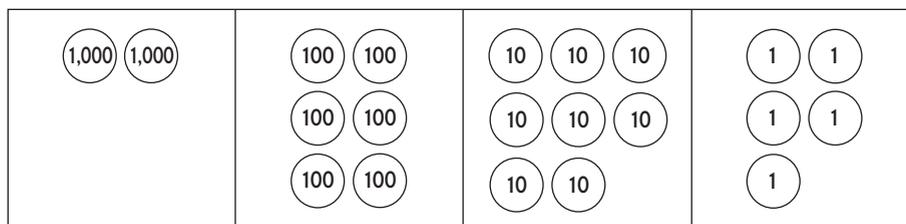


Unit 1 : Numbers to 10,000

Friendly Notes

Thousands, Hundreds, Tens, and Ones

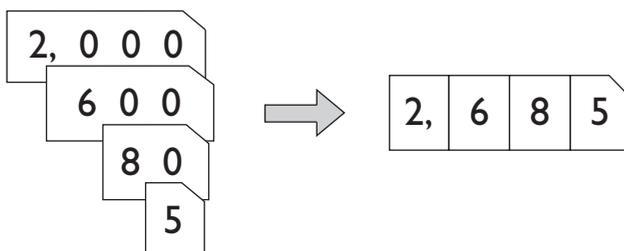
1. Count the thousands, hundreds, tens, and ones in this chart.



$$2,000 + 600 + 80 + 5 = 2,685$$

2,685 is the **standard form** of 2,685.

2,000 + 600 + 80 + 5 is the **expanded form** of 2,685.



We write 2,685 in words as two thousand six hundred eighty-five.



In 2,685:

the digit 2 is in the thousands place.

Its value is 2,000.

the digit 6 is in the hundreds place.

Its value is 600.

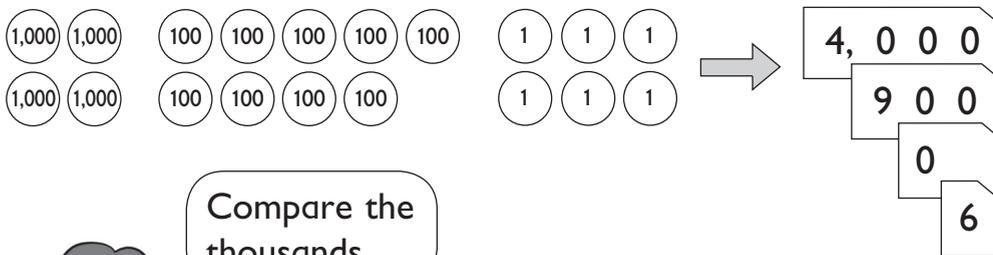
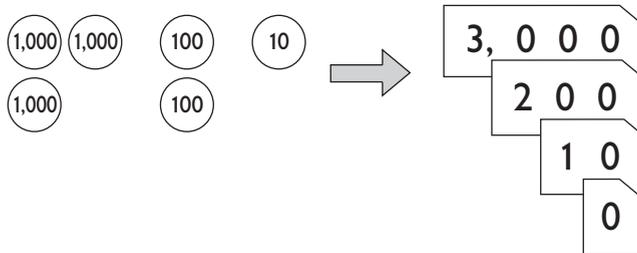
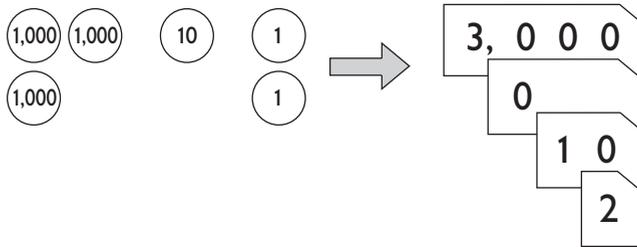
the digit 8 is in the tens place.

Its value is 80.

the digit 5 is in the ones place.

Its value is 5.

2. Compare the numbers 3,012, 3,210, and 4,906.
Which is the greatest number?
Which is the smallest number?



Compare the thousands.

4 thousands is the greatest.
So, 4,906 is the greatest number.



3,012 and 3,210 have the same number of thousands.
Compare the hundreds.

0 hundreds is less than 2 hundreds.
So, 3,012 is the smallest number.

Arranging the numbers in order beginning with the smallest, we have 3,012, 3,210, 4,096.

Number Patterns

In a number pattern, we first find out how the given numbers are related to one another to find the missing numbers.

1. 1,202, 1,204, 1,206, _____

We add 2 to get the next number.
So, the missing number is 1,208.

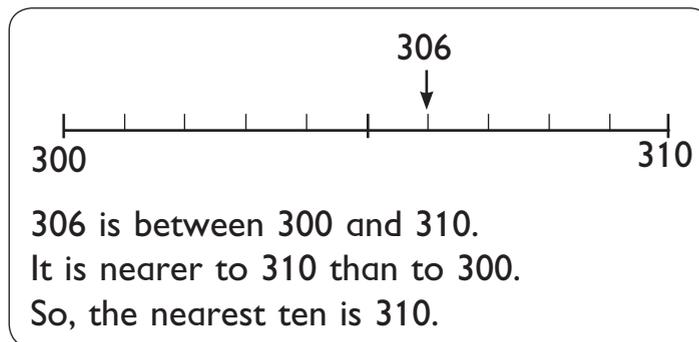
2. 2,894, 2,794, 2,694, _____

We subtract one hundred to get the next number.
So, the missing number is 2,594.



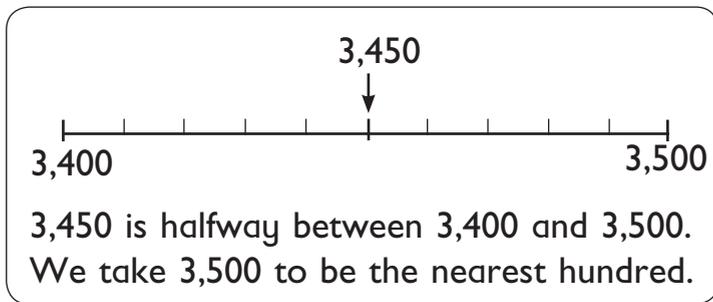
Rounding Numbers

1. Round 306 to the nearest ten.



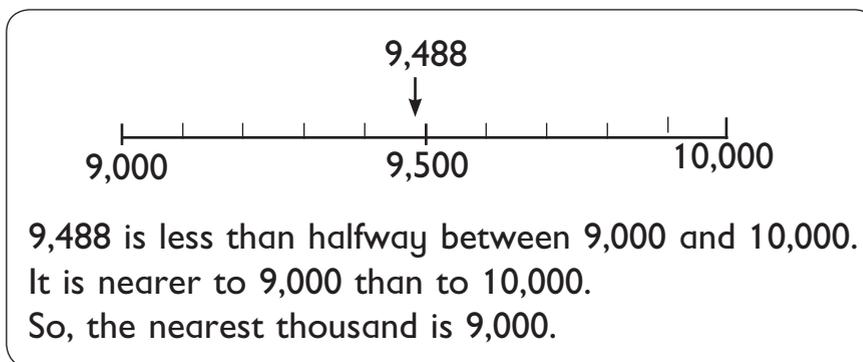
306 is 310 when rounded to the nearest ten.

2. Round 3,450 to the nearest hundred.



3,450 is 3,500 when rounded to the nearest hundred.

3. Round 9,488 to the nearest thousand.



9,488 is 9,000 when rounded to the nearest thousand.

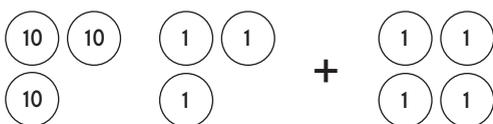
Unit 2 : Addition and Subtraction

Friendly Notes

Mental Calculation

We add two numbers to find the **sum**.

1. Find the sum of 33 and 4.



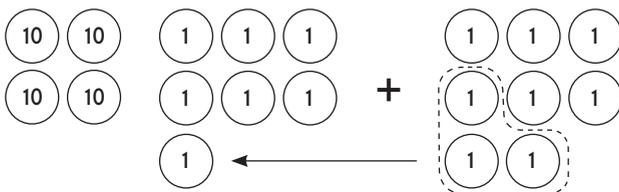
$$33 + 4 = 37$$

Add the ones first.

$$\begin{array}{r} 33 + 4 \\ \swarrow \quad \searrow \\ 30 \quad 3 \\ 3 + 4 = 7 \\ 30 + 7 = 37 \end{array}$$



2. Find the sum of 47 and 8.



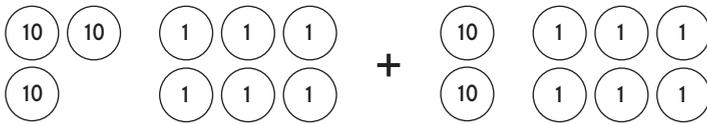
$$47 + 8 = 55$$

Make a 10 first.

$$\begin{array}{r} 47 + 8 \\ \swarrow \quad \searrow \\ 40 \quad 7 \\ 7 + 3 = 10 \\ 40 + 10 = 50 \\ 50 + 5 = 55 \end{array}$$



3. Find the sum of 36 and 26.



$$36 \xrightarrow{+20} 56 \xrightarrow{+6} 62$$



$$\begin{array}{r} 36 + 26 \\ \swarrow \quad \searrow \\ 20 \quad 6 \end{array}$$

Add 20 to 36 first.

$$\begin{array}{r} 56 + 6 \\ \swarrow \quad \searrow \\ 4 \quad 2 \end{array}$$

$$56 + 4 = 60$$

$$60 + 2 = 62$$



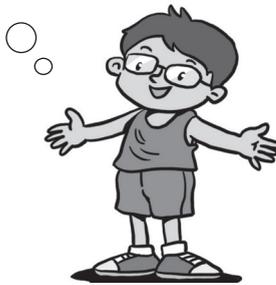
$$36 + 26 = 62$$

4. Add 47 and 15.

$$\begin{array}{r} 47 + 15 \\ \swarrow \quad \searrow \\ 3 \quad 12 \end{array}$$

$$47 + 3 = 50$$

$$50 + 12 = 62$$



$$47 + 15 = 62$$

5. Add 35 and 59.

59 is one less than 60.

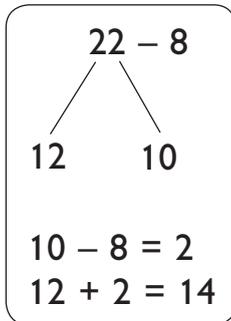
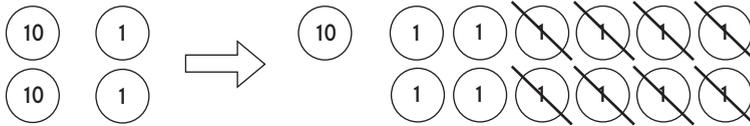
$$35 \xrightarrow{+60} 95 \xrightarrow{-1} 94$$



$$35 + 59 = 94$$

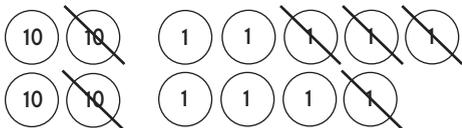
We subtract the smaller number from the greater number to find the **difference**.

6. Find the difference between 22 and 8.



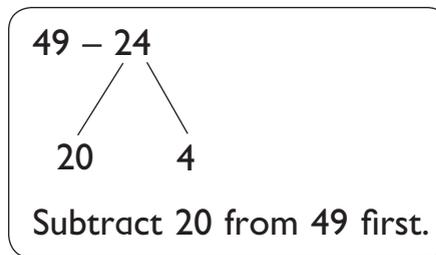
$$22 - 8 = 14$$

7. Find the difference between 49 and 24.

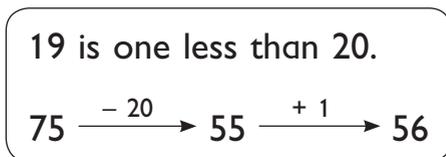


$$49 \xrightarrow{-20} 29 \xrightarrow{-4} 25$$

$$49 - 24 = 25$$



8. Subtract 19 from 75.



$$75 - 19 = 56$$

Sum and Difference

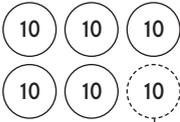
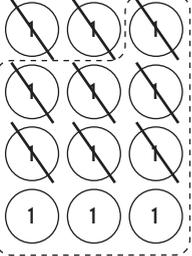
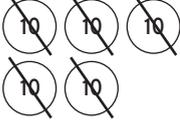
To add two 3-digit numbers, we add the ones first, followed by the tens, and then the hundreds.

1. Find the sum of 362 and 259.

<p>Add the ones.</p> $\begin{array}{r} ^1 \\ 362 \\ + 259 \\ \hline 1 \end{array}$				<p>10 ones make 1 ten.</p>
<p>Add the tens.</p> $\begin{array}{r} ^1 ^1 \\ 362 \\ + 259 \\ \hline 21 \end{array}$				<p>10 tens make 1 hundred.</p>
<p>Add the hundreds.</p> $\begin{array}{r} ^1 ^1 \\ 362 \\ + 259 \\ \hline 621 \end{array}$				

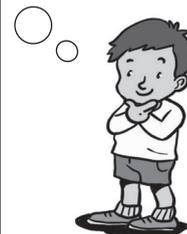
To find the difference between two 3-digit numbers, we subtract the ones first, followed by the tens, and then the hundreds.

2. Find the difference between 362 and 259.

<p>Subtract the ones.</p> $\begin{array}{r} ^5 ^{12} \\ 362 \\ - 259 \\ \hline \end{array}$			
<p>Subtract the tens.</p> $\begin{array}{r} ^5 ^{12} \\ 362 \\ - 259 \\ \hline 03 \end{array}$			
<p>Subtract the hundreds.</p> $\begin{array}{r} ^5 ^{12} \\ 362 \\ - 259 \\ \hline 103 \end{array}$			

We can check our answers with addition.

$$\begin{array}{r} ^1 \\ 259 \\ + 103 \\ \hline 362 \end{array}$$



Adding Ones, Tens, Hundreds, and Thousands

To find the sum of two 4-digit numbers:

Step 1: Add the ones.

Step 2: Add the tens.

Step 3: Add the hundreds.

Step 4: Add the thousands.

Change 10 ones for 1 ten,
10 tens for 1 hundred, or
10 hundreds for 1 thousand,
when we have more than 10 ones, 10 tens,
or 10 hundreds to add.

Find the sum of 3,098 and 2,386.

Estimate the value by rounding each number to the nearest thousand and the adding.

3,098 is about 3,000.

2,386 is about 2,000.

$3,000 + 2,000 = 5,000$

The answer should be around 5,000.



Add the ones.

$$\begin{array}{r} 3,0\overset{1}{9}8 \\ + 2,386 \\ \hline 4 \end{array}$$

Change 10 ones for 1 ten.

Add the tens.

$$\begin{array}{r} 3,0\overset{1}{9}8 \\ + 2,386 \\ \hline 84 \end{array}$$

Change 10 tens for 1 hundred.

Add the hundreds.

$$\begin{array}{r} 3,0\overset{1}{9}8 \\ + 2,386 \\ \hline 484 \end{array}$$

Add the thousands.

$$\begin{array}{r} 3,0\overset{1}{9}8 \\ + 2,386 \\ \hline 5,484 \end{array}$$

5,484 is close to the estimated answer of 5,000.

So, the answer is reasonable.

Subtracting Ones, Tens, Hundreds, and Thousands

To find the difference between two 4-digit numbers:

Step 1: Subtract the ones.

Step 2: Subtract the tens.

Step 3: Subtract the hundreds.

Step 4: Subtract the thousands.

Change 1 ten for 10 ones,
1 hundred for 10 tens, or
1 thousand for 10 hundreds,
when we do not have enough ones, tens,
or hundreds to take away from.

Find the difference between 4,098 and 1,795.

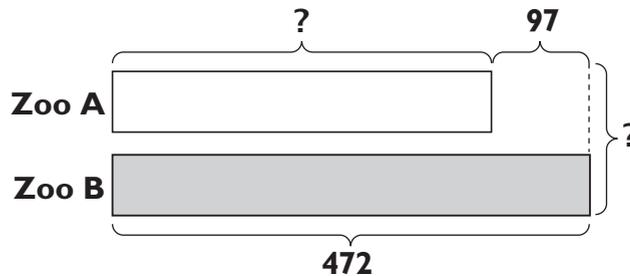
Subtract the ones.	Subtract the tens.	Subtract the hundreds.	Subtract the thousands.
$\begin{array}{r} 4,098 \\ - 1,795 \\ \hline 3 \end{array}$	$\begin{array}{r} 4,098 \\ - 1,795 \\ \hline 03 \end{array}$	$\begin{array}{r} \overset{3}{\cancel{4}}, \overset{10}{0}98 \\ - 1,795 \\ \hline 303 \end{array}$	$\begin{array}{r} \overset{3}{\cancel{4}}, \overset{10}{0}98 \\ - 1,795 \\ \hline 2,303 \end{array}$
		Change 1 thousand for 10 hundreds.	

Two-step Word Problems

Models can help us solve addition and subtraction word problems more easily.

There are 472 animals at Zoo B.
There are 97 fewer animals at Zoo A than Zoo B.
How many animals are there altogether?

We draw a model to solve the word problem.



Step 1:
Find the number of animals in Zoo A.



$$472 - 97 = 375$$

There are 375 animals in Zoo A.

Step 2:
Find the total number of animals.



$$375 + 472 = 847$$

There are 847 animals altogether.

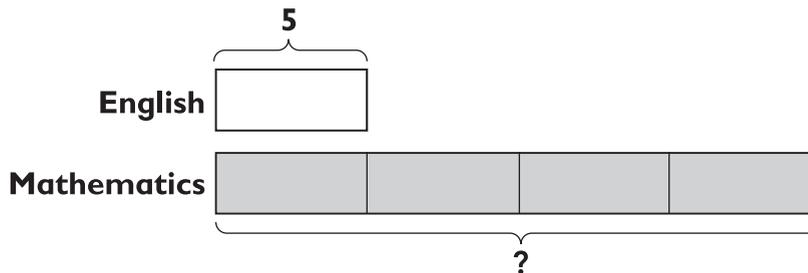
Unit 3 : Multiplication and Division

Friendly Notes

Word Problems

Models can also help us solve multiplication and division word problems.

1. There are 5 English books.
There are 4 times as many mathematics books as English books.
How many mathematics books are there?



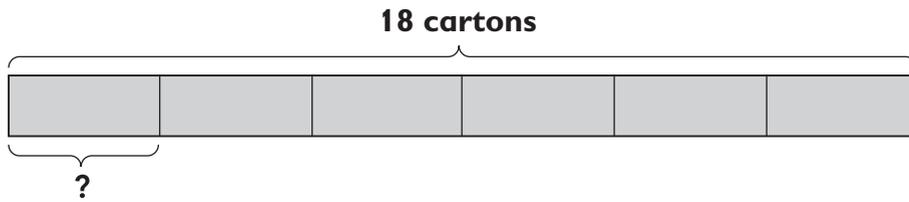
$$5 \times 4 = 20$$

There are 20 Mathematics books.

Multiply 5 by 4.



2. Mrs. Simpson bought 18 cartons of milk.
She gave the milk equally to 6 children.
How many cartons of milk did each child get?



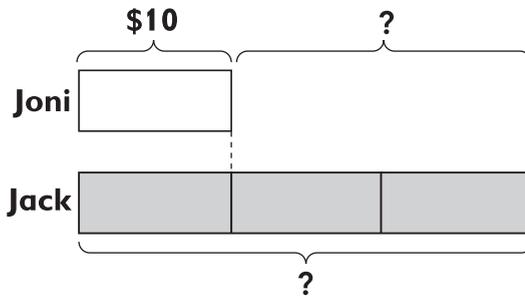
$$18 \div 6 = 3$$

Each child got 3 cartons of milk.

6 units = 18 cartons
1 unit = $18 \div 6$



3. Joni has \$10.
Jack has 3 times as much as Joni.
How much less money does Joni have than Jack?



$$10 \times 3 = 30$$

Jack has \$30.

$$30 - 10 = 20$$

Joni has \$20 less than Jack.

Multiplying Ones, Tens, and Hundreds

To find the **product** of two numbers, we multiply them.

1. (a) Multiply 6 by 3.

$$6 \times 3 = 18$$

$$6 \text{ ones} \times 3 = 18 \text{ ones}$$

(b) Multiply 60 by 3.

$$60 \times 3 = 180$$

$$6 \text{ tens} \times 3 = 18 \text{ tens}$$

(c) Multiply 600 by 3.

$$600 \times 3 = 1,800$$

$$6 \text{ hundreds} \times 3 = 18 \text{ hundreds}$$

To multiply a 2-digit number by a 1-digit number:

Step 1: Multiply the ones by the 1-digit number.

Step 2: Multiply the tens by the 1-digit number.

2. Find the product of 35 and 4.

Multiply the ones by 4.

$$\begin{array}{r} 35 \\ \times 4 \\ \hline 0 \end{array}$$

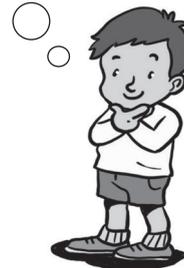
Multiply the tens by 4.

$$\begin{array}{r} 35 \\ \times 4 \\ \hline 140 \end{array}$$

$$35 \times 4 = 140$$

The **product** of 35 and 4 is 140.

$$\begin{array}{r} 30 \\ 5 \\ \times 4 \\ \hline 120 \\ 20 \\ \hline 140 \end{array}$$



To multiply a 3-digit number by a 1-digit number:
 Step 1: Multiply the ones by the 1-digit number.
 Step 2: Multiply the tens by the 1-digit number.
 Step 3: Multiply the hundreds by the 1-digit number.

3. Multiply 248 by 2.

Multiply the ones by 2.

$$\begin{array}{r} 248 \\ \times \quad 2 \\ \hline 6 \end{array}$$

Multiply the tens by 2.

$$\begin{array}{r} 248 \\ \times \quad 2 \\ \hline 96 \end{array}$$

Multiply the hundreds by 2.

$$\begin{array}{r} 248 \\ \times \quad 2 \\ \hline 496 \end{array}$$

$$248 \times 2 = 496$$

200 × 2 = 400
 40 × 2 = 80
 8 × 2 = 16
 248 × 2
 = 400 + 80 + 16



We can check if our answer is reasonable by estimating the product of the numbers.

4. Estimate the product of 513 and 3.

513 is 500 rounded to the nearest hundred.

$$500 \times 3 = 1,500$$

The product of 513 and 3 is about 1,500.



Quotient and Remainder

When a number cannot be divided by another number exactly, there is a **remainder**.

$$18 \div 7 = 2 \text{ remainder } 4$$

When 18 is divided by 7, the quotient is 2 and the remainder is 4.

$$\begin{aligned} 2 \times 7 &= 14 \\ 14 + 4 &= 18 \end{aligned}$$



Unit 4 : Multiplying and Dividing by 6, 7, 8, and 9

Friendly Notes

Multiplying and Dividing by 6

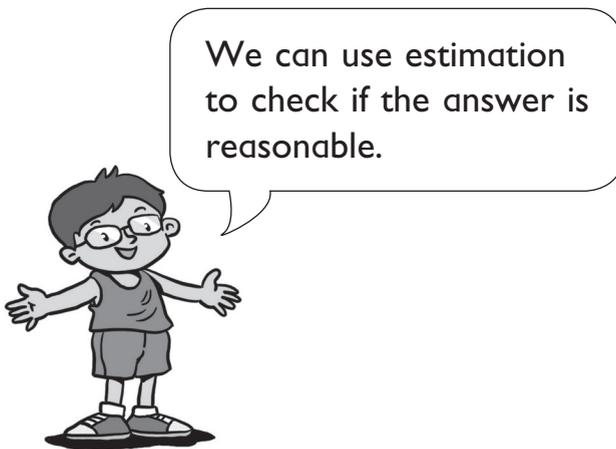
Remembering the multiplication table of 6 shown below helps us to multiply and divide by 6 easily.

$1 \times 6 = 6$ $6 \div 6 = 1$	•••
$2 \times 6 = 12$ $12 \div 6 = 2$	••• •••
$3 \times 6 = 18$ $18 \div 6 = 3$	••• ••• •••
$4 \times 6 = 24$ $24 \div 6 = 4$	••• ••• ••• •••
$5 \times 6 = 30$ $30 \div 6 = 5$	••• ••• ••• ••• •••
$6 \times 6 = 36$ $36 \div 6 = 6$	••• ••• ••• ••• ••• •••
$7 \times 6 = 42$ $42 \div 6 = 7$	••• ••• ••• ••• ••• ••• •••
$8 \times 6 = 48$ $48 \div 6 = 8$	••• ••• ••• ••• ••• ••• ••• •••
$9 \times 6 = 54$ $54 \div 6 = 9$	••• ••• ••• ••• ••• ••• ••• ••• •••
$10 \times 6 = 60$ $60 \div 6 = 10$	••• ••• ••• ••• ••• ••• ••• ••• ••• •••

1. Multiply 532 by 6.

	Multiply the ones by 6.	Multiply the tens by 6.	Multiply the hundreds by 6.
$\begin{array}{r} 532 \\ \times \quad 6 \\ \hline \end{array}$	$\begin{array}{r} 532 \\ \times \quad 6 \\ \hline 2 \end{array}$	$\begin{array}{r} 532 \\ \times \quad 6 \\ \hline 92 \end{array}$	$\begin{array}{r} 532 \\ \times \quad 6 \\ \hline 3,192 \end{array}$

When 532 is multiplied by 6, the product is 3,192.



532 is 500 rounded to the nearest hundred.

$$500 \times 6 = 3,000$$

3,192 is close to 3,000.

So, the answer is reasonable.

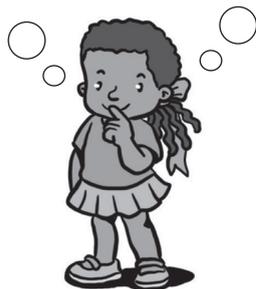
Multiplying and Dividing by 7

Remembering the multiplication table of 7 shown below helps us to multiply and divide by 7 easily.

$1 \times 7 = 7$ $7 \div 7 = 1$	
$2 \times 7 = 14$ $14 \div 7 = 2$	
$3 \times 7 = 21$ $21 \div 7 = 3$	
$4 \times 7 = 28$ $28 \div 7 = 4$	
$5 \times 7 = 35$ $35 \div 7 = 5$	
$6 \times 7 = 42$ $42 \div 7 = 6$	
$7 \times 7 = 49$ $49 \div 7 = 7$	
$8 \times 7 = 56$ $56 \div 7 = 8$	
$9 \times 7 = 63$ $63 \div 7 = 9$	
$10 \times 7 = 70$ $70 \div 7 = 10$	

$$10 \times 7 = 70$$

$$9 \times 7 = 70 - 7$$



$$10 \times 7 = 70$$

$$2 \times 7 = 14$$

$$8 \times 7 = 70 - 14$$

Multiplying and Dividing by 8

Remembering the multiplication table of 8 shown below helps us to multiply and divide by 8 easily.

$1 \times 8 = 8$ $8 \div 8 = 1$	
$2 \times 8 = 16$ $16 \div 8 = 2$	
$3 \times 8 = 24$ $24 \div 8 = 3$	
$4 \times 8 = 32$ $32 \div 8 = 4$	
$5 \times 8 = 40$ $40 \div 8 = 5$	
$6 \times 8 = 48$ $48 \div 8 = 6$	
$7 \times 8 = 56$ $56 \div 8 = 7$	
$8 \times 8 = 64$ $64 \div 8 = 8$	
$9 \times 8 = 72$ $72 \div 8 = 9$	
$10 \times 8 = 80$ $80 \div 8 = 10$	

$$10 \times 8 = 80$$

$$9 \times 8 = 80 - 8$$



$$5 \times 8 = 40$$

$$6 \times 8 = 40 + 8$$

Multiplying and Dividing by 9

Remembering the multiplication table of 9 shown below helps us to multiply and divide by 9 easily.

$1 \times 9 = 9$ $9 \div 9 = 1$	
$2 \times 9 = 18$ $18 \div 9 = 2$	
$3 \times 9 = 27$ $27 \div 9 = 3$	
$4 \times 9 = 36$ $36 \div 9 = 4$	
$5 \times 9 = 45$ $45 \div 9 = 5$	
$6 \times 9 = 54$ $54 \div 9 = 6$	
$7 \times 9 = 63$ $63 \div 9 = 7$	
$8 \times 9 = 72$ $72 \div 9 = 8$	
$9 \times 9 = 81$ $81 \div 9 = 9$	
$10 \times 9 = 90$ $90 \div 9 = 10$	

If the sum of the digits in a number is 9, the number can be divided by 9 exactly.

$$243 \div 9 = 27$$

$$2 + 4 + 3 = 9$$



Unit 5 : Length

Friendly Notes

Meters and Centimeters

The meter (m) and centimeter (cm) are units of length.

$$1 \text{ m} = 100 \text{ cm}$$

1. Write 2 m 64 cm in cm.

2 m 64 cm is
64 cm more
than 2 m.



$$2 \text{ m } 64 \text{ cm} = 264 \text{ cm}$$

$$\begin{aligned} 2 \text{ m} &= 2 \times 100 \text{ cm} \\ &= 200 \text{ cm} \\ 2 \text{ m } 64 \text{ cm} &= 200 \text{ cm} + 64 \text{ cm} \end{aligned}$$



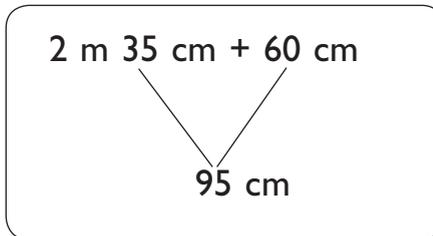
2. Write 839 cm in m and cm.

$$\begin{aligned} 839 \text{ cm} &= 800 \text{ cm} + 39 \text{ cm} \\ 8 \text{ m} &= 800 \text{ cm} \end{aligned}$$

$$839 \text{ cm} = 8 \text{ m } 39 \text{ cm}$$



3. Find the sum of 2 m 35 cm and 60 cm.



$$2 \text{ m } 35 \text{ cm} + 60 \text{ cm} = 2 \text{ m } 95 \text{ cm}$$



4. Find the difference between 3 m 18 cm and 1 m 30 cm.

$$3 \text{ m } 18 \text{ cm} = 318 \text{ cm}$$

$$1 \text{ m } 30 \text{ cm} = 130 \text{ cm}$$

$$318 \text{ cm} - 130 \text{ cm} = 188 \text{ cm}$$
$$= 1 \text{ m } 88 \text{ cm}$$

$$\begin{array}{r} 318 \\ - 130 \\ \hline 188 \end{array}$$



Kilometers

The kilometer (km) is another unit of length.

We use the kilometer to measure long distances such as the length of a road or the distance we travel from one place to another.

$$1 \text{ km} = 1,000 \text{ m}$$

1. Write 4 km 208 m in m.

$$\begin{aligned} 4 \text{ km} &= 4,000 \text{ m} \\ 4 \text{ km } 208 \text{ m} \\ &= 4,000 \text{ m} + 208 \text{ m} \end{aligned}$$

$$4 \text{ km } 208 \text{ m} = 4,208 \text{ m}$$



2. Write 7,090 m in km and m.

$$\begin{aligned} 7,090 \text{ m} &= 7,000 \text{ m} + 90 \text{ m} \\ 7 \text{ km} &= 7,000 \text{ m} \end{aligned}$$

$$7,090 \text{ m} = 7 \text{ km } 90 \text{ m}$$



3. Find the sum of 1 km 206 m and 1 km 590 m.

$$1 \text{ km } 206 \text{ m} \xrightarrow{+ 1 \text{ km}} 2 \text{ km } 206 \text{ m} \xrightarrow{+ 590 \text{ m}} 2 \text{ km } 796 \text{ m}$$



$$1 \text{ km } 206 \text{ m} + 1 \text{ km } 590 \text{ m} = 2 \text{ km } 796 \text{ m}$$

4. Find the difference between 2 km and 1 km 207 m.

$$\begin{aligned} 2 \text{ km} - 1 \text{ km} &= 1 \text{ km} \\ &= 1,000 \text{ m} \\ 1,000 \text{ m} - 207 \text{ m} &= 793 \text{ m} \end{aligned}$$



$$2 \text{ km} - 1 \text{ km } 207 \text{ m} = 793 \text{ m}$$

Yards, Feet, and Inches

The yard (yd), foot (ft), and inch (in.) are other units of length.

1 yd is shorter than a meter.

$$\begin{aligned}1 \text{ yd} &= 3 \text{ ft} \\1 \text{ ft} &= 12 \text{ in.}\end{aligned}$$

1. Write 12 yd in feet.

$$\begin{aligned}1 \text{ yd} &= 3 \text{ ft} \\12 \text{ yd} &= 12 \times 3 \text{ ft} \\&= 36 \text{ ft}\end{aligned}$$

$$12 \text{ yd} = 36 \text{ ft}$$



2. Write 15 yd 4 ft in feet.

$$\begin{aligned}1 \text{ yd} &= 3 \text{ ft} \\15 \text{ yd} &= 15 \times 3 \text{ ft} \\&= 45 \text{ ft} \\15 \text{ yd } 4 \text{ ft} &= 45 \text{ ft} + 4 \text{ ft}\end{aligned}$$

$$15 \text{ yd } 4 \text{ ft} = 49 \text{ ft}$$



3. Write 134 ft in yards.

$$\begin{array}{r}134 \text{ ft} \\ \swarrow \quad \searrow \\132 \text{ ft} \quad 2 \text{ ft} \\ | \\44 \text{ yd}\end{array}$$

$$134 \text{ ft} = 44 \text{ yd } 2 \text{ ft}$$



4. Write 2 ft 8 in. in inches.

$$\begin{aligned}1 \text{ ft} &= 12 \text{ in.} \\2 \text{ ft} &= 2 \times 12 \text{ in.} \\2 \text{ ft } 8 \text{ in.} &= 24 + 8 \text{ in.} \\&= 32 \text{ in.}\end{aligned}$$



$$2 \text{ ft } 8 \text{ in.} = 32 \text{ in.}$$

5. Find the value of 2 yd 4 ft + 3 yd 5 ft in yards.

$$2 \text{ yd } 4 \text{ ft} \xrightarrow{+ 3 \text{ yd}} 5 \text{ yd } 4 \text{ ft} \xrightarrow{+ 5 \text{ ft}} 5 \text{ yd } 9 \text{ ft}$$



$$\begin{aligned}2 \text{ yd } 4 \text{ ft} + 3 \text{ yd } 5 \text{ ft} &= 5 \text{ yd } 9 \text{ ft} \\&= 8 \text{ yd}\end{aligned}$$

$$\begin{aligned}1 \text{ yd} &= 3 \text{ ft} \\3 \text{ yd} &= 9 \text{ ft}\end{aligned}$$



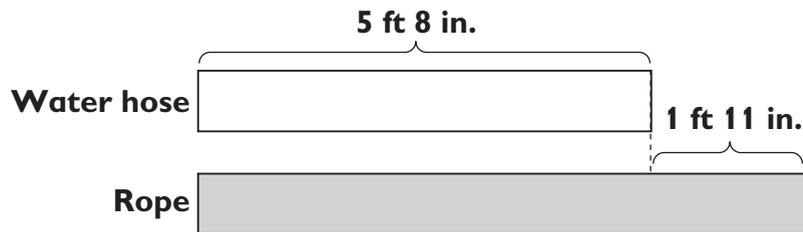
6. Find the value of 2 ft – 9 in. in inches.

$$\begin{aligned}2 \text{ ft} &= 2 \times 12 \text{ in.} \\&= 24 \text{ in.}\end{aligned}$$

$$\begin{aligned}2 \text{ ft} - 9 \text{ in.} &= 24 \text{ in.} - 9 \text{ in.} \\&= 15 \text{ in.}\end{aligned}$$



7. A water hose is 5 ft 8 in. long.
A rope is 1 ft 11 in. longer than the water hose.
- Find the length of the rope.
 - Find the total length of the water hose and the rope.



(a) $5 \text{ ft } 8 \text{ in.} \xrightarrow{+ 1 \text{ ft}} 6 \text{ ft } 8 \text{ in.} \xrightarrow{+ 11 \text{ in.}} 7 \text{ ft } 7 \text{ in.}$

$$5 \text{ ft } 8 \text{ in.} + 1 \text{ ft } 11 \text{ in.} = 7 \text{ ft } 7 \text{ in.}$$

The length of the rope is 7 ft 7 in.



(b) $5 \text{ ft } 8 \text{ in.} \xrightarrow{+ 7 \text{ ft}} 12 \text{ ft } 8 \text{ in.} \xrightarrow{+ 7 \text{ in.}} 13 \text{ ft } 3 \text{ in.}$

$$5 \text{ ft } 8 \text{ in.} + 7 \text{ ft } 7 \text{ in.} = 13 \text{ ft } 3 \text{ in.}$$

The total length of the water hose and the rope is 13 ft 3 in.



Miles

The mile (mi) is another unit of length.
One mile is longer than 1 km.
We measure long distances in miles.

$$1 \text{ mile} = 5,280 \text{ ft}$$

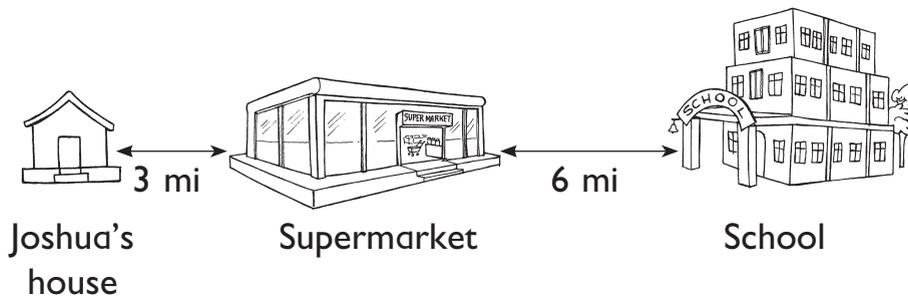
1. Write 1 mile in yd.

$$\begin{aligned} 1 \text{ mile} &= 5,280 \text{ ft} \\ &= 1,760 \text{ yd} \end{aligned}$$

$$1 \text{ yd} = 3 \text{ ft}$$



2. Find the distance between Joshua's house and the school.



The distance between Joshua's house and the school is 9 mi.

Unit 6 : Mass and Weight

Friendly Notes

Comparing Mass

We use these words to compare the mass of two or more objects.

as light as

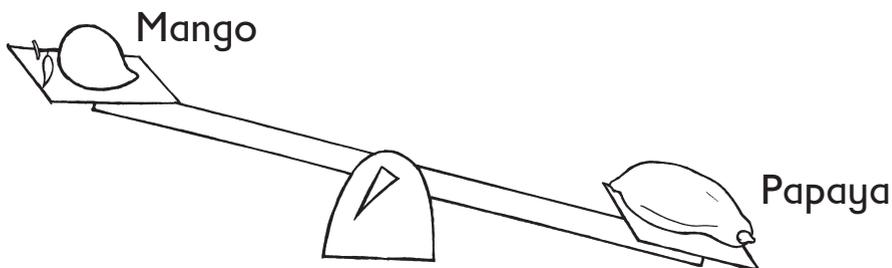
lighter than

the lightest

as heavy as

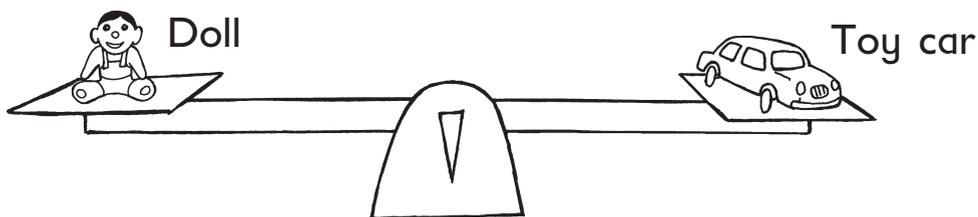
heavier than

the heaviest



The mango is **lighter than** the papaya.

The papaya is **heavier than** the mango.

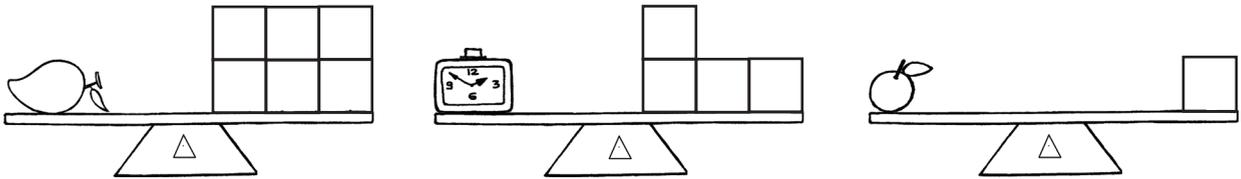


The doll is **as heavy as** the toy car.

The toy car is **as light as** the doll.

We can use objects to measure mass.

We can use blocks to measure the mass of the mango, alarm clock, and plum. Use \square as 1 unit.



The mango is as heavy as 6 \square .
The alarm clock is as heavy as 4 \square .
The plum is as heavy as 1 \square .

Each \square stands for 1 unit.



We can say that:

The mass of the mango is **6** units.

The mass of the alarm clock is **4** units.

The mass of the plum is **1** unit.

The plum is **lighter than** the mango and the alarm clock.

The plum is the **lightest**.

The mango is **heavier than** the alarm clock and the plum.

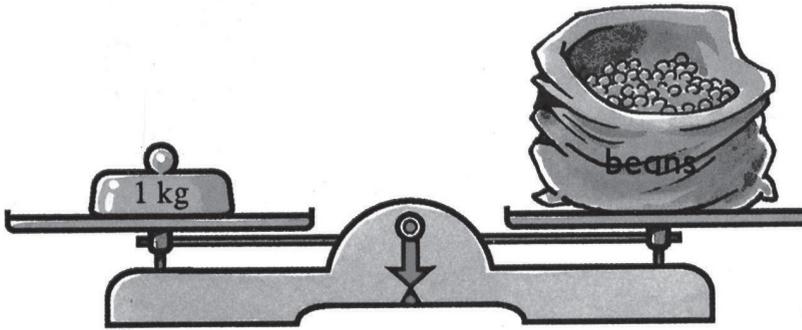
The mango is the **heaviest**.

Measuring Mass in Kilograms and Grams

The kilogram and gram are units for measuring mass.
We write **kg** for kilogram and **g** for gram.
1 kilogram is heavier than 1 gram.

$$1 \text{ kg} = 1,000 \text{ g}$$

1. Measure the mass of these objects in kilograms.

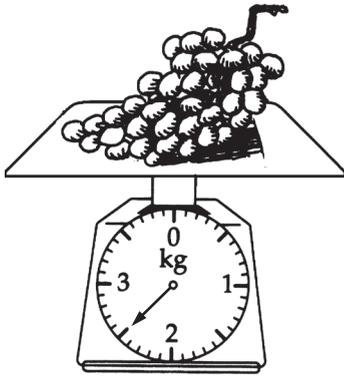


The bag of beans has mass of 1 kg.



The watermelon has mass of 3 kg.

2. Are the grapes heavier or lighter than 2 kg?

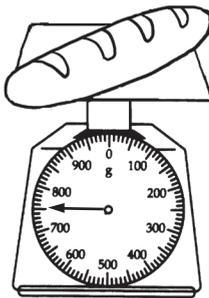
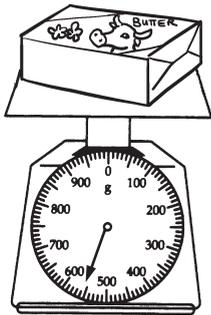


The grapes have a mass greater than 2 kg.



The grapes are heavier than 2 kg.

3. (a) Measure the mass of these objects in grams.
(b) Which is lighter, the bread or the butter?

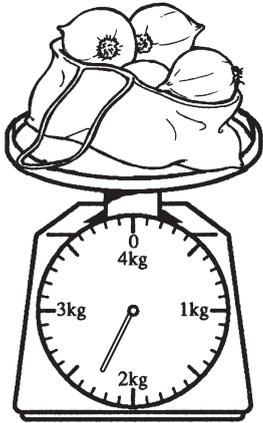


- (a) The butter has a mass of 560 g.
The bread has a mass of 750 g.

- (b) The butter is lighter.

The bread has a mass greater than the butter.



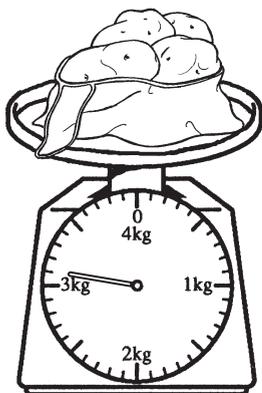


The bag of onions has a mass of 2 kg 300 g.

The bag of onions weighs 2,300 g.

$$\begin{aligned} 2 \text{ kg} &= 2,000 \text{ g} \\ 2 \text{ kg } 300 \text{ g} &= 2,000 \text{ g} + 300 \text{ g} \end{aligned}$$





The bag of potatoes has a mass of 3 kg 100 g.

$$3 \text{ kg} = 3,000 \text{ g}$$
$$3 \text{ kg } 100 \text{ g} = 3,000 \text{ g} + 100 \text{ g}$$

The bag of potatoes weighs 3,100 g.

$$3,100 - 2,300 = 800$$

The bag of potatoes is 800 g heavier than the bag of onions.



Measuring Weight in Pounds and Ounces

The pound and ounce are units for measuring weight.

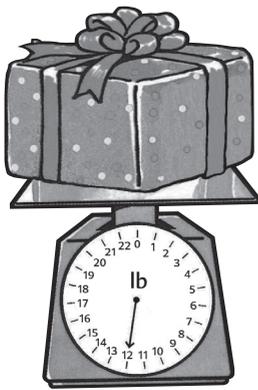
We write **lb** for pound and **oz** for ounce.

1 pound is heavier than 1 ounce.

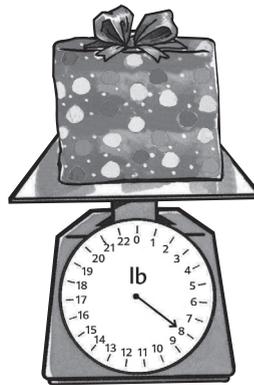
1 ounce is heavier than 1 gram.

1 pound is lighter than 1 kilogram.

1. Measure the weight of the boxes in pounds.
Which box is heavier?



Box A



Box B

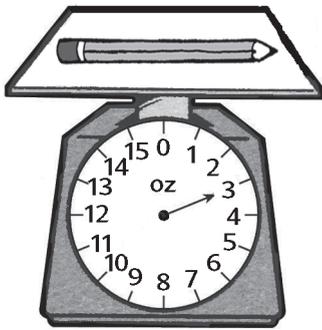
Box A weighs 12 lb.

Box B weighs 8 lb.

Box A weighs 4 lb more than Box B.

Box A is heavier.

2. Measure the weight of the pencil in ounces.



The pencil weighs 3 oz.

3. Mr. Brown weighs 140 lb.
Mrs. Brown weighs 30 lb less than Mr. Brown.
(a) What is Mrs. Brown's weight?
(b) What is their total weight?

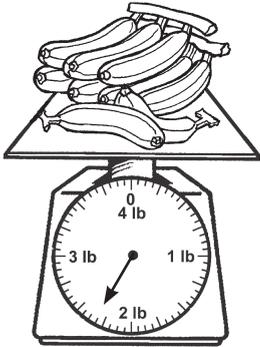
(a) $140 \text{ lb} - 30 \text{ lb} = 110 \text{ lb}$
Mrs. Brown's weight is 110 lb.

(b) $140 \text{ lb} + 110 \text{ lb} = 250 \text{ lb}$
Their total weight is 250 lb.

Pounds and Ounces

The pound (lb) and ounce (oz) are units of weight.

$$1 \text{ lb} = 16 \text{ oz}$$



The weight of the bananas is 2 lb 5 oz.

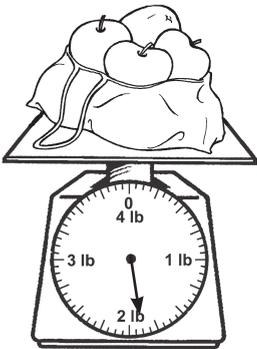
$$1 \text{ lb} = 16 \text{ oz}$$

$$2 \text{ lb} = 16 \times 2 \\ = 32 \text{ oz}$$

$$2 \text{ lb } 5 \text{ oz} = 32 \text{ oz} + 5 \text{ oz}$$



The bananas weigh 37 oz.



The weight of the bag of apples is 1 lb 14 oz.

$$1 \text{ lb} = 16 \text{ oz}$$

$$1 \text{ lb } 14 \text{ oz} = 16 \text{ oz} + 14 \text{ oz}$$



The bag of apples weighs 30 oz.

$$37 - 30 = 7$$

The bananas weigh 7 oz more than the bag of apples.

Word Problems

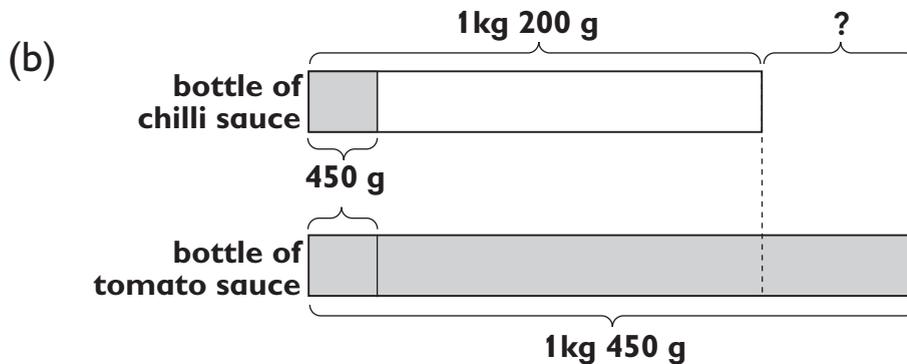
We can use models to solve word problems on mass and weight.

1. The mass of a bottle of chilli sauce is 1 kg 200 g.
The mass of a bottle of tomato sauce is 1 kg 450 g.
The mass of each empty bottle is 450 g.
- (a) How many grams of chilli sauce are there in the bottle?
- (b) How much heavier is the bottle of tomato sauce than the chilli sauce?

(a) $1 \text{ kg } 200 \text{ g} = 1,000 \text{ g} + 200 \text{ g}$
 $= 1,200 \text{ g}$

$$1,200 \text{ g} - 450 \text{ g} = 750 \text{ g}$$

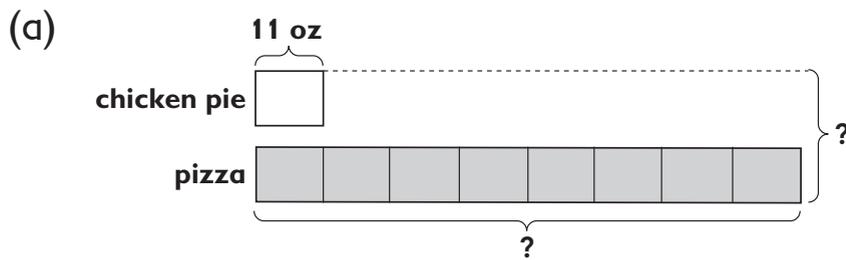
There are 750 g of chilli sauce in the bottle.



$$1 \text{ kg } 450 \text{ g} - 1 \text{ kg } 200 \text{ g} = 250 \text{ g}$$

The bottle of tomato sauce is 250 g heavier than the bottle of chilli sauce.

2. A chicken pie weighs 11 oz.
A pizza is 8 times as heavy as the chicken pie.
- (a) What is the weight of the pizza in pounds and ounces?
(b) What is the total weight of the chicken pie and pizza in ounces?



$$11 \times 8 \text{ oz} = 88 \text{ oz}$$

$$= 5 \text{ lb } 8 \text{ oz}$$

1 lb = 16 oz
 $88 - 16 = 72$
 $72 - 16 = 56$
 $56 - 16 = 40$
 $40 - 16 = 24$
 $24 - 16 = 8$
 I can subtract 16 five times from 88 and have 8 left over.
 So, 88 oz = 5 lb 8 oz

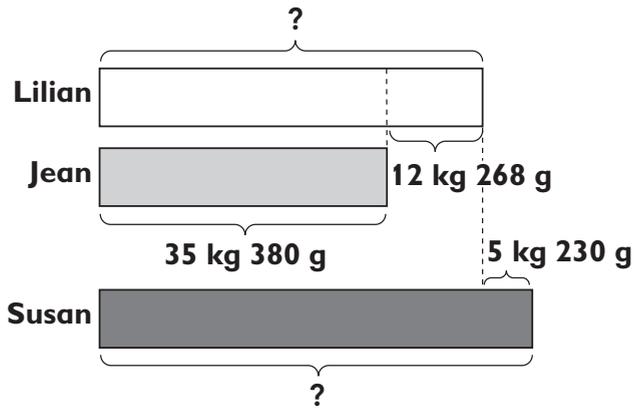
The weight of the pizza is 5 lb 8 oz.



(b) $11 \text{ oz} + 88 \text{ oz} = 99 \text{ oz}$

The total weight of the chicken pie and the pizza is 99 oz.

3. Lilian is 12 kg 268 g heavier than Jean.
 Jean's mass is 35 kg 380 g.
 Lilian is 5 kg 230 g lighter than Susan.
 Find Susan's mass in kilograms and grams.



$$35 \text{ kg } 380 \text{ g} \xrightarrow{+ 12 \text{ kg}} 47 \text{ kg } 380 \text{ g} \xrightarrow{+ 268 \text{ g}} 47 \text{ kg } 648 \text{ g}$$

$$35 \text{ kg } 380 \text{ g} + 12 \text{ kg } 268 \text{ g} = 47 \text{ kg } 648 \text{ g}$$

Lilian's mass is 47 kg 648 g.

$$47 \text{ kg } 648 \text{ g} + 5 \text{ kg } 230 \text{ g} = 52 \text{ kg } 878 \text{ g}$$

Susan's mass is 52 kg 878 g.



Unit 8 : Money

Friendly Notes

Dollars and Cents

The dollar (\$) and cent (¢) are units of money.
100 cents is needed to make one dollar.

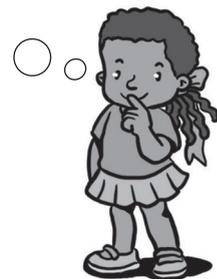
$$\$1 = 100¢$$

We write 6 dollars 20 cents as \$6.20.
The dot (.) separates the cents from the dollars.



1. Write \$12.08 in cents.
 $\$12.08 = 1,208¢$

$$\begin{aligned}\$12.08 &= \$12 + 8¢ \\ \$12 &= 12 \times 100¢ \\ &= 1,200¢\end{aligned}$$



2. Write 367¢ in dollars and cents.
 $367¢ = \$3.67$



$$\begin{aligned}367¢ &= 300¢ + 67¢ \\ \$1 &= 100¢ \\ \$3 &= 300¢\end{aligned}$$

Addition

We add different amounts of money in the same way we add whole numbers.
Then we put in the dot at the right place, to separate the dollars and the cents.

1. Find the value of \$4.05 and \$26.85.



$$\$26.85 \xrightarrow{+ \$4} \$30.85 \xrightarrow{+ 5c} \$30.90$$

$$\$4.05 + \$26.85 = \$30.90$$

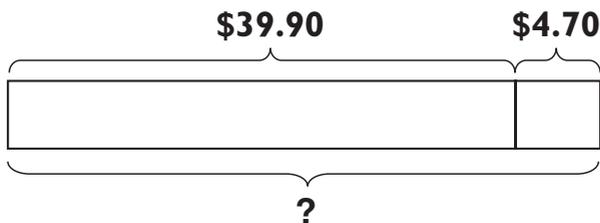
We can also add like this:

$$\begin{array}{r} \$ 26.85 \\ + \$ 4.05 \\ \hline \$ 30.90 \end{array}$$

$$\begin{array}{r} 1 \quad 1 \\ 2,685 \\ + 405 \\ \hline 3,090 \end{array}$$



2. Jorge bought a storybook for \$39.90.
He had \$4.70 left.
How much money did he have at first?



$$\$39.90 + \$4.70 = \$44.60$$

Jorge had \$44.60 at first.

Subtraction

We subtract different amounts of money in the same way we subtract whole numbers.
Then we put in the dot to separate the dollars and the cents.

1. Subtract \$15.75 from \$23.60.

$$\$23.60 \xrightarrow{-\$15} \$8.60 \xrightarrow{-75\text{¢}} \$7.85$$

$$\$23.60 - \$15.75 = \$7.85$$

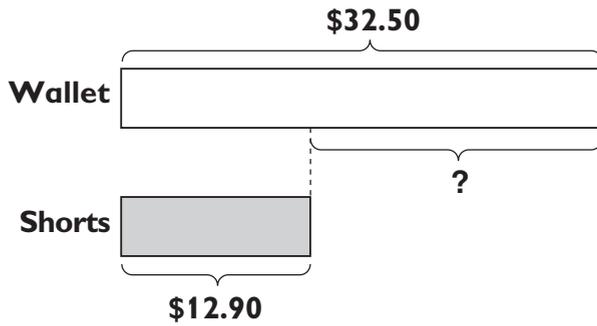
We can also subtract like this:

$$\begin{array}{r} \$23.60 \\ + \$15.75 \\ \hline \$7.85 \end{array}$$

$$\begin{array}{r} \overset{1}{2} \overset{12}{3} \overset{15}{6} \overset{1}{0} \\ - 1,575 \\ \hline 785 \end{array}$$



2. A wallet costs \$32.50.
A pair of shorts costs \$12.90.
How much more does the wallet cost than the pair of shorts?



$$\$32.50 - \$12.90 = \$19.60$$

The wallet costs \$19.60 more than the pair of shorts.

Unit 9 : Fractions

Friendly Notes

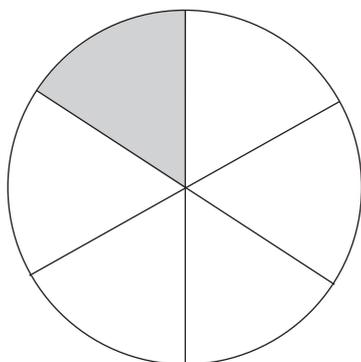
Fraction of a Whole

$$1 \text{ whole} = 2 \text{ halves} = \frac{2}{2}$$

$$1 \text{ whole} = 3 \text{ thirds} = \frac{3}{3}$$

$$1 \text{ whole} = 4 \text{ fourths} = \frac{4}{4}$$

$$1 \text{ whole} = 5 \text{ fifths} = \frac{5}{5}$$



1 out of 6 equal parts is shaded.

$\frac{1}{6}$ of the circle is shaded.

$\frac{1}{6}$ = one-sixth

$\frac{1}{6}$ ← numerator
← denominator

1 whole = 6 sixths

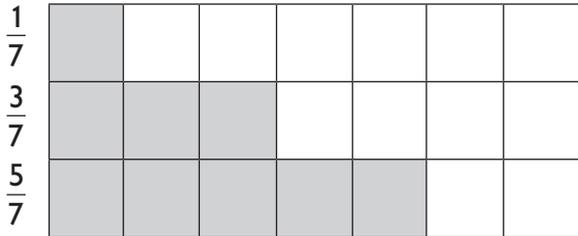
$$= \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6} + \frac{1}{6}$$

$\frac{1}{6}$ and $\frac{5}{6}$ make one whole.



For fractions with a common denominator, the fraction with the greatest numerator is the greatest.

Arrange the fractions in order.
Begin with the smallest.



We compare the size of the shaded parts.



$\frac{5}{7}$ is the greatest.

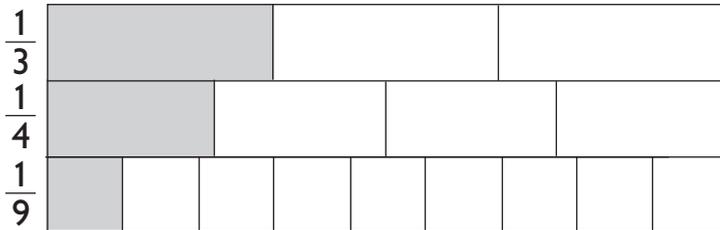
$\frac{1}{7}$ is the smallest.

Arranging the fractions in order beginning with the smallest, we have $\frac{1}{7}, \frac{3}{7}, \frac{5}{7}$.

For fractions with a common numerator, the fraction with the greatest denominator is the smallest.

Arrange the fractions in order.
Begin with the smallest.

We compare the size of the shaded parts.



$\frac{1}{3}$ is the greatest.

$\frac{1}{9}$ is the smallest.

Arranging the fractions in order beginning with the smallest, we have $\frac{1}{9}$, $\frac{1}{4}$, $\frac{1}{3}$.

We can represent fractions on number lines

What fraction does each letter represent?

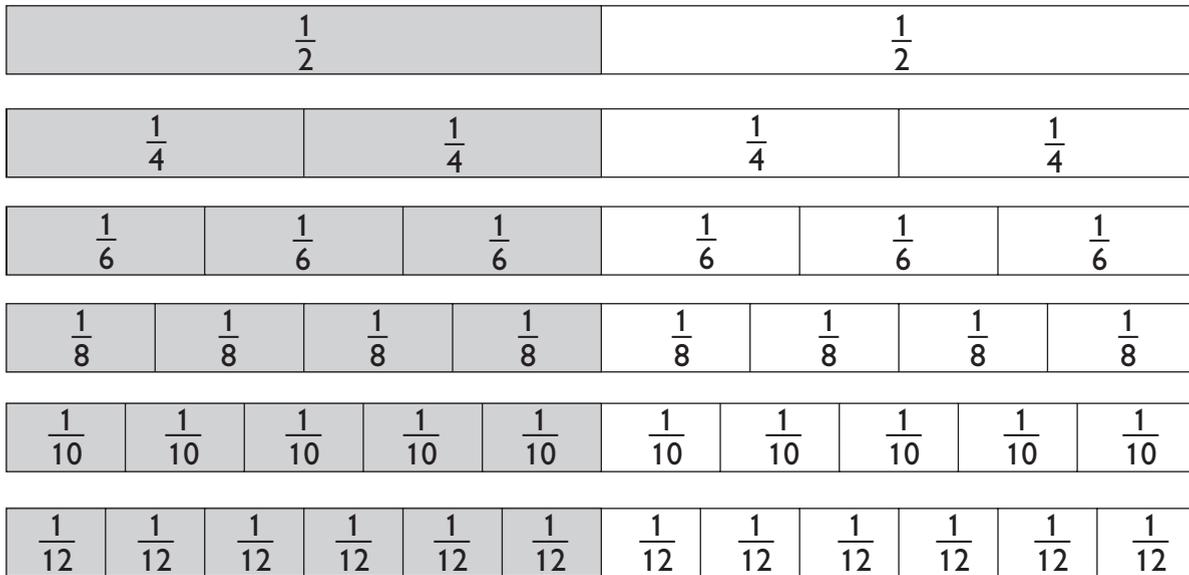


The number line has 5 equal parts.
Each part represents $\frac{1}{5}$.

$$X = \frac{1}{5}, Y = \frac{3}{5}, Z = \frac{4}{5}$$



Equivalent Fractions



From the bars above, we can see that the following fractions are equal.

$$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$$

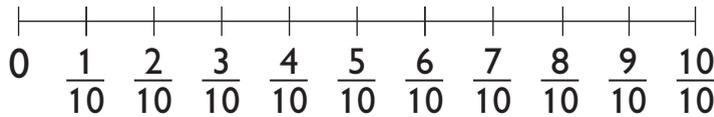
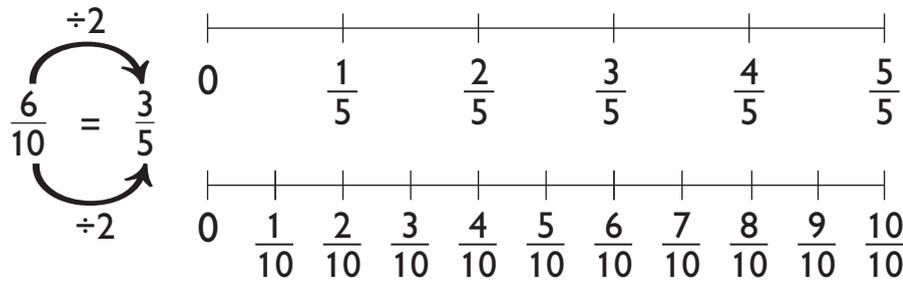
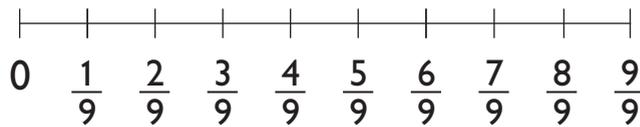
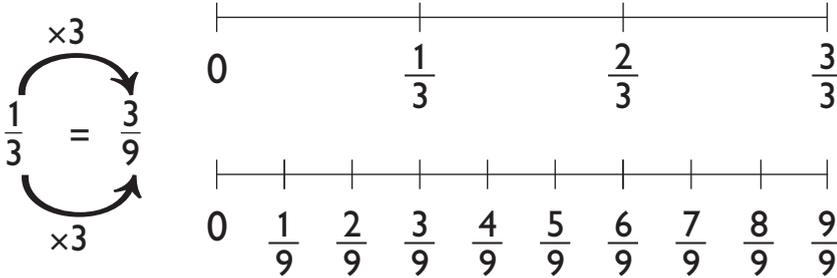
Equivalent fractions have different numerators and denominators. But they are equal in value.

$\frac{1}{2}$, $\frac{2}{4}$, $\frac{3}{6}$, $\frac{4}{8}$, $\frac{5}{10}$, and $\frac{6}{12}$ are **equivalent fractions**.



To find an equivalent fraction, we can either multiply or divide the numerator and denominator by the same number.

Find an equivalent fraction of $\frac{1}{3}$ and $\frac{6}{10}$.



We can express a fraction in its simplest form.

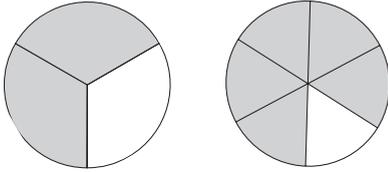
Express $\frac{8}{12}$ in its simplest form.

$$\frac{8}{12} = \frac{4}{6} = \frac{2}{3}$$

$\frac{2}{3}$ is the simplest form of $\frac{8}{12}$.

We can compare related fractions by expressing them in same denominator.

Which is greater, $\frac{2}{3}$ or $\frac{5}{6}$?

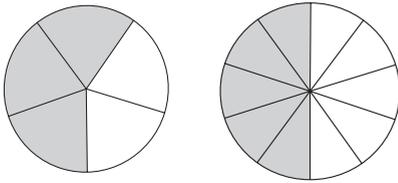


$\frac{5}{6}$ is greater than $\frac{2}{3}$.

$$\frac{2}{3} = \frac{4}{6}$$



Which is smaller, $\frac{3}{5}$ or $\frac{5}{10}$?



$\frac{5}{10}$ is smaller than $\frac{3}{5}$.

$$\frac{3}{5} = \frac{6}{10}$$

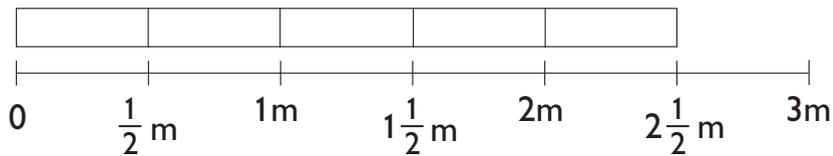


Fractions and Measurement

We can represent different measurement using fractions.

1. A rod is $\frac{1}{2}$ m long.

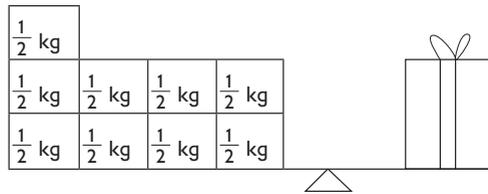
How long are 5 such rods placed end to end?



They are $2\frac{1}{2}$ m long.

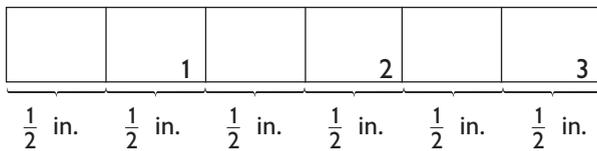
2. Each block has a mass of $\frac{1}{2}$ kg.

What is the mass of the package?



The mass of the package is $4\frac{1}{2}$ kg.

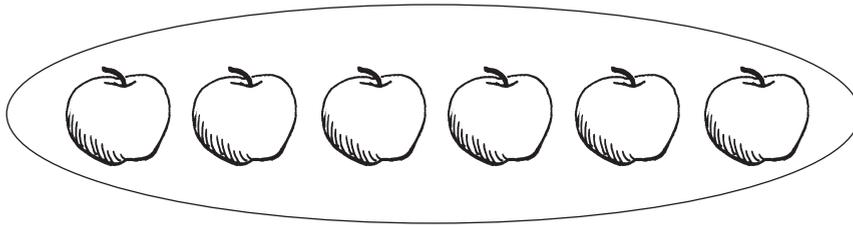
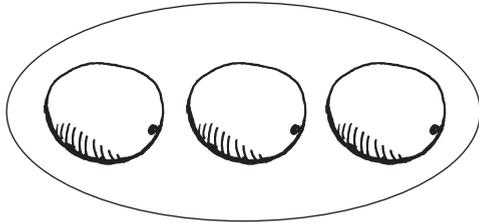
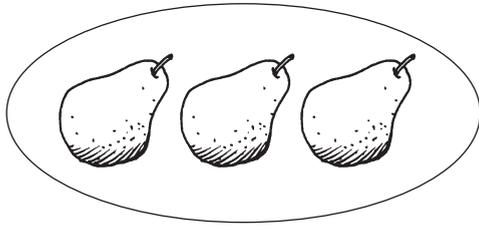
3. How many halves are there in 3 in.?



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

There are 6 halves in 3 in.

Fraction of a Set



3 out of 12 fruits are pears.

$\frac{3}{12}$ of the fruits are pears.

$$\frac{3}{12} = \frac{1}{4}$$

3 out of 12 fruits are mangoes.

$\frac{3}{12}$ of the fruits are mangoes.



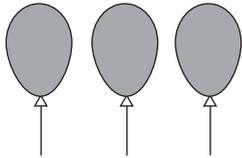
6 out of 12 fruits are apples.

$\frac{6}{12}$ of the fruits are apples.

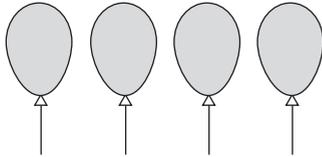
$$\frac{6}{12} = \frac{1}{2}$$



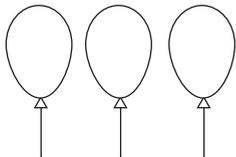
1. There are 10 balloons.
3 of these balloons are red.
4 of these balloons are green.
The remaining balloons are white.
What fraction of the balloons are white?



Red balloons



Green balloons



White balloons

$$10 - 3 - 4 = 3$$

$\frac{3}{10}$ of the balloons are white.

2. Leila has 3 quarters, 5 dimes, 2 nickels, and 2 pennies.



- (a) What fraction of her coins are quarters?
- (b) What fraction of her coins are nickels?
- (c) What fraction of her coins are dimes?

There are 12 coins altogether.

(a) $\frac{3}{12} = \frac{1}{4}$

$\frac{1}{4}$ of her coins are quarters.

(b) $\frac{2}{12} = \frac{1}{6}$

$\frac{1}{6}$ of her coins are nickels.

(c) 5 out of 12 coins are dimes.

$\frac{5}{12}$ of her coins are dimes.

Unit 10 : Time

Friendly Notes

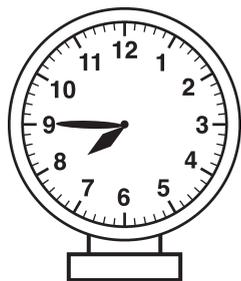
Hours and Minutes

The hour (h) and minute (min) are units of time.

$$1 \text{ h} = 60 \text{ min}$$

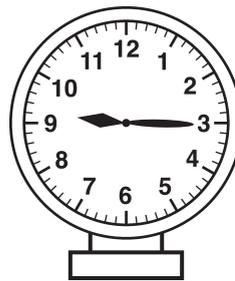
A.M. means after 12:00 midnight and before 12:00 noon.

P.M. means after 12:00 noon and before 12:00 midnight.



7:45

We read 7:45 as seven forty-five. 7:45 is 15 minutes before 8 o'clock. It is fifteen minutes to eight.

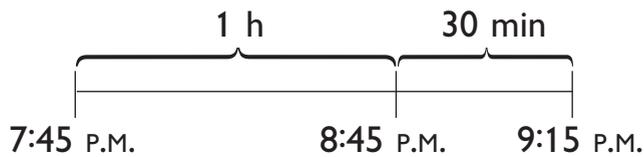


9:15

We read 9:15 as nine fifteen. 9:15 is 15 minutes past 9 o'clock. It is fifteen minutes past nine.



1. Kenny started doing his homework at 7:45 P.M.
He finished doing it at 9:15 P.M.
How many minutes did he take to complete his homework?



1 h = 60 min

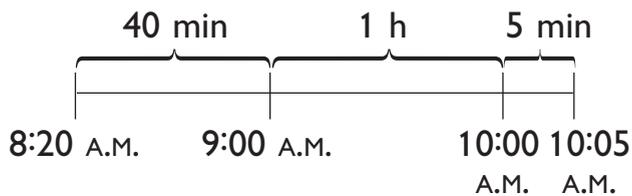


He took 1 h 30 min to complete his homework.

$$\begin{aligned} 1 \text{ h } 30 \text{ min} &= 60 \text{ min} + 30 \text{ min} \\ &= 90 \text{ min} \end{aligned}$$

He took 90 min to complete his homework.

2. Philip started swimming at 8:20 A.M.
He swam for 1 h 45 min.
What time did he stop swimming?



He stopped swimming at 10:05 A.M.

Other Units of Time

The second (s) is another unit of time.

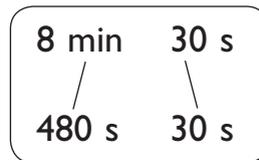
$$1 \text{ min} = 60 \text{ s}$$

The year, month, week, and day are other units of time.

$$1 \text{ year} = 12 \text{ months}$$

$$1 \text{ week} = 7 \text{ days}$$

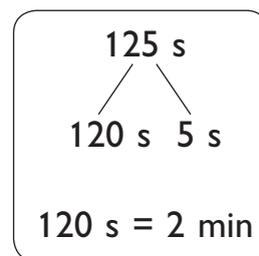
1. (a) Write 8 min 30 s in seconds.



$$8 \text{ min } 30 \text{ s} = 510 \text{ s}$$



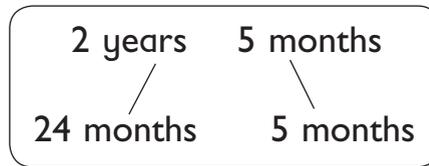
- (b) Write 125 s in minutes and seconds.



$$125 \text{ s} = 2 \text{ min } 5 \text{ s}$$



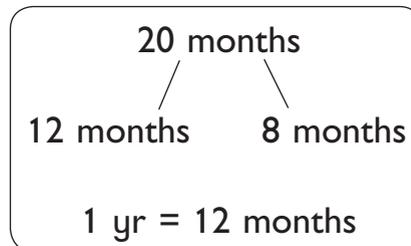
2. (a) Write 2 years 5 months in months.



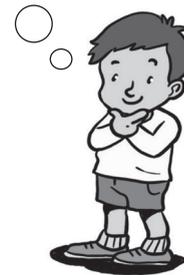
$$2 \text{ years } 5 \text{ months} = 29 \text{ months}$$



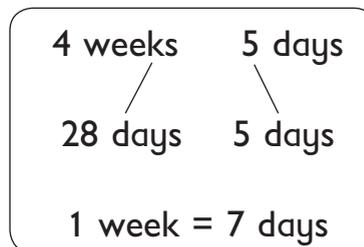
(b) Write 20 months in years and months.



$$20 \text{ months} = 1 \text{ year } 8 \text{ months}$$



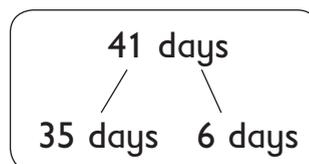
3. (a) Write 4 weeks 5 days in days.



$$4 \text{ weeks } 5 \text{ days} = 33 \text{ days}$$



(b) Write 41 days in weeks and days.



$$41 \text{ days} = 5 \text{ weeks } 6 \text{ days}$$



Unit 11 : Data Analysis

Friendly Notes

Presenting Data

We can present data in the form of a table, bar graph, or line plot.

Mrs. Li took a survey of the favorite fruits of the students in her class.

She presented the results of her survey in a table as shown below.

Favorite fruit	Number of students
Banana	5
Pear	8
Apple	10
Orange	14
Grapefruit	3

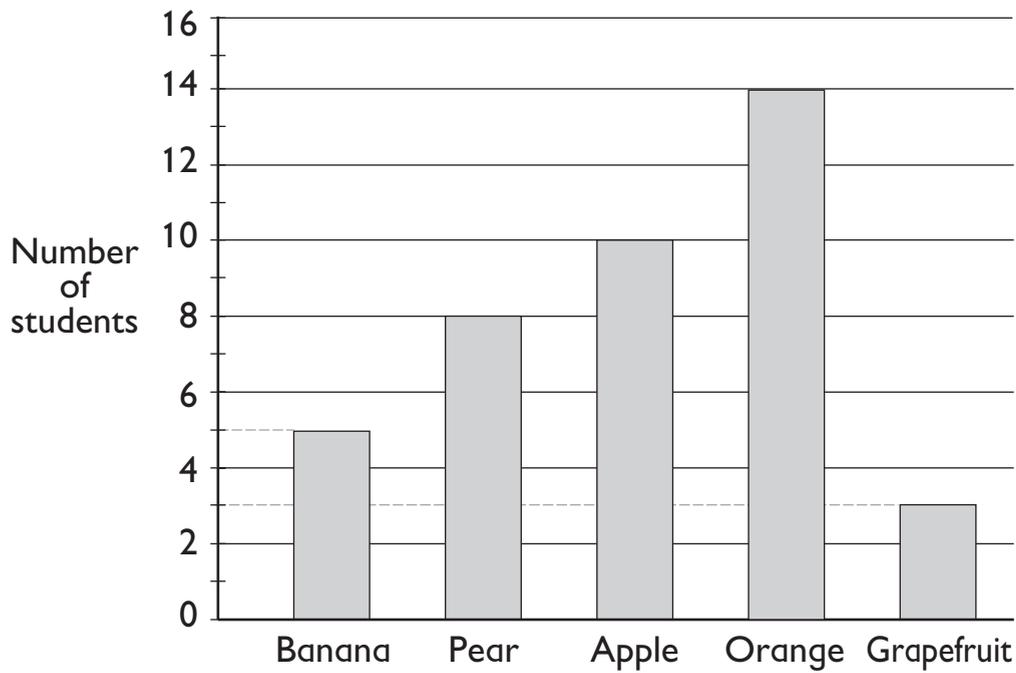
From the table,

- (a) the greatest number of students like oranges.
- (b) the least number of students like grapefruits.
- (c) $5 + 8 + 10 + 14 + 3 = 40$
There are 40 students in the class.

The results of the survey can also be presented in a bar graph as shown below.



Favorite fruit	Number of students
Banana	5
Pear	8
Apple	10
Orange	14
Grapefruit	3



A survey was carried out to find the number of pets in each family. The data collected is shown below.

0	2	2	1	1	0	3
5	4	2	2	1	3	3
0	0	0	1	1	1	1
2	1	1	4	2	0	0
2	2	1	3	1	0	0
0	2	1	1	3	2	2

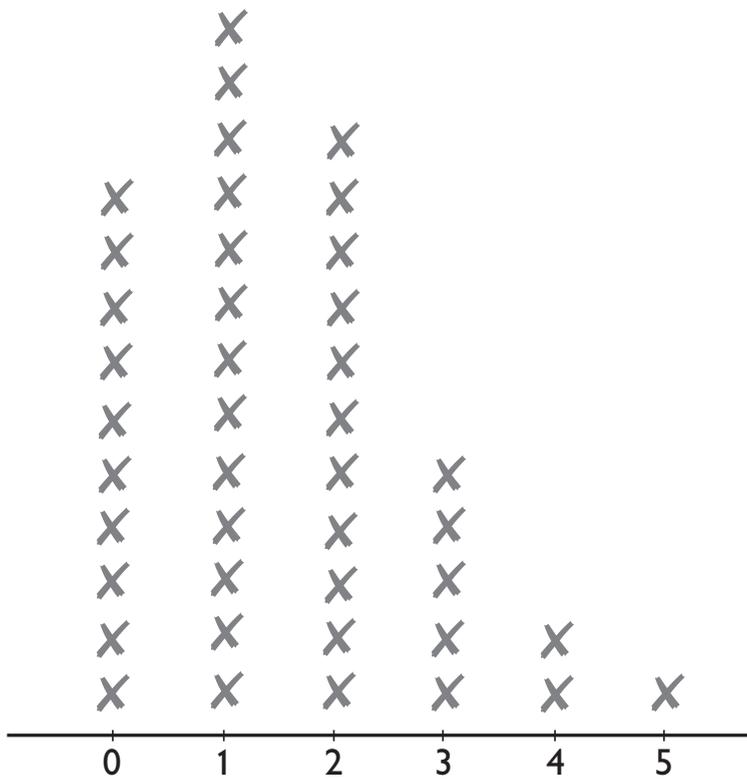
The results of a survey can be recorded in a tally chart in order to make the counting data easier.

Number of pets in the family	Number of families	
0	### ##	10
1	### ### ///	13
2	### ### /	11
3	###	5
4	//	2
5	/	1

42 families were surveyed altogether.



The results of the survey can also be presented in a line plot as shown below.



The number of pets in most families is 1.

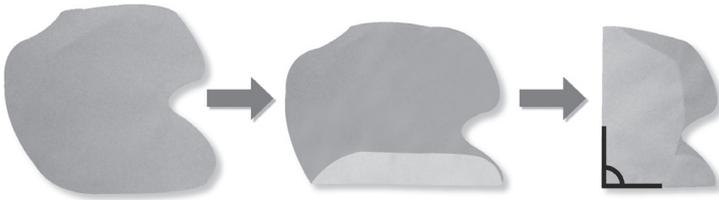


Unit 12 : Geometry

Friendly Notes

Right Angles

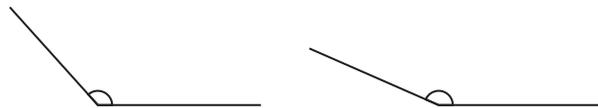
We can make a right angle by folding a piece of paper twice as shown below:



Some angles are smaller than a right angle.



Some angles are greater than a right angle.



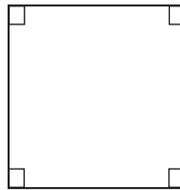
Shapes

A **quadrilateral** is a figure with 4 sides.

A rectangle and a square have 4 right angles each.



Rectangle

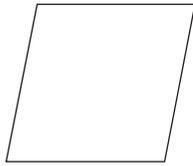


Square

A square is a special kind of rectangle.



A **rhombus** is a quadrilateral with 4 equal sides.

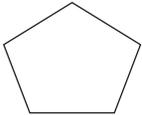
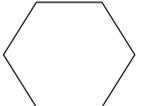
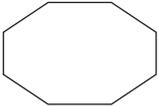


rhombus

A square is a special kind of rhombus.



Angles

Polygon	Number of sides	Number of inside angles
 Quadrilateral	4	4
 Pentagon	5	5
 Hexagon	6	6
 Octagon	8	8