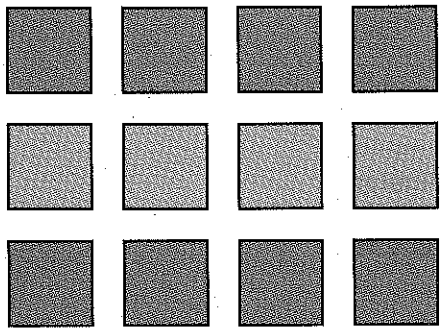


right angle



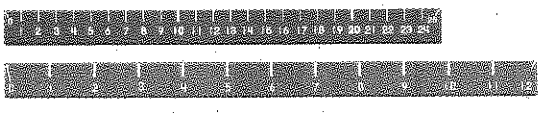
A right angle is sometimes called a *square corner.*

row



This rectangular array has 3 rows with 4 tiles in each row.

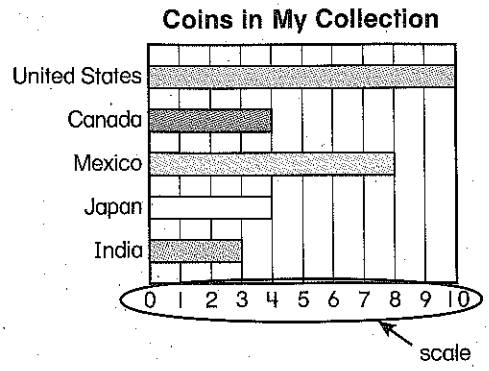
ruler



A ruler is used to measure length.

S

scale



The numbers along the side or the bottom of a graph.

Show All Totals Method

25	724
+ 48	+ 158
60	800
13	70
73	12
	882

situation equation

A baker baked 100 loaves of bread. He sold some loaves. There are 73 loaves left. How many loaves of bread did he sell?

$100 - \square = 73$

situation equation

skip count

skip count by 2s: 2, 4, 6, 8, . . .
skip count by 5s: 5, 10, 15, 20, . . .
skip count by 10s: 10, 20, 30, 40, 50, . . .

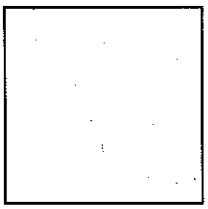
solution equation

A baker baked 100 loaves of bread. He sold some loaves. There are 73 loaves left. How many loaves of bread did he sell?

$100 - 73 = \square$

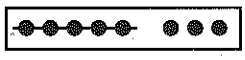
solution equation

square



A square has 4 equal sides and 4 right angles.

subtract



$8 - 5 = 3$

subtraction doubles

Both addends or partners are the same.

$8 - 4 = 4$

sum

$4 + 3 = 7$

sum → 7

$$\begin{array}{r} 4 \\ +\,3 \\ \hline 7 \end{array}$$

survey

When you collect data by asking people questions, you are taking a survey.

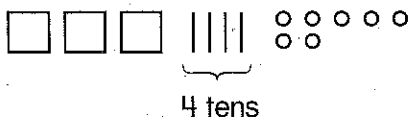
T

teen number

any number from 11 to 19

11 12 13 14 15 16 17 18 19

tens

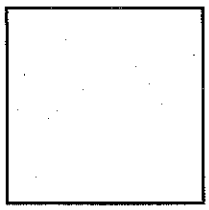


4 tens

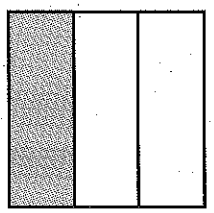
347 has 4 tens.

tens

third

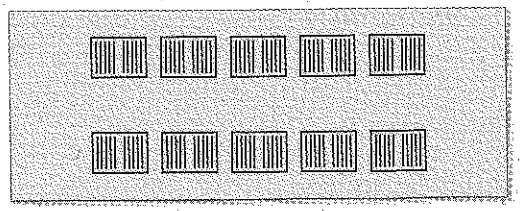


square



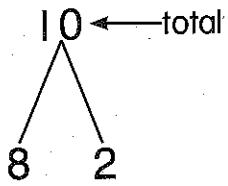
The picture shows 3 thirds. A third of the square is shaded.

thousand

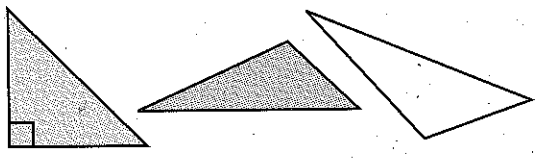


1,000 = ten hundreds

total



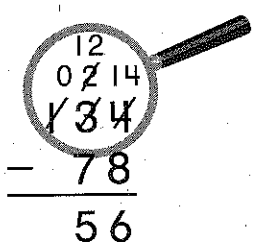
triangle



A triangle has 3 sides and 3 angles.

U

ungroup



Ungroup when you need more ones or tens to subtract.

Ungroup First Method

$$\begin{array}{r} 6\,4 \\ -\,2\,8 \\ \hline \end{array}$$

yes no

1. Check to see if there are enough tens and ones to subtract.

$$\begin{array}{r} 5\,14 \\ \cancel{6}\,\cancel{4} \\ -\,2\,8 \\ \hline \end{array}$$

2. You can get more ones by taking from the tens and putting them in the ones place.

$$\begin{array}{r} 5\,14 \\ \cancel{6}\,\cancel{4} \\ -\,2\,8 \\ \hline 3\,6 \end{array}$$

3. Subtract from either right to left or left to right.

unknown addend

$$3 + \square = 9$$

unknown addend

unknown total

$$3 + 6 = \square$$

unknown total

V

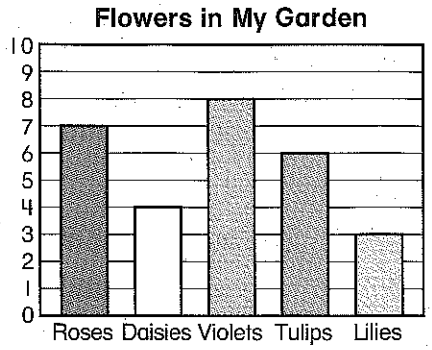
vertical

$$\begin{array}{r} 4 \\ +\,3 \\ \hline 7 \end{array}$$

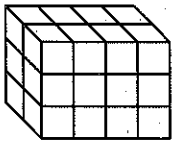
vertical form

vertical line

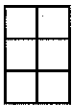
vertical bar graph



view

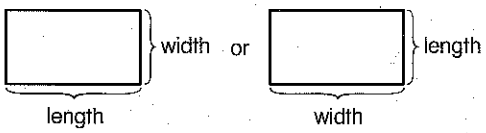


This is the side view of the rectangular prism above.



W

width



Y

yard (yd)

3 feet = 1 yard (not drawn to scale)