NEW FAVOURITE MATH

Level D

NEW FAVOURITE MATH

New Favourite Math Series (Six levels) is designed in accordance with the Principles and Standards for School Mathematics (PSSM) that focus on mathematics content and its methods of teaching, and are produced by the National Council for Teachers of Mathematics (NCTM).

New Favourite Math carefully observes:

- using mathematical concepts, generalizations and laws in a smooth way.
- employing points of stimulating all forms of mathematical thinking.
- age, in addition to the developmental and physiological features of the students.
- employing modern constructivist teaching methods.
- using realistic pictures and portrayals far away from fantasy.
- connecting mathematics with life to highlight the importance of mathematics through mathematical problems.
- designing teaching resources and aids.
- the modernity of the content and keeping up with technological advancement.
- creating the spirit of challenge and competition.
- steering clear of routine and unnecessary repetition.

NEW FAVOURITE MATH

Levels A-F

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1.1 The Concept of Numbers (Counting)

There are many ways in which we can count. For example:

1, 2, 3, 4, ... Counting in ones

2, 4, 6, 8, ... Counting in twos

5, 10, 15, 20, ... Counting in fives

20, 10, 15, 20, ... Counting in twenties

▶ You can start counting from any number.
▶ You can also count backwards.
▶ What is the greatest number you know?
▶ Can we ever count to the last number?

Exercises

1 - **Write the missing numbers, and complete the pattern.**

A- 74, 76, 78, _80_ , _82_ , _84_

B- 105, 110, 115, _120_ , _125_ , _130_

C- 800, 700, _600_ , _500_ , _400_

D- 30, 80, 130, **180**, **230**, **280**

E- 421, 424, 427, **430**, **433**, **436**

F- 950, 900, _850_ , _800_ , _750_

2 - **Make up some number patterns of your own.**

31,29,27,25,32,21   92,96,100,104,108,112

53,57,61,65,69,73

Remember

Even Numbers:
The numbers that are exactly divisible by 2 are called even numbers, like 2, 4, 6.

Odd Numbers:
The numbers that are not divisible by 2 are called odd numbers like 3, 5, 9.

Exercises

1 - **Write:**
- The even numbers between 12 and 19. __14,16,18__
- The odd numbers between 26 and 36. __27,29,31,33,35__
- The first 6 even numbers after 37. __38,40,42,44,46,48__

2 - **Write 'E' for even numbers and 'O' for odd numbers.**

47 _O_	389 _O_	255 _O_	366 _E_
148 _E_	149 _O_	152 _E_	596 _E_

3 - **Is 65 an even number? How do you know?**

No, It's not divsible by 2

- **Is 41440 an even number? How do you know?**

Yes, It's divisble by 2

1.2 The Concept of Numbers (Place Value)

● In grade 3, you have learnt about hundreds, tens and ones.

One

Ten

One hundred

5 tens and 3 ones = 53

200 + 10 + 6 = 216
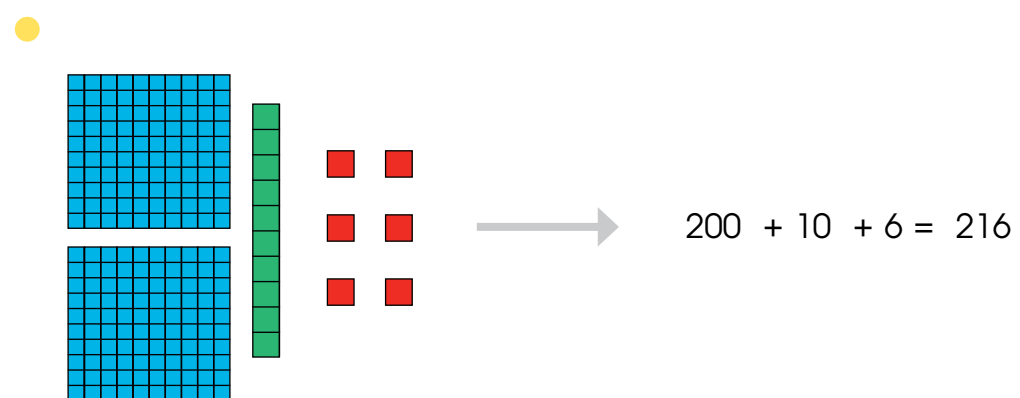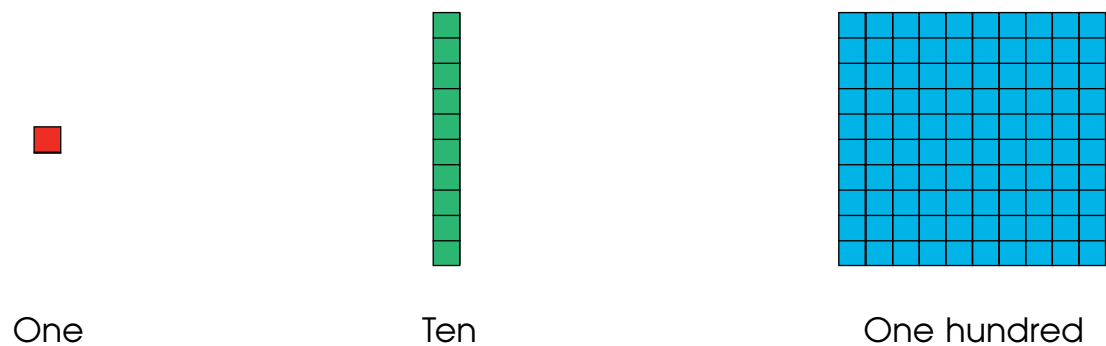
1 - **Expand these numbers:**

a- 751 = 700 + 50 + 1

b- 8327 = 8000 + 300 + 20 + 7

c- 97623 = 90000 + 7000 + 600 + 20 + 3

d- 548002 = 500000 + 40000 + 8000 + 0 + 0 + 2

2 - **Write the following in numerals:**

a- One thousand, seven hundred twenty-eight: 1728

b- Eight thousand, one hundred fifty-two: 8152

c- Twenty-seven thousand, four hundred fifty-one: 27451

d- Fifty-thousand, two hundred twenty: 50220

e- One million, two hundred thousand, one hundred: 1200100

Look at this place value chart. It helps us to read numbers.

M Millions	H. th Hundreds of thousands	T. th Tens of thousands	Th Thousands	H Hundreds	T Tens	O Ones

Write 5,678,439 in the place value chart:

M	H.th	T.th	Th	H	T	O
5	0	0	0	0	0	0
	6	0	0	0	0	0
		7	0	0	0	0
			8	0	0	0
				4	0	0
					3	0
						9

■ Exercises ▼

1 - **Write the following in numerals:**

▶ Nine hundred and forty nine. _____949_____
▶ Seven thousand eight hundred and seventy four. _____7874_____
▶ Nine hundred thirteen thousand and eighty six. _____913086_____
▶ Eight hundred forty six thousand and eighty nine. _____846089_____
▶ Eight hundred thirty thousand and forty nine. _____830049_____

2 - **What is the place value of the circled number?**

3 4 ⑤ 6 7 1 Thousands	4 5 6 7 ⑧ 8 Tens
1 2 3 4 5 ⑥ Ones	7 8 ④ 5 6 7 8 Tens of thousands
3 4 5 6 ⑦ 8 4 Hundreds	4 5 7 6 ④ 1 4 Hundreds

1.3 Comparing Numbers

Look at these two numbers:

433456   **453121**

453121 is greater than **433456**

433456 is less than **453121**

You can write these as:

453121 > 433456   or   433456 < **453121**

Greater than
8 > 3
8 is greater than 3

Equal To
5 = 5
5 is equal to 5
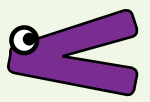
Less than
2 < 7
2 is less than 7

■ Exercises ▼

1 - **Tick the smallest number and circle the greatest one.**

a- 787867	404340 ✓	(873403)	839979
b- 567843 ✓	934567	4034940	(4123100)

2 - **Use (>), (<) to get a true statement.**

a- 834567   **>**   814567
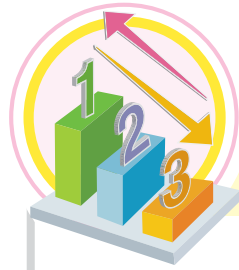
b- 8456781   **<**   8456782

c- 8764534   **<**   7645647

d- 6345678   **>**   645997

1.4 Ordering Numbers

Numbers are said to be in **ascending order** when they are arranged from the smallest to the greatest number.

Example: 2340, 3572, 77321, 553210

Numbers are said to be in **descending order** when they are arranged from the greatest to the smallest number.

Example: 553210, 77321, 3572, 2340

■ Exercises

1 - Arrange the following numbers in ascending order.

- 4909, 5919, 6009, 3999
  3999,4909,5919,6009

- 43999, 93014, 80479, 79170
  43999,79170,80479,93014

2 - Arrange the following numbers in descending order.

- 485671, 497693, 4644034, 496998
  4644034,497693,496998,485671

- 880881, 819988, 879941, 880781
  880881,880781,879941,819988

1.5 Rounding Numbers (Estimating)

I'll be home around 4 o'clock.

I got about 90 in math last year.

About 10000 students attended universities.

■ The numbers above are examples of rounding off.

Rounding off gives us an approximate value. We can round off to the nearest ten, hundred or thousand.

To round off a number:

1- Find the place that you want to round. For example, let's take a place value of thousand ⟶ ⑦284

2- Look at the digit on the right ⟶ (2)

If this digit is less than 5, leave the digit that you want to round as it is, and turn all the digits on the right into zeros ⟶ 7000

But if you want to round a number to the nearest hundred, you have to circle the third digit from the right 7②8 4. Then, look at the second digit from the right (in the tens' place) that is, 8. If it's greater than, or equals 5, we add 1 to the circled digit and turn all the digits on the right into zeros: 7300.

1 -Round each number to the nearest ten.

a- 928 ⟶ _930_

b- 333 ⟶ _330_

c- 7517 ⟶ _7520_

d- 43595 ⟶ _43600_

2 -Round each number to the nearest hundred.

a- 4231 ⟶ _4200_

b- 56780 ⟶ _56800_

c -143997 ⟶ _144000_

d- 90125 ⟶ _90100_

3 -Round each number to the nearest thousand.

a- 26722 ⟶ _27000_

b- 894104 ⟶ _894000_

c- 148997 ⟶ _149000_

d- 90125 ⟶ _90000_
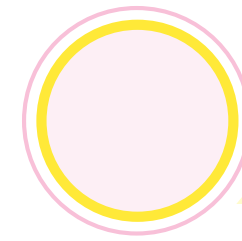
1.6   Problem Solving

1- Is the number 52130 closer to 52000 or to 50000?

Can you convince me?   52000

2- Arrange the digits 0, 2, 4, 5, 5, 6 to make the greatest number you can.
Write the number in words.   655420,Six hundred fifty five thousand four hundred twenty

▶ Now make the smallest number you can using the same digits.   204556

▶ Write the number in words.   Two hundred four thousand five hundred fifty six

3- Consider the numbers in the table:

Country	Area in km^2
Jordan	92300
Palestine	26805
Lebanon	10400
Kuwait	17820
Bahrain	665
Oman	309500

Oman , Jordan , Palestine , Kuwait , Lebanon , Bahrain

▶ Write the name of the countries starting from greatest to smallest in area.

▶ Which three countries are largest in area?

4- Jacki read 10 books. Beth read 2 more books than Jacki. How many books did Beth read?   10+2=12

5- Beth read 8 books. Jacki read 3 fewer books than Beth.
How many books did Jacki read?   8-3=5

Addition and Subtraction

2.1   Adding up to 6-Digit Numbers

a) 4 + 2 = ———

b) 6 + 10 = ———

c) 11 + 2 + 3 = ———

d) 12 + 15 + 2 = ———

e) 5 + 20 + 100 = ———

f) 200 + 150 = ———

g) 3 + 2 + 55 = ———

h) 900 + 100 = ———

Addition Without Regrouping

Add these:

A-
```
  2 7 0
+   1 1
```

B-
```
  4 5 2
+ 4 2 5
```

C-
```
  9 2 1 1
+   6 7 8
```

D-
```
  2 7 0
+   1 1
```

E-
```
  4 5 2
+ 4 2 5
```

F-
```
  9 2 1 1
+   6 7 8
```

G-
```
  3 8 4
+ 6 1 4
```

H-
```
  3 8 4
+ 6 1 4
```

SKIP THIS QUESTION

Addition With Regrouping Ones

1 - Find the sum without using a calculator, using the method you think is best:

a-
```
  2 5 3
+   1 9
```

b-
```
  1 3 6
+   4 8
```

Remember, to find:

68 + 15 =

```
   68              60 + ⑧  ——→ 13
+  15    ——→       10 + ⑤
```
13 is 1 ten and 3 ones so we carry ten to the tens column

```
     ①
    68              68
 + 15    ——→     + 15
    3              83
```

c-
```
  2 5 3
+   1 9
```

d-
```
  1 3 6
+   4 8
```

Addition With Regrouping Tens and Ones

```
  4 6 3
+   5 8
```
——→ **Remember, to find:** 3 + 8 = 11

```
    ①
  4 6 3
+   5 8
      1
```
——→ Add the digits in the tens column together

```
    ①
  4 6 3
+   5 8
    2 1
```
——→ Add the digits in the hundreds column together

```
  4 6 3
+   5 8
  5 2 1
```

Exercises

1 -Find the sum

a-
```
    3 6 6
  + 2 9 5
    6 6 1
```

b-
```
    4 8 3
  + 1 2 9
    6 1 2
```

c-
```
    3 4 5 4
  + 1 3 6 7
    4 8 2 1
```

d-
```
    2 2 9 9
  + 3 4 5
    2 6 4 4
```

e-
```
    2 3 2 3 5 9
  + 5 2 0 6 4 0
    7 5 2 9 9 9
```

f-
```
    2 2 9 9
  + 3 4 5
    2 6 4 4
```

2 -Put the suitable digit in the ☐ , and check your answer using a calculator.

a- 410023 + ☐ 15 ☐ ☐ 2 = 725975

b- ☐ 0880 + 3 ☐ 9 ☐ 7 = 97837

c- 275 ☐ 8 + ☐ ☐ 91 ☐ = 73 ☐ 20

SKIP THID QUESTION

Use the calculator to check all exercises in the lesson.

2.2   Subtracting up to 6-Digit Numbers

a) 8 - 4 = _____   e) 7 - 7 = _____

b) 4 - 0 = _____   f) 10 - 3 = _____

c) 9 - 7 = _____   g) 40 - 25 = _____

d) 10 - 6 = _____   h) 125 - 100 = _____

Subtraction Without Regrouping

```
   6 8
 - 2 5
```
→ Step (1) 8 - 5 = 3 →
```
   6 8
 - 2 5
     3
```
→

Step (2) 6 - 2 = 4 → The answer is 43. Can you check it by calculator?

Exercises

1- Subtract the following numbers:

a-
```
    8 3
  - 2 2
    6 1
```

b-
```
    7 6
  - 4 0
    3 6
```

c-
```
    8 8 9
  - 2 3 4
    6 5 5
```

d-
```
    89321
  - 78321
    11000
```

e-
```
    53977
  -  1932
    52045
```

f-
```
    19631
  - 19111
    00520
```

Subtraction With Regrouping Ones

Step (1) 8 - 9 = ?
Take (1) ten from the (3) tens → (1) ten + 8 ones
→ 10 + 8 = 18

38
- 9

Step (2) 18 - 9 = 9 →

$$\begin{array}{r} \overset{2}{\cancel{3}}\,\overset{18}{\cancel{8}} \\ -\ 9 \\ \hline 2\ 9 \end{array}$$

Step (3) Don't forget that we took 1 ten from the 3 tens above, so we got 2. Check the answer by calculator!

■ Exercise

1- Solve by subtraction:

a-
```
   8 3
-  4 6
```
3 7

b-
```
   9 7
-  2 9
```
6 8

c-
```
  3 5 5
-   4 6
```
3 0 9

d-
```
  7 7 4 5
- 3 4 2 2
```
4 3 2 3

e-
```
  8 3 7 2
- 1 3 5 8
```
7 0 1 4

f-
```
  763254
- 152126
```
611128

g-
```
  193291
- 111117
```
82174

h-
```
  94753
- 94614
```
1 3 9

Subtraction With Regrouping Tens and Ones:

```
  3 2 7
-   8 9
```
→ Step (1) Subtracting ones →
```
  3 2 7^{+10}
-   8 9
```
8

Step (2) Subtracting tens →
```
  2  1+10
  3 2 17
-    8 9
```
8
→
```
  2 11 17
-    8 9
```
2 3 8
→ Don't forget subtracting hundreds.

■ Exercise

2- Subtract the following:

a-
```
   5 1 6
-  3 2 7
```
1 8 9

b-
```
   7 0 3
-  2 8 5
```
4 1 8

c-
```
   6 1 1
-  1 9 9
```
4 1 2

d-
```
  196455
- 197265
```
SKIP THIS

e-
```
   7749
-  4834
```
2915

f-
```
  109561
-   9371
```
100190

g-
```
  20000
-      5
```
1 9 9 9 5

h-
```
   1000
-   404
```
5 9 6

i-
```
  201010
-  19111
```
181899

2.3 Problem Solving

Divide & Conquer the Problem

Before

Plan
- Read: visualize
- Reread: code
- Sketch: predict

During

Solve
- Show my strategies.
- Show my thinking.

After

Check
- Check my work.
- Go back to the question.
- Answer in a complete sentence.

What is the problem asking?
What would be a reasonable answer?

Are my strategies effective and efficient?
Is there another way to solve the problem?

Did I answer the question?
Does my answer make sense?

Keywords

Addition terms	Subtraction terms
Plus	Minus
Add	Subtract
Sum	Difference
Total	Take away
Add together	Less than
Altogether	How many remains
How many	Take

Problem Solving

1. John had 24 apples, Lama gave him 16 more. How many apples does John have now? 24 - 16 = 8 APPLES

2. Lee buys 10 books, and he gets 14 more form Joe and another 7 from Jess. How many does he have altogether? 10 + 14 + 7 = 31 Books

3. Find the total of 233456 and 673? 233456 + 673 = 234129

4. A school has 287 students. 59 student left at the end of year. How many students remained? 287 - 59 = 228

5. What is the difference between 11786 and 1579? 11786 - 1579 = 10207

6. How much less than 40 is 25? 40 - 25 = 15

7. Sami subtracted a number from 4000 and he got an answer of 1732. What was the number he subtracted? 4000 - 1732 = 2268
4000 - 2268 = 1732

8. Complete the magic square. The sum of all numbers in every row, column, and diagonal should be 24.

7	6	11
12	8	4
5	10	9

9. Make up one addition problem and one subtraction problem of your own. Give them to a friend to solve them.

1- Jack spent 173 minutes reading last week. He read for 118 minutes this week. How many minutes did he read in all?
Answer 173 + 118 = 291 minutes

2- Sarah has 645 rings and 324 bracelets. How many more rings than bracelets does Sarah have?
*Answer* 645 - 324 = 321 more rings

Multiplication

3.1 Multiplication Table

Solve the following products either mentally or by hand or using a pencil and paper.

a) 3 X 2 = __6__   b) 3 X 4 = __12__   c) 7 X 4 = __28__   d) 5 X 8 = __40__

e) 10 X3 = __30__   f) 4 X 8 = __32__   g) 6 X 6 = __36__   h) 3 X 9 = __27__

- **Complete your own multiplication chart.**

x	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	12	14	16	18	20
3	0	3	6	9	12	15	18	21	24	27	30
4	0	4	8	12	16	20	24	28	32	36	40
5	0	5	10	15	20	25	30	35	40	45	50
6	0	6	12	18	24	30	36	42	48	54	60
7	0	7	14	21	28	35	42	49	56	63	70
8	0	8	16	24	32	40	48	56	64	72	80
9	0	9	18	27	36	45	54	63	72	81	90
10	0	10	20	30	40	50	60	70	80	90	100
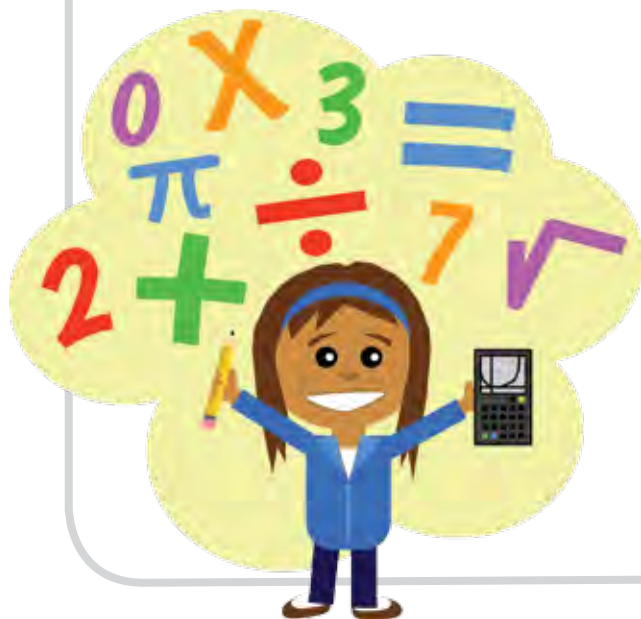
3.2 Multiplication Without Regrouping

Look at these two examples:

$$\begin{array}{r} 32 \\ \times\ 3 \\ \hline 96 \end{array}$$

Step (1): 3 x 2 = 6 ones

Step (2): 3 x 3 = 9 tens

Step (3): 90 x 6 = 96

$$\begin{array}{r} 242 \\ \times\ \ 2 \\ \hline 484 \end{array}$$

Step (1): 2 x 2 = 4 ones

Step (2): 2 x 4 = 8 tens

Step (3): 2 x 2 = 4 hundreds 400 + 80 + 4 + 484

■ Exercise

Multiply:

A-
$$\begin{array}{r} 320 \\ \times\ 3 \\ \hline 9\,6\,0 \end{array}$$
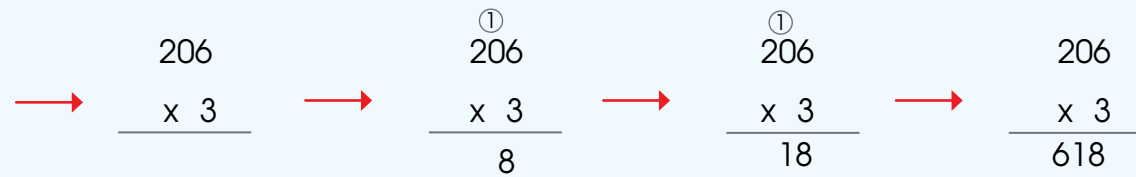
B-
$$\begin{array}{r} 4432 \\ \times\ 2 \\ \hline 8\,8\,6\,4 \end{array}$$

C-
$$\begin{array}{r} 13142 \\ \times\ 2 \\ \hline 2\,6\,2\,8\,4 \end{array}$$

3.3 Multiplication With Regrouping

```
  206
x   3
-----
  618
```

Step (1): 3 x 6 = 18 ones
18 ones = 1 tens and 8 ones
Step (2): 3 x 0 = 0 tens
Step (3): 3 x 2 = 6 hundred
Step (4): 6 hundred + 1 tens + 8 ones
600 + 10 + 8 = 618

```
  206              ①                ①
x   3      →     206      →        206      →        206
          →     x   3    →        x   3    →        x   3
                -----            -----            -----
                    8               18              618
```

Exercise

Multiply:

A-
```
  2 2 4
x     4
-------
  8 9 6
```

B-
```
  4 2 9
x     2
-------
  8 5 8
```

C-
```
2 1 3 4 7
x       2
---------
4 2 6 9 4
```

D-
```
  2 4 4
x     3
-------
  7 3 2
```

Look at this example:

Calculate
```
    6 7
x   1 2
```

Step (1): Start by multiplying 2 by 67.

Step (2): Put 0 (Zero) under the ones column in the result (under 4).

Step (3): Multiply 1 by 67.

Step (4): Add the results from step (1) and step (3) together.

Check the answer by calculator. Is it right?

```
        ①
      6 7
x     1 2
--------
        ①
      1 3 4
+   6 7 0
--------
      8 0 4
```

```
        ①
      6 7
x     1 2
--------
      804
```

Exercise

Multiply:

A- 70 x 30 = 2100

B- 32 x 20 = 640

C- 45 x 11 = 495

D-
```
  155
x   3
-----
  4 6 5
```

E-
```
  256
x   2
-----
  5 1 2
```

F-
```
  342
x   4
-----
1 3 6 8
```

G-
```
   72
x  33
-----
2 3 7 6
```

H-
```
   56
x  32
-----
1 7 9 2
```

I-
```
  132
x  20
-----
2 6 4 0
```

J-
```
  425
x  31
------
1 3 1 7 5
```

3.4 Problem Solving

Remember that you have to understand the problem and read it more than once before you begin.

1 Silva has 4 boxes of pins, each box contains 112 pins. How many pins does she have altogether? $112 * 4 = 448$

2 I multiplied two numbers and got 324. What could the two numbers be? Do you have another solution?
$162 * 2 = 324$ * $81 * 4 = 324$ / $36 * 9 = 324$
$108 * 3 = 324$ / $54 * 6 = 324$

3 Jill drives 50 people every day. He works 6 days a week. How many people will he drive in 3 weeks? $50 * 6 = 300$ people in 6 days
$300 * 3 = 900$ people in 3 weeks

4 There are 130 rows of 15 chairs in a hall. How many people can be seated?
$130 * 15 = 1950$ people can be seated

5 In a library, a rack can hold 166 books. How many books can 14 racks hold? $166 * 14 = 2324$ Books

6 340 soldiers are lined up in each row. How many soldiers are there in 8 rows?
$340 * 8 = 2720$ soldiers

7 43 students are seated in each class. How many students are there in 10 classes?
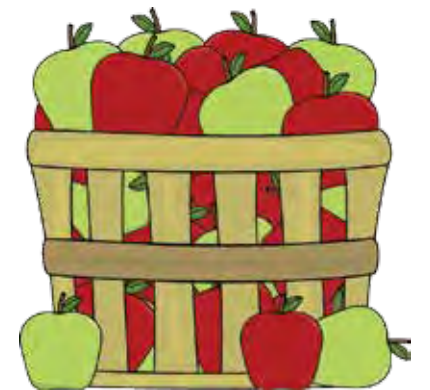$43 * 10 = 430$ students

8 A book has 76 pages. How many pages are there in 46 books?
$76 * 46 = 3466$ pages

9 A box has 30 apples. How many apples are there in 35 boxes?
$30 * 35 = 1050$ apples

4.1 Factors and Multiples

6 =

1 x 6 ,   1 and   6   are factors of 6.

2 x 3 ,   2 and   3   are factors of 6.

What do you think are the factors of number 12?

Factors are what we can multiply to get the number.

■ Exercise

Find the factors for:

30   _1,3,5,6,10,30_   24   _1,2,3,4,6,8,24_

100   _1,2,4,5,10,20,25,50,100_   81   _1,3,9,27,81_

6

x 0 = 0   so   0 is a multiple of 6

x 1 = 6   so   6 is a multiple of 6

x 2 = 12   so   12 is a multiple of 6

x 3 = 18   so   18 is a multiple of 6

⋮

and so on

What do you think about 10. Can you write some multiples?

Multiples are what we get after multiplying the number by an integer.

■ Exercise

Write 5 multiples for each number:

a) 30   _0,30,60,90,120_   b) 200   _400,600,800,1000,1200_   c) 12   _24,36,48,60,72_

d) 9   _9,18,27,36,45_   e) 22   _44,66,88,110,132_   f) 27   _54,81,108,135,162_

4.2 Long Division

You can mentally solve a lot of division exercises:

☐ $42 \div 6 = 7$ because $(7 \times 6) = 42$

☐ $70 \div 7 = 10$ because $(7 \times 10) = 70$

☐ $81 \div 9 = 9$ because $(9 \times 9) = 81$

☐ $200 \div 4 = 50$ because $(4 \times 50) = 200$

You can notice that multiplication is closely connected to division.

But how much is $176 \div 8$? It's not so easy, but we could try guessing ... is it 10 ?

... 10 x 8 = 80 too small

... is it 20 ??   20 x 8 = 160   still small

... is it 25 ??   25 x 8 = 200   big

The answer is between 20 and 25.

Let's say it's 23.   23 x 8 = 184. It's big but close.

Let's say it's 22. 22 x 8 = 176.... **Bingo!**

But what if the question is even more difficult like $6125 \div 7 = ?$

That is going to take **a long** time to find the solution, so use **long division.**

It will help you.

Remember: Dividend ÷ Divisor = Quotient

write as

$$\text{Divisor} \overline{)\text{Dividend}}^{\text{Quotient}}$$

So when we say $42 \div 6 = 7$

we can write $6\overline{)42}^{\,7}$

Find 695 ÷ 5 by long division

$5\overline{)695}$ ⟶ $\dfrac{1}{5\overline{)695}}$
$\underline{5}\downarrow\downarrow -$
195

First, the dividend (6) is divided by the divisor (5). 6 ÷ 5 = 1, and the remainder is 1. Multiply (1) by the divisor (5) to get 5. We put (5) under the digit that we divided (6). Then we subtract 6 - 5.

$\overset{x13}{5\overline{)695}}$
$\underline{-\ 5}$
195
$\underline{-\ 15\downarrow}$
045

Take 19 ÷ 5. We will get 3 and the remainder = 4. So the quotient is (3). 3 x V = 15

$\overset{x138}{5\overline{)695}}$
$\underline{-\ 5}$
195
$\underline{-\ 15}$
045
$\underline{-\ 45}$
000

45 ÷ 5 = 8 with no remainder. So, the answer = 8.

So the answer of 695 ÷ 5 = 138
How can we check our answer?

Solve:

a)
$\dfrac{64}{8\overline{)512}}$
$\underline{-\ \ 48}$
32
$\underline{-\ \ 32}$
0

b)
$\dfrac{32}{4\overline{)128}}$
$\underline{-\ \ 12}$
12
$\underline{-\ \ 12}$
0

c)
$\dfrac{120}{8\overline{)960}}$
$\underline{-\ 96}$
0

d)
$\dfrac{875}{7\overline{)6125}}$
$\underline{-\ \ 56}$
525
$\underline{-\ \ 49}$
35
$\underline{-\ \ 35}$
0

e)
$\dfrac{154}{6\overline{)924}}$
$\underline{-\ \ 6}$
324
$\underline{-\ \ 30}$
24
$\underline{-\ \ 24}$
0

f)
$\dfrac{47}{2\overline{)815}}$
$\underline{-\ 8}$
015
$\underline{-\ 14}$
001

4.3   Problem Solving

A teacher has $100 to buy workbooks. If each workbook costs $5 how many workbooks can the teacher buy?

Solution:

Let's read the question again to understand it well.

The teacher has 100 workbooks that cost $5 each.
With $100, how many books can we buy?

$$5\overline{)100} \longrightarrow = 20$$

So, we can buy 20 books.
and to check $\longrightarrow$ 20 books x 5 = 100. That's right.

■ **Solve:**

1   A gym teacher has $60 to spend on a new football. If each football costs 3, how many footballs can the gym teacher buy?

$$3\overline{)60}^{\;20}$$

2   A group of 360 people is going on a boat trip. Each boat holds 9 people. How many boats will the group need?

$$9\overline{)360}^{\;\;\;}$$
$$-36$$
$$\overline{000}$$

3   888 people need to ride the elevator to the top of a building. The elevator can hold 12 people at a time. How many trips will the elevator need to make?

$$12\overline{)888}^{\;74}$$
$$-840$$
$$\overline{048}$$

4   A box of books weighs 42 kg. Each book weighs 3 kg. How many books are there in the box?

$$3\overline{)42}^{\;14}$$
$$-42$$
$$\overline{0}$$

5   Samar's mother made 75 cookies. She put the cookies in bags with 2 cookies in each. How many bags could she have filled up?

$$2\overline{)75}^{\;37}$$
$$-74$$
$$\overline{01}$$

Fractions

5.1 Introduction to Fractions

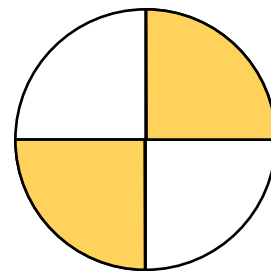**The shaded part represents** $\frac{1}{4}$

(1): Indicates the number of shaded parts.
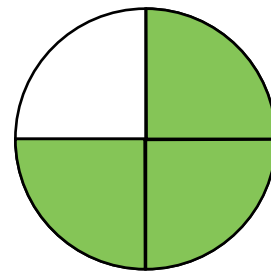
(4): Indicates the total number of all parts.
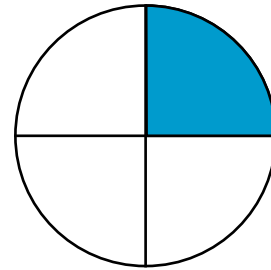
The shaded part represents

$\frac{2}{4}$ or $\frac{1}{2}$

The shaded part represents $\frac{3}{4}$

A fraction is made up of a numerator and a denominator.

Fraction = $\frac{\text{Numerator}}{\text{Denominator}}$ ← Top
 ← Bottom

In the fraction $\frac{2}{3}$, $\frac{2}{3}$ is the numerator.
 is the denominator.

Exercise

Write the fraction that corresponds to the **shaded** parts at the right, and the fraction that corresponds to the **unshaded** parts at the left. Determine the numerator and denominator.
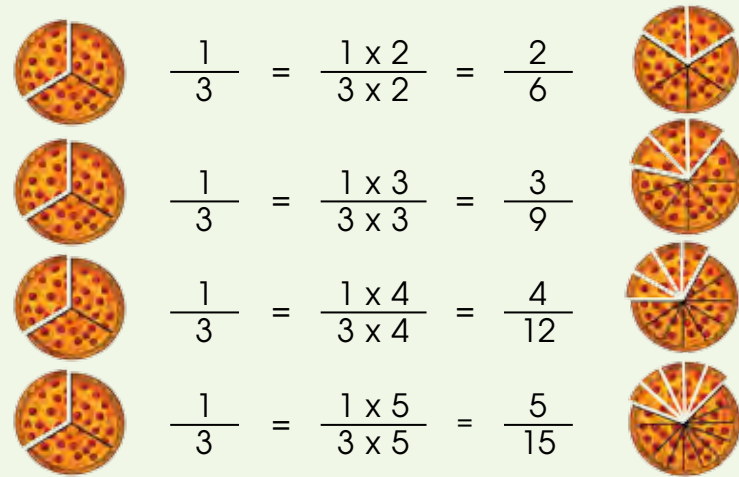
$\frac{8}{10}$ ← → $\frac{2}{10}$

$\frac{2}{8}$ ← → $\frac{6}{8}$

$\frac{1}{4}$ ← → $\frac{3}{4}$

$\frac{2}{12}$ ← → $\frac{10}{12}$
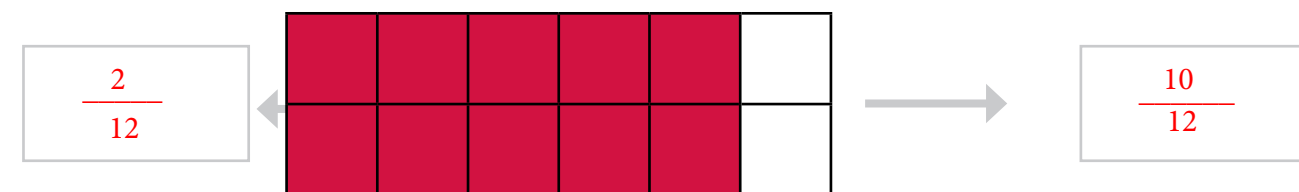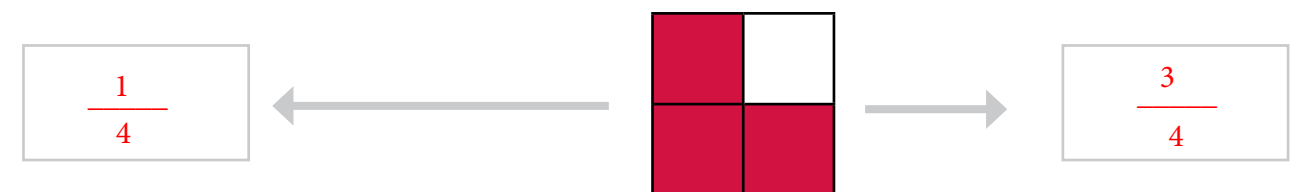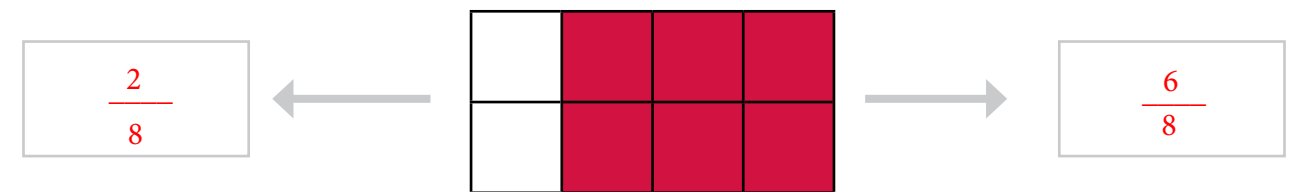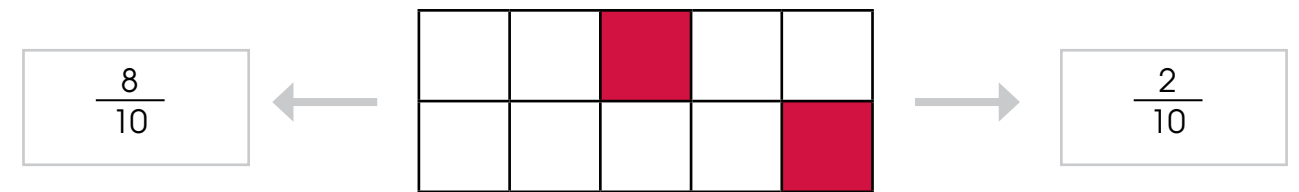
Do you notice anything? Share it with us.

5.2 Equivalent Fractions

1. When we multiply the numerator and the denominator of a fraction by the same number, we get an **equivalent fraction.**

2. When we divide the numerator and the denominator of a fraction by the same number, we get an **equivalent fraction.**

1 Look at the equivalent fractions of $\frac{1}{3}$.

$$\frac{1}{3} = \frac{1 \times 2}{3 \times 2} = \frac{2}{6}$$

$$\frac{1}{3} = \frac{1 \times 3}{3 \times 3} = \frac{3}{9}$$

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

$$\frac{1}{3} = \frac{1 \times 5}{3 \times 5} = \frac{5}{15}$$

We can see that

$\frac{2}{6} = \frac{3}{9} = \frac{4}{12} = \frac{5}{15}$ ... are equivalent fractions to $\frac{1}{3}$

2 Find four equivalent fractions of $\frac{2}{3}$.

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

● $\frac{2}{3} = \frac{2 \times 3}{3 \times 3} = \frac{6}{9}$

● $\frac{2}{3} = \frac{2 \times 4}{3 \times 4} = \frac{8}{12}$

● $\frac{2}{3} = \frac{2 \times 5}{3 \times 5} = \frac{10}{15}$

● $\frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15}$

Go back and divide the top and bottom of $\frac{4}{6}$ by 2. We will get $\frac{2}{3}$

$$\frac{6}{9} = \frac{2}{3}$$

Exercises

1 Write five equivalent fractions to $\frac{3}{5}$. $\frac{6}{10} = \frac{9}{15} = \frac{12}{20} = \frac{15}{25} = \frac{18}{30}$

2 Fill in the blanks with equivalent fractions.

$$\frac{1}{5} = \frac{2}{10} = \frac{3}{15} = \frac{4}{20} = \frac{5}{25} = \frac{6}{30}$$

4 Write the next three equivalent fractions to each of the following.

a- $\frac{3}{4} = \frac{6}{8} = \frac{9}{12} = \frac{12}{16} = \frac{15}{20} = \frac{18}{24} = \frac{21}{28}$

b- $\frac{4}{9} = \frac{8}{18} = \frac{12}{27} = \frac{16}{36} = \frac{20}{45} = \frac{24}{54} = \frac{28}{63}$

c- $\frac{21}{30} = \frac{7}{10} = \frac{14}{20} = \frac{21}{30} = \frac{28}{40}$

3 Write five equivalent fractions to each of the following.

a- $\frac{3}{4}$ b- $\frac{5}{6}$ c- $\frac{6}{7}$ d- $\frac{7}{8}$ e- $\frac{1}{4}$

$\frac{3}{4} = \frac{6}{8} = \frac{9}{12} = \frac{12}{16} = \frac{15}{20} = \frac{18}{24}$

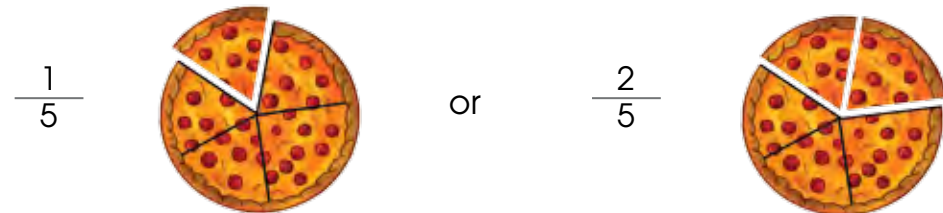$\frac{5}{6} = \frac{10}{12} = \frac{15}{18} = \frac{20}{24} = \frac{25}{30} = \frac{30}{36}$

$\frac{6}{7} = \frac{12}{14} = \frac{18}{21} = \frac{24}{28} = \frac{30}{35} = \frac{36}{42}$

$\frac{7}{8} = \frac{14}{16} = \frac{21}{24} = \frac{28}{32} = \frac{35}{40} = \frac{42}{48}$

$\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \frac{4}{16} = \frac{5}{20} = \frac{6}{24}$

Look at these fractions:

$$\frac{1}{5} \quad \text{or} \quad \frac{2}{5}$$

▌ **Which fraction is bigger?**

We check the denominators. If they are the same, we check the numerators. The fraction which has the greatest numerator is the greatest fraction.

$\frac{2}{5}$ is bigger than $\frac{1}{5}$

▌ **Which fraction is smaller?** $\frac{5}{8}$ or $\frac{6}{8}$

$\frac{5}{8}$ is smaller than $\frac{6}{8}$

because the numerator 5 is smaller than the numerator 6 with fixed denominators.

■ **Exercise**

Circle the greater fraction, and say why you chose it.

a) $\frac{2}{5}$, $\frac{1}{5}$

b) $\frac{3}{11}$, $\frac{5}{11}$

c) $\frac{5}{7}$, $\frac{3}{7}$

d) $\frac{1}{6}$, $\frac{4}{6}$

e) $\frac{7}{11}$, $\frac{3}{11}$

f) $\frac{8}{9}$, $\frac{6}{9}$

Ordering Fractions in Ascending and Descending Order

Look at these fractions:

$$\frac{9}{12} \quad , \quad \frac{6}{12} \quad , \quad \frac{10}{12}$$

$\frac{10}{12}$ is the greatest fraction and $\frac{6}{12}$ is the smallest.

The ascending order is: (small $\longrightarrow$ big)

$$\frac{6}{12} \quad , \quad \frac{9}{12} \quad , \quad \frac{10}{12}$$

And the descending order is: (big $\longrightarrow$ small)

$$\frac{10}{12} \quad , \quad \frac{9}{12} \quad , \quad \frac{6}{12}$$

■ **Exercises**

1- Arrange the following fractions in ascending order.

a) $\frac{5}{6}$, $\frac{2}{6}$, $\frac{1}{6}$

$\frac{1}{6}$, $\frac{2}{6}$, $\frac{5}{6}$

b) $\frac{7}{8}$, $\frac{5}{8}$, $\frac{1}{8}$

$\frac{1}{8}$, $\frac{5}{8}$, $\frac{7}{8}$

2- Arrange the following fractions in descending order.

c) $\frac{4}{5}$, $\frac{2}{5}$, $\frac{3}{5}$

$\frac{4}{5}$, $\frac{3}{5}$, $\frac{2}{5}$

d) $\frac{15}{40}$, $\frac{16}{40}$, $\frac{39}{40}$, $\frac{25}{40}$

$\frac{39}{40}$, $\frac{25}{40}$, $\frac{16}{40}$, $\frac{15}{40}$

There are two kinds of simple fractions: **proper and improper**.

Proper Fractions

If the numerator is smaller than the denominator, the fraction is called a **proper fraction.** For example:

$$\frac{1}{5} \ , \quad \frac{5}{7} \ \text{and} \ \frac{7}{11}$$

Improper Fractions

If the numerator is greater than the denominator, the fraction is called an **improper fraction.** For example:

$$\frac{4}{3} \ , \quad \frac{16}{15} \ \text{and} \ \frac{29}{23}$$

Mixed Numbers

Look at the shapes.

1 whole and $\frac{1}{4}$
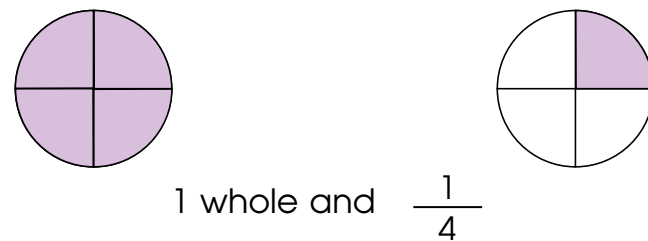
We can write this as $1\frac{1}{4}$. 1 is a whole number. $\frac{1}{4}$ is a fraction. $1\frac{1}{4}$ is called **a mixed number** because it is made up of a whole number and a fraction.

■ Exercises

1 Write the mixed number of:

$2\frac{1}{4}$

$1\frac{3}{8}$

$2\frac{1}{2}$
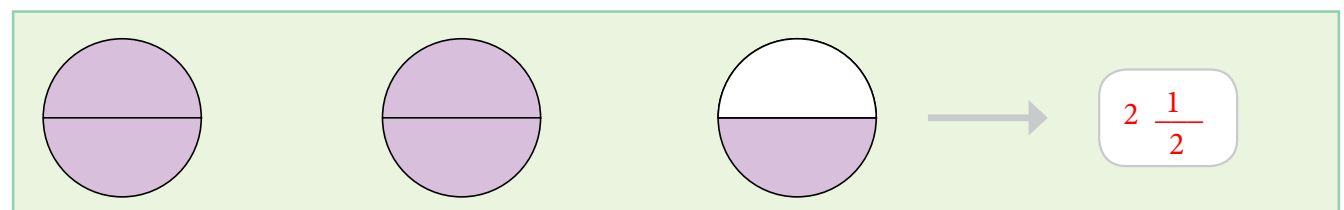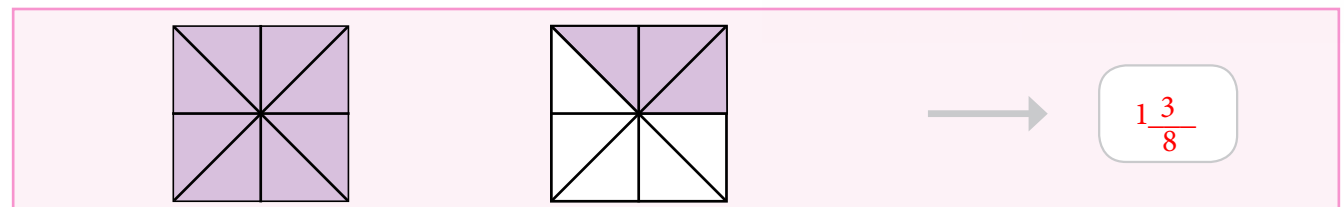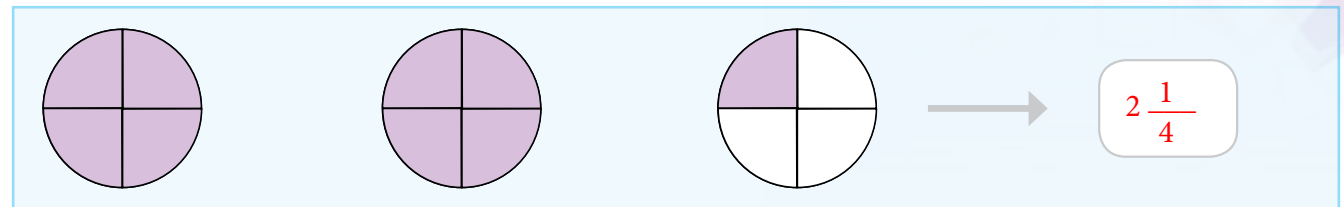
2 Tick the whole number and draw a circle around the fraction.

4 $\left(\dfrac{5}{7}\right)$

3 $\dfrac{1}{7}$

5 $\dfrac{3}{7}$

19 $\dfrac{1}{4}$

17 $\dfrac{3}{6}$

27 $\dfrac{1}{3}$
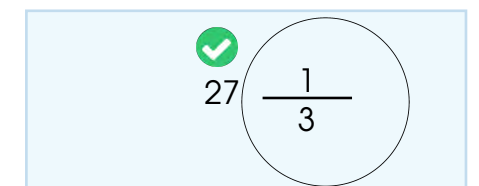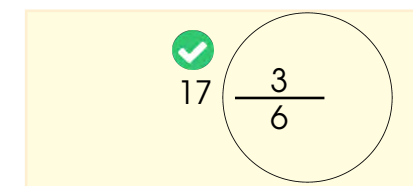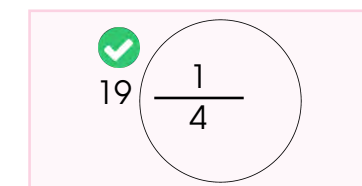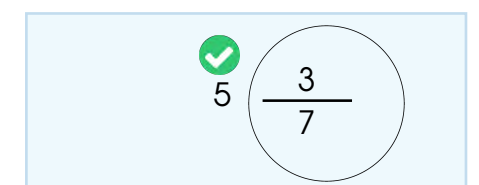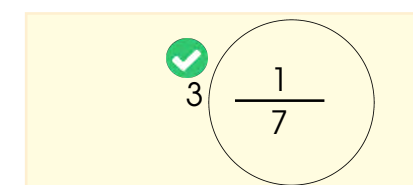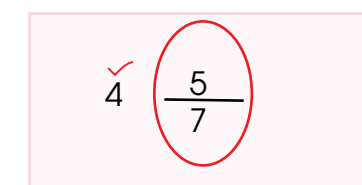
5.5　Addition and Subtraction of Fractions

$$\frac{1}{6} \quad + \quad \frac{2}{6} \quad = \quad \frac{3}{6}$$
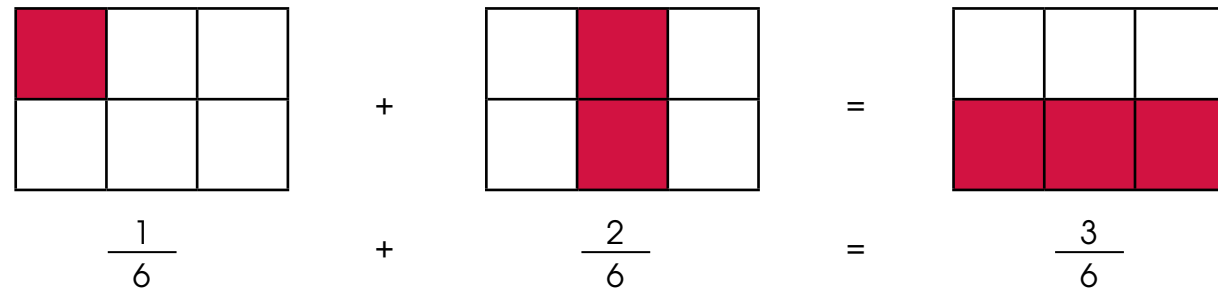
We noticed that when we want to add two fractions or more, we add the tops together, and we leave the bottoms the way they are.

> **important:** (1) Don't add or subtract the denominators.
>
> (2) We must have the same denominators before we make any
>
> addition or subtraction.

▪ Exercises

1- Calculate:

a) $\dfrac{1}{2} + \dfrac{1}{2} = \dfrac{2}{2}$

b) $\dfrac{4}{12} + \dfrac{5}{12} = \dfrac{9}{12}$

c) $\dfrac{7}{9} + \dfrac{1}{9} = \dfrac{8}{9}$

d) $1 + \dfrac{3}{4} = \dfrac{4}{4}$

e) $\dfrac{1}{2} + \dfrac{2}{4} = \dfrac{4}{4}$

f) $\dfrac{3}{6} + \dfrac{1}{12} = \dfrac{7}{12}$

$$\frac{5}{6} \quad - \quad \frac{2}{6} \quad = \quad \frac{3}{6}$$
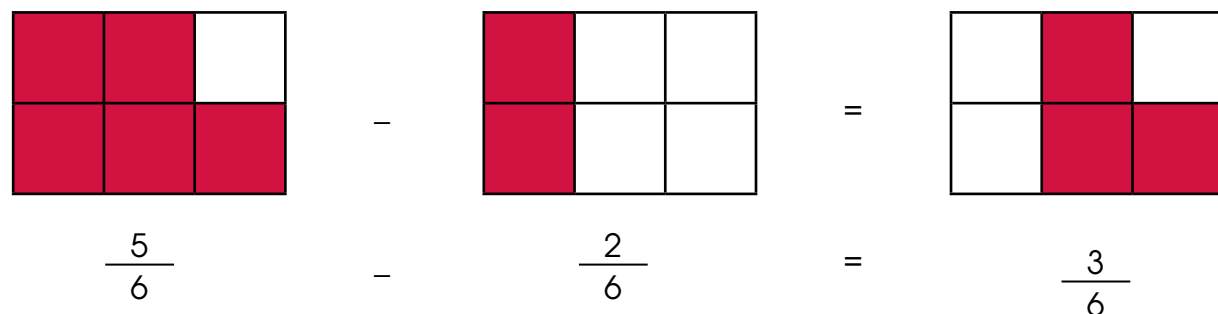
2- Calculate:

a) $\dfrac{7}{8} - \dfrac{4}{8} = \dfrac{3}{8}$

b) $\dfrac{8}{10} - \dfrac{5}{10} = \dfrac{3}{10}$

c) $\dfrac{4}{6} - \dfrac{2}{6} = \dfrac{2}{6}$

d) $1 - \dfrac{1}{2} = \dfrac{1}{2}$

e) $\dfrac{6}{9} - \dfrac{1}{3} = \dfrac{3}{9}$

f) $\dfrac{1}{2} - \dfrac{2}{4} = \dfrac{0}{}$

3- Sara drew a graph to show the mobile colors in her class:

A - What is the fraction of

Black mobiles $\dfrac{8}{10}$

White mobiles $\dfrac{6}{10}$

Gold mobiles $\dfrac{3}{10}$

Pink mobiles $\dfrac{9}{10}$
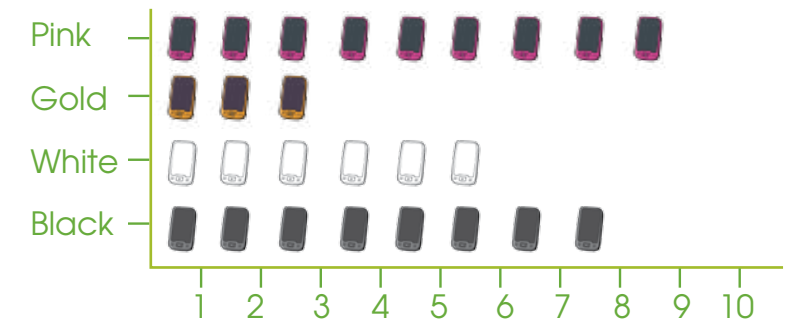
B - What is the fraction that represents gold and white mobiles together?

$$\frac{3}{10} + \frac{6}{10} = \frac{9}{10}$$

C - What is the fraction that represents green mobiles? What does it mean?

0

5.6 Fractions Simplification

If we can completely divide the numerator and the denominator of a fraction by the same number, we get a simpler fraction.

Look at these examples.

- $\dfrac{15}{18} = \left[\dfrac{15 \div 3}{18 \div 3}\right] = \dfrac{5}{6}$

- $\dfrac{12}{3} = \left[\dfrac{12 \div 3}{3 \div 3}\right] = \dfrac{4}{1} = 4$

A fraction whose numerator and denominator cannot be made any smaller is said to be reduced to its simplest form **(simplest equivalent fraction)**. Sometimes we may have to divide the numerator and denominator many times to reach the simplest fraction.

- Simplify $\dfrac{16}{24}$ to its simplest form.

$$\dfrac{16}{24} = \dfrac{16 \div 2}{24 \div 2} = \dfrac{8 \div 2}{12 \div 2} = \dfrac{4 \div 2}{6 \div 2} = \dfrac{2}{3}$$

$\dfrac{2}{3}$ is the simplest form of $\dfrac{16}{24}$

■ Exercise

Simplify the following to the simplest equivalent fraction.

a) $\dfrac{2}{6} = \dfrac{1}{3}$ b) $\dfrac{15}{18} = \dfrac{5}{6}$ c) $\dfrac{35}{42} = \dfrac{5}{6}$ d) $\dfrac{16}{24} = \dfrac{2}{3}$

e) $\dfrac{21}{27} = \dfrac{7}{9}$ f) $\dfrac{28}{35} = \dfrac{4}{5}$ g) $\dfrac{20}{30} = \dfrac{2}{3}$ h) $\dfrac{33}{55} = \dfrac{3}{5}$
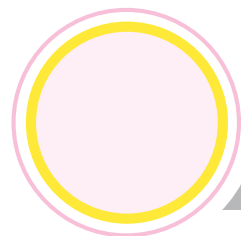
5.7 Problem Solving

1. Your class had a pizza party. $\dfrac{3}{8}$ of one pizza was left over, and $\dfrac{4}{8}$ of another pizza was left over. You put them both into one box. How much pizza do you have altogether? $\dfrac{3}{8} + \dfrac{4}{8} = \dfrac{7}{8}$

2. A cake recipe requires $\dfrac{3}{5}$ cup of sugar for the frosting and a cup of sugar for the cake. How much sugar is that altogether?

$$1 + \dfrac{3}{5} = \dfrac{8}{5}$$

3. After a party, $\dfrac{8}{5}$ of the cake is left over. Then, brother ate $\dfrac{2}{8}$ of the cake. How much is left over after that? $\dfrac{8}{5} - \dfrac{2}{8} = \dfrac{54}{40} = \dfrac{27}{20}$

4. You have $7\dfrac{5}{8}$ centimeters of yarn to make a bracelet. You only use $4\dfrac{1}{8}$ meters for the bracelet. How much yarn is left over? $\dfrac{61}{8} - \dfrac{33}{8} = \dfrac{28}{8} = \dfrac{7}{2}$

5. a- What number could replace X below?

$\dfrac{1}{12} = \dfrac{X}{4}$ SKIP THIS QUESTION
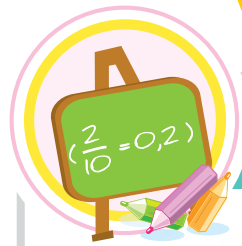
b- What number could replace M below?

$\dfrac{M}{20} = \dfrac{20}{100}$ M = 4

c- What number could replace B below?

$\dfrac{15}{150} = \dfrac{3}{B}$ B = 30

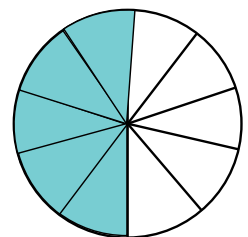d- What number could replace H below?
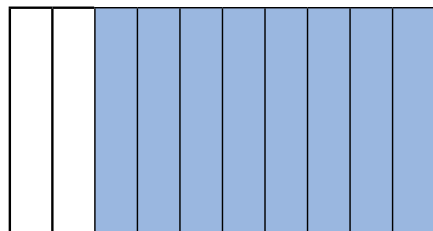
$\dfrac{6}{H} = \dfrac{42}{49}$ H = 7

Decimals

6.1   Decimals in Tenths

Look at the shapes:

|	
$\frac{5}{10}$ of the circle is shaded. We can write this as decimal 0.5. 0.5 means $\frac{5}{10}$	$\frac{8}{10}$ of the rectangle is shaded. We can write this as a decimal 0.8. 0.8 means $\frac{8}{10}$

There are 10 equal parts in shape (A).

The shaded part is $\frac{1}{10}$ (one tenth).

The unshaded parts is $\frac{9}{10}$ (nine tenths).

Fractions can also be written in a different way.

$\frac{1}{10}$ can be written as 0.1

$\frac{9}{10}$ can be written as 0.9

There are no whole numbers in these decimals.

(A)

A decimal is a number with one or more digits to the right of the decimal point.

■ Exercise

Change each fraction into a decimal

a) $\frac{3}{10}$

0.3

b) $\frac{2}{10}$

0.2

c) $\frac{6}{10}$

0.6

d) $1\frac{5}{10}$

1.5

6.2   Decimals in Thousandths

There are 100 equal parts in shape (B).

The shaded part is $\frac{1}{100}$ (one hundredth).

The unshaded part is $\frac{99}{100}$ (ninety nine hundredths).

Fraction	Decimal fraction
$\frac{1}{100}$	0.01
$\frac{99}{100}$	0.99
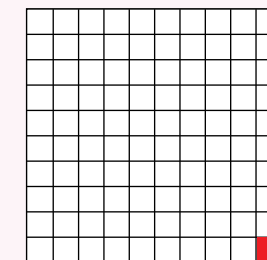
(B)

There are 1000 equal parts in shape (C).

The shaded parts is $\frac{1}{1000}$ (one thousandth).

The unshaded parts is $\frac{999}{1000}$ (nine hundred ninety nine thousandths)

Fraction	Decimal fraction
$\frac{1}{1000}$	0.001
$\frac{999}{1000}$	0.999
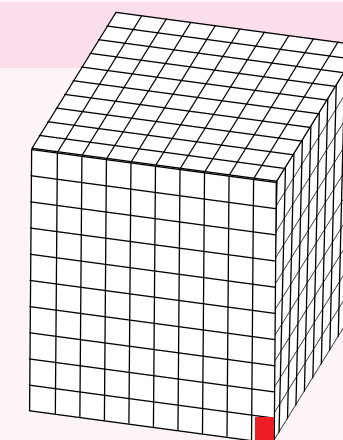
(C)

The place value chart helps us to read the the decimal fractions:

hundreds	tens	units	tenths	hundredths	thousandths
4	3	1	2	4	6

4 hundreds
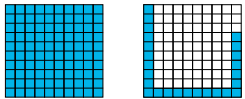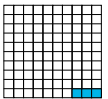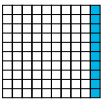3 tens
1 unit
2 tenths
4 hundredths
6 thousandths
The number is:
Four hundred thirty one and two hundred forty six thousand.
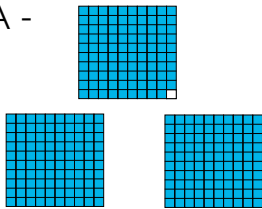
Exercises

1 - How many blocks are shaded in each set? Write your answers as decimals.

A -	B -	C -	D -
2.99 This is called a mixed number	1.25	0.03	0.1

2 - Write as decimals.

A- One and twelve hundredths: 1.12

B- Four and one tenths: _____4.1_____

C- Six tenths: _____0.6_____

D- Seventeen hundredths: _____0.17_____

3 - Complete.

A- 6.33 = __6__   Ones, __3__ tenths __3__ hundredths.

B- 7.47 = __7__   Ones, __7__ tenths __4__ hundredths.

C- 8.06 = __8__   Ones, __6__ tenths __0__ hundredths.

D- 12.6 = __12__   Ones, __6__ tenths __0__ hundredths.

E- 0.02 = __0__   Ones, __2__ tenths __0__ hundredths.

4 - Write these money amounts in decimals using the dollar sign.

A- One dollar and 16 cents: **$1.16**

B- Three dollars and 25 cents: _____$ 3.25_____

C- 40 cents: _____$ 0.4_____

D- 300 cents: _____$ 3_____

6.3   Comparing Hundredths and More
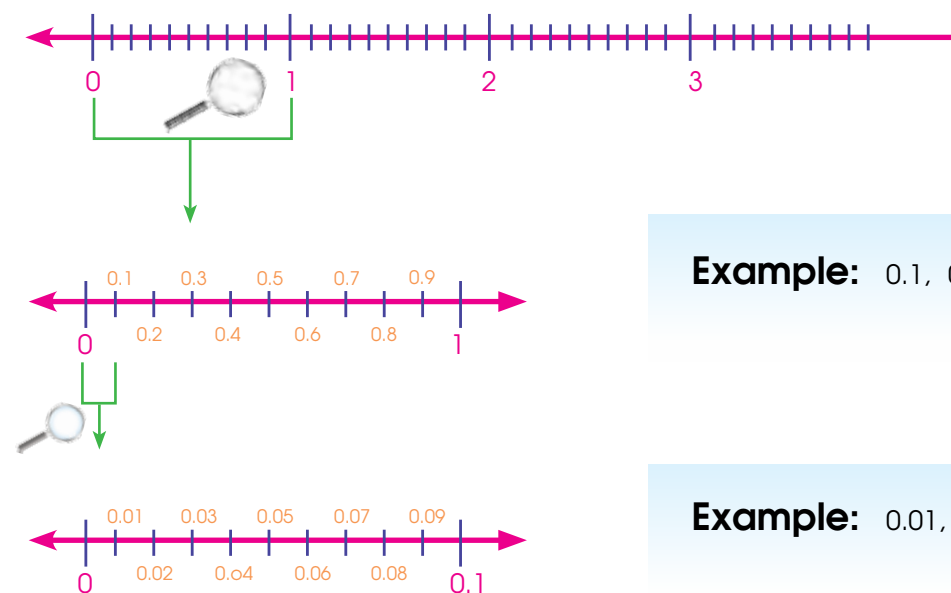
Example: 0.1, 0.2, 0.3

Example: 0.01, 0.05, 0.09

Notice that 0.1 is greater than 0.09 because 0.1 is located to the right of 0.09.

Exercises

1 - Fill in ⬭ with (< or >).

a) 0.5 (>) 0.19   b) 1.2 (>) 0.99   c) 0.3 (<) 3.0

d) 0.6 (>) 0.1   e) 1.32 (>) 1 23   f) 1.9 (>)1.09

g) $\frac{7}{100}$ (<) 1.23

2- Arrange each set from smallest to largest.

A -

6.73 , 6.1 , 1.33 , 0.99

_0.99_ < _1.33_ < _6.1_ < _6.73_

B -

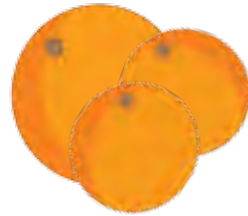6.7 , 6.07 , 0.77 , 1.7

_0.77_ < _1.7_ < _6.07_ < _6.7_

6.4 Problem Solving

1 Sami needs $3.50. He has $0.5. How much more money does he need? $3.5 - $0.5 = $3

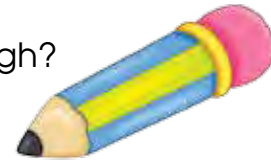**2** Lily buys an orange for $0.75 and pays with a $4.00 bill.

How much change will she get?

$4.00 - $0.75 = $3.25

3 One pencil weighs 31.3 grams. How much do 3 pencils weigh?

31.3 * 3 = 93.9 grams

4 You walk $\dfrac{3}{4}$ of a kilometer and then sit down to take a rest.

Then you walk $\dfrac{1}{4}$ of a kilometer. How far did you walk altogether?

Write your answer in decimals. $\dfrac{3}{4} + \dfrac{1}{4} = \dfrac{4}{4} = 1$

5 A cake recipe requires $2\dfrac{2}{3}$ cups of sugar for the frosting and $\dfrac{1}{3}$ cup of

sugar for the cake. How much sugar is that altogether? Write your answer in

decimals.

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

$\dfrac{8}{3} + \dfrac{1}{3} = \dfrac{9}{3} = 3$

7.1 Measuring a Line

Take out a ruler from your pencil box and look at it carefully.

Between 0 and 1, there are a number of short lines. Count them carefully.
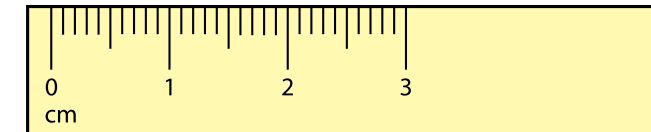
These short lines divide each centimeter into ten equal parts. Each one of these ten parts is called a millimeter (mm).

There are 10 mm in 1 cm $\dfrac{1}{10}$

1 mm =   or 0.1 cm.

To measure a line, we place the zero mark of the ruler at one end point of the line and count the number of centimeters and millimeters till the other end point of the line.

We can write the length of the line in two ways:

The length is 1 cm and 5 mm or 4.5 cm.

■ Exercise ▼

Measure the following line segments and write their lengths in centimeters.

LET THE STUDENTS
USE THE RULER

1 meter	= 100 centimeters (cm)
1 centimeter	= 10 millimeters (mm)

3 m and 50 cm can be written as 3.50 m.

Changing Centimeters Into Meters

Exercises:

1- Change into meters:

A   35 cm

$= 35 \div 100$

$= \dfrac{35}{100}$

$= 0.35$ m

B   315 cm

$= 315 \div 100$

$= \dfrac{315}{100}$

$= 3.15$ m

C   35 m and 62 cm

$35 +$

$= 35 + 0.62 \quad \dfrac{62}{100}$

$= 35.62$ m

100 cm = 1m.
1 cm = 0.01 m

2- Add/subtract:

	m	cm
	① ①	①
	15	275
+	25	874
	41	149

	m	cm
	5	10 1
	2̶6̶	4̶1̶2
-	15	503
	10	909

■ Exercises ▼

1- Change into meters:

115   cm $\dfrac{115}{100} = 1.15$ m   206   cm $\dfrac{206}{100} = 2.06$ m   301   cm $\dfrac{301}{100} = 3.01$ m

341   cm $\dfrac{341}{100} = 3.41$ m   137   cm $\dfrac{137}{100} = 1.37$ m   258   cm $\dfrac{258}{100} = 2.58$ m

2- Write the answer in decimal form.

84 m and 75 cm - 68 m and 69 cm =   84.75 - 68.69 = 16.06

89 m and 78 cm + 109 m and 74 cm =   89.78 + 109.74 = 199.52

638 m and 94 cm - 735 m and 97 cm =   SKIP THIS ONE

345 m and 79 cm + 563 m and 83 cm =   345.79 + 563.83 = 909.62

7.2   Polygons
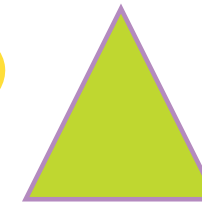
Triangle   Rectangle   Square

How many sides does each shape have?

A triangle has _____ .

A square has _____ sides, and _____ vertices.
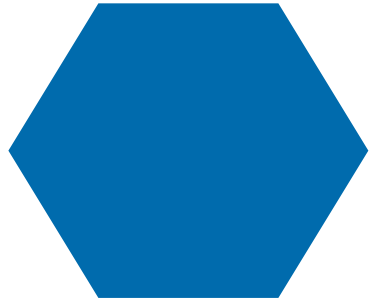
Poly means many.
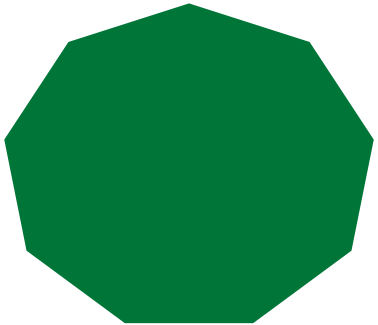
A polygon is a many-sided figure. It's a flat shape made form three or more line segments. Triangles, squares, rectangles, and pentagons are all examples of polygons.
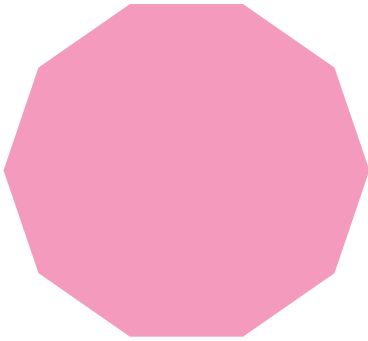
We name polygons according to the number of sides they have.

Look at these examples:

Triangles (3)	Quadrilaterals (4)	Pentagon (5)

Hexagon (6)	Heptagon (7)

Hexagon (8)	Heptagon (9)

Hexagon (10)

Complete this table using the provided information.

No. of vertices	No. of sides	Name of polygon
3		
4		
5		
6	SKIP THIS QUESTION	
7		
8		
9		
10		

7.3 Quadrilaterals

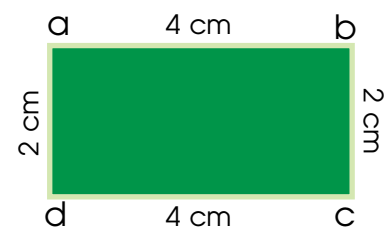All four-sided polygons are called quadrilaterals.

Quadrilaterals that have 4 equal sides and 4 right angles are called squares.

Quadrilaterals with equal opposite sides and 4 right angles are called rectangles.

Quadrilaterals that have opposite sides that are parallel and of the same length are called parallelogram.

Quadrilaterals that have opposite sides that are parallel, and whose four sides the same length are called rhombus.

A trapezoid has exactly one pair of parallel sides.

Rectangle

a — 4 cm — b
2 cm ... 2 cm
d — 4 cm — c

Rhombus

e
3 cm, 3 cm, 3 cm, 3 cm
h ... f
g

Square

i — 2 cm — j
2 cm ... 2 cm
l — 2 cm — k

Trapezoid

q — 4 cm — r
3 cm ... 3 cm
s — 6 cm — t

Parallelogram

m — 3 cm — n
2 cm ... 2 cm
p — 3 cm — o
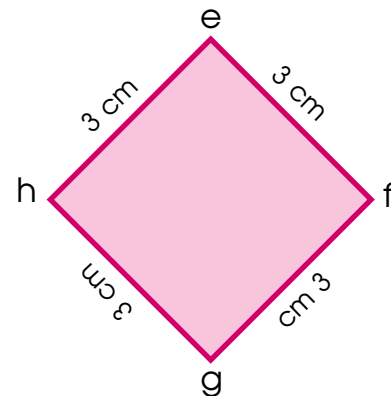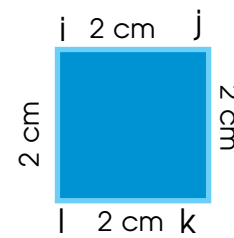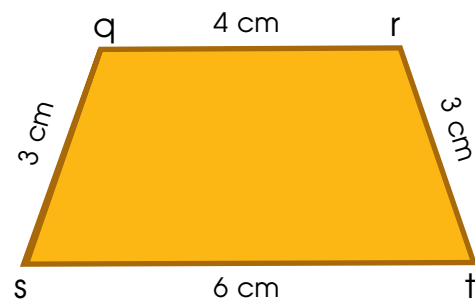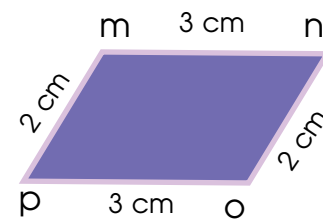
Perimeter

To find the perimeter of any polygon, add up all the sides.

Perimeter = 2 + 3 + 2 + 3 cm

= 10 cm

Or we can write

= 2(2) + 2(3)

= 4 + 6

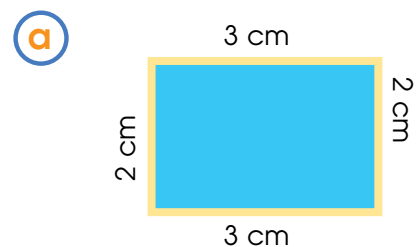= 10

3 cm
2 cm ... 2 cm
3 cm
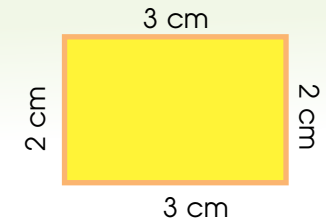
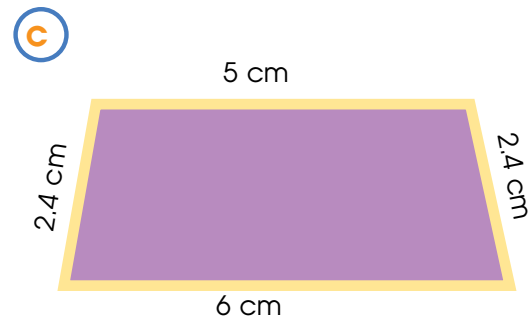**If the length = L
and the Width = W
Write the perimeter formula.**

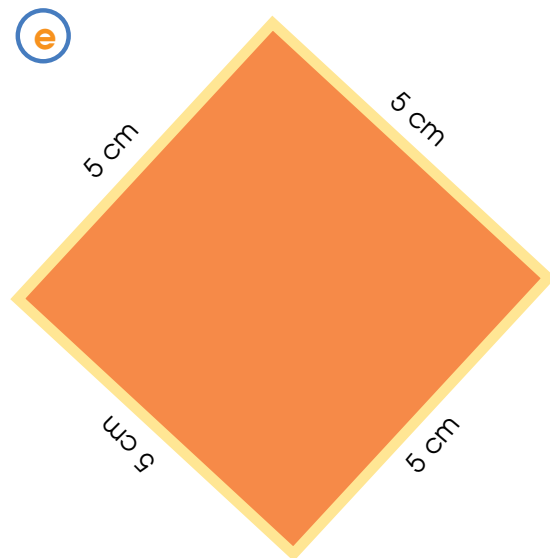Note: Parallel lines are lines that exist in the same plane but never meet together.
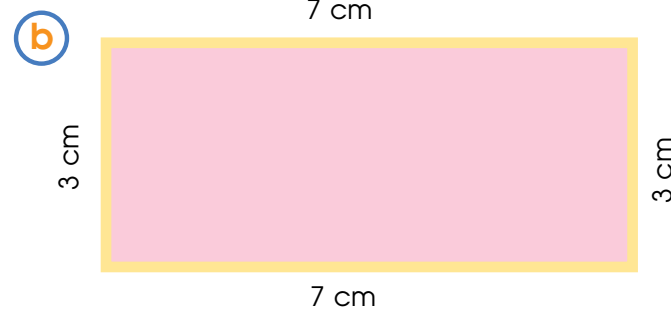
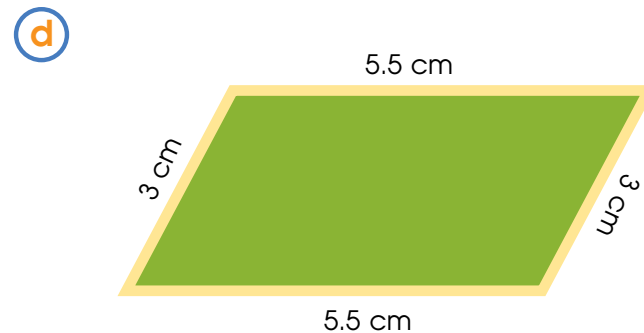## ■ Exercise

Find the perimeter of these shapes:

a

3 cm

2 cm   2 cm

3 cm

$2(2) + 3(3) = 13 \text{ cm}$

b

7 cm

3 cm   3 cm

7 cm

$3(3) + 7(7) = 58 \text{ cm}$

c

5 cm

2.4 cm   2.4 cm

6 cm

$2.4(2.4) + 6(6) = 41.76 \text{ cm}$

d

5.5 cm

3 cm   3 cm

5.5 cm

$3(3) + 5.5(5.5) = 39.25 \text{ cm}$

e

5 cm   5 cm

5 cm   5 cm

'⁄ fiŁ '⁄ fi⁄ ' " U̲

f

6 cm

6 cm   6 cm

6 cm

(⁄(fiŁ (⁄+fi⁄ +" U̲
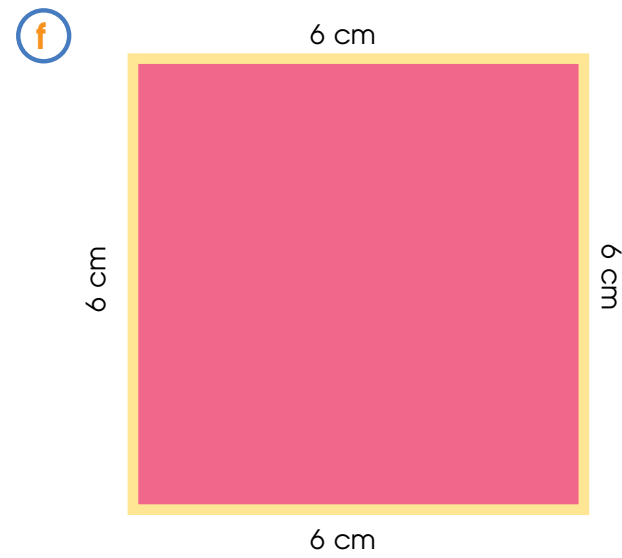
7.4 Triangles

Is a plane figure with three straight sides and three angles.
Triangles differ in the lengths of their sides and angle measurements.
Some triangles can be classified into more than one category depending on the length of sides and the measure of angles.

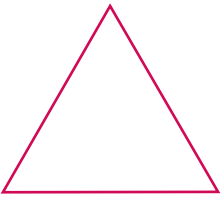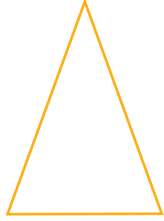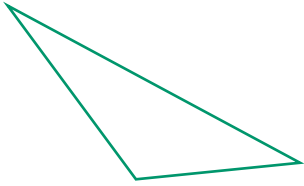| Set A	Set B	Set C
Triangles with three sides that are equal in length.	Triangles with two sides that are equal in length.	Triangles with three sides of different lengths.
A B C	E F G	X Y Z

■ Exercise

Using a ruler, measure the sides of these triangles and sort them into sets:
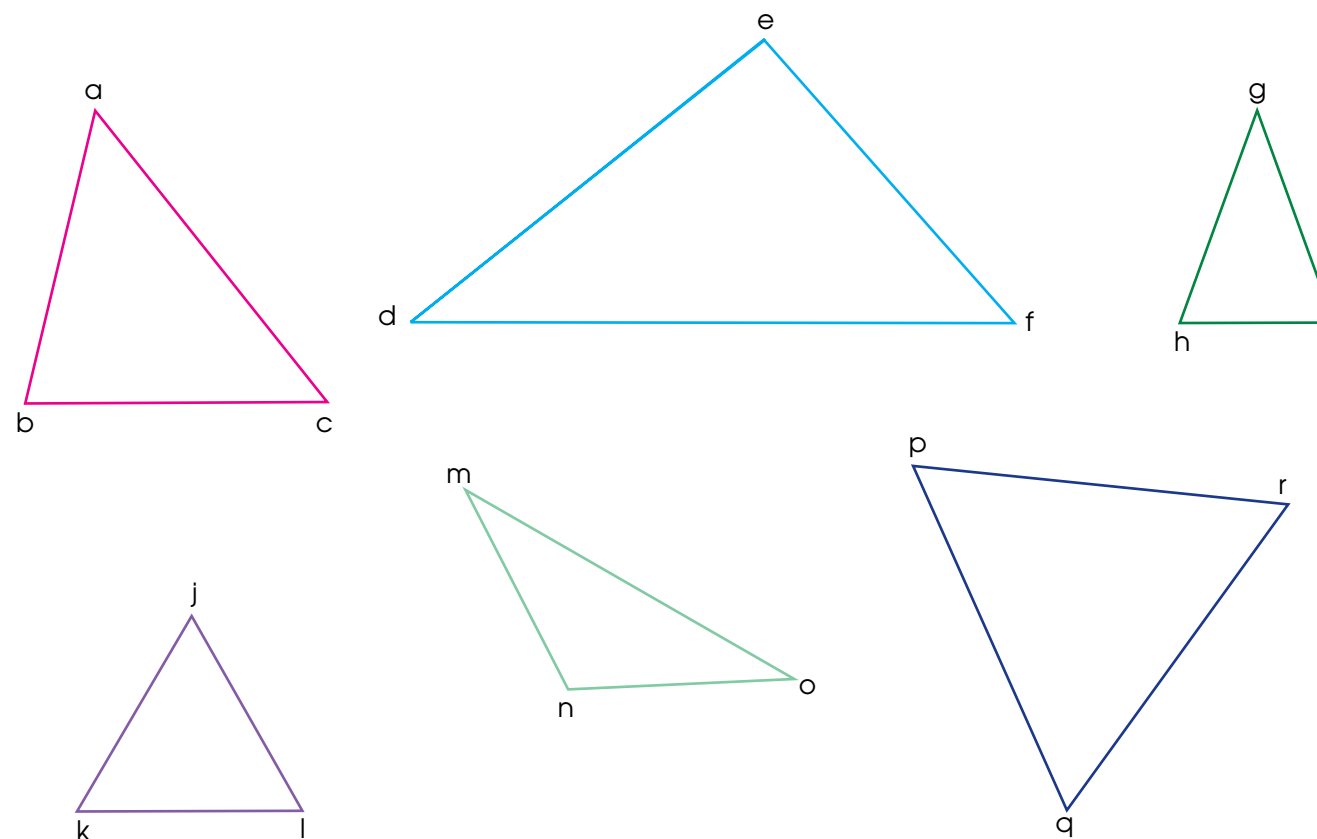
Naming triangles

The triangles in sets A, B and C are given special names in mathematics:

Equilateral 3 equal sides   **Isosceles** 2 equal sides   **Scalene** 0 equal sides
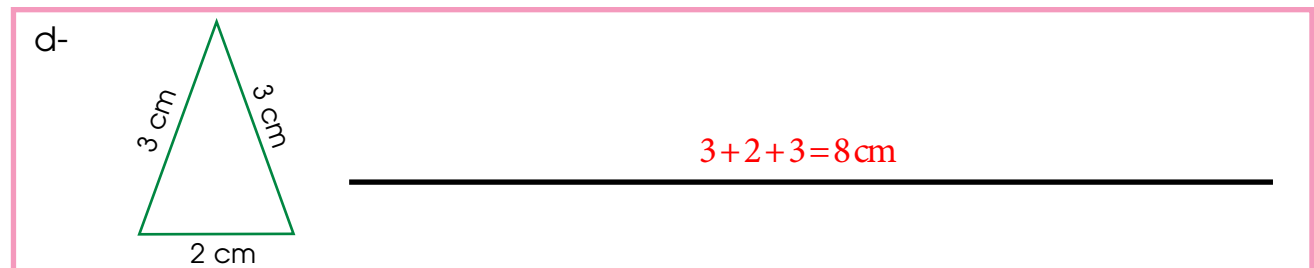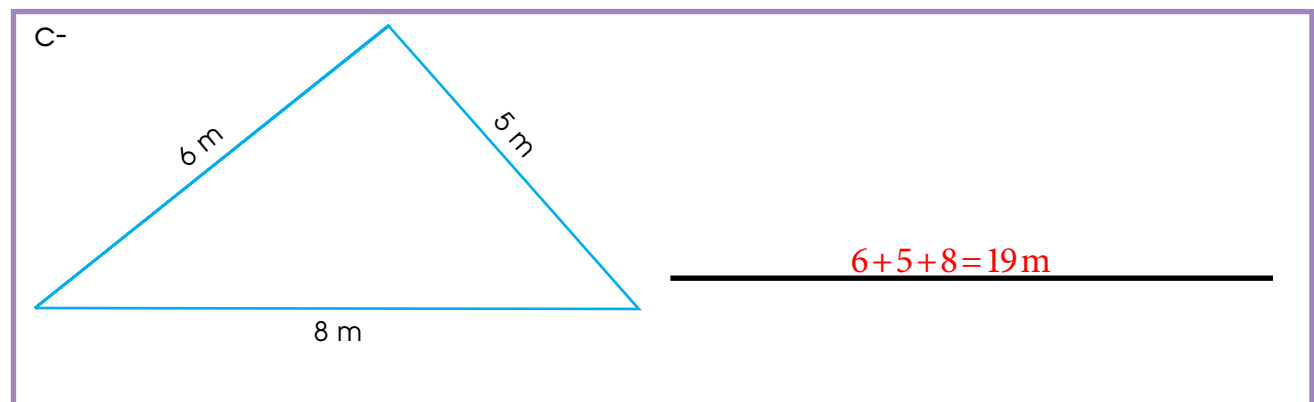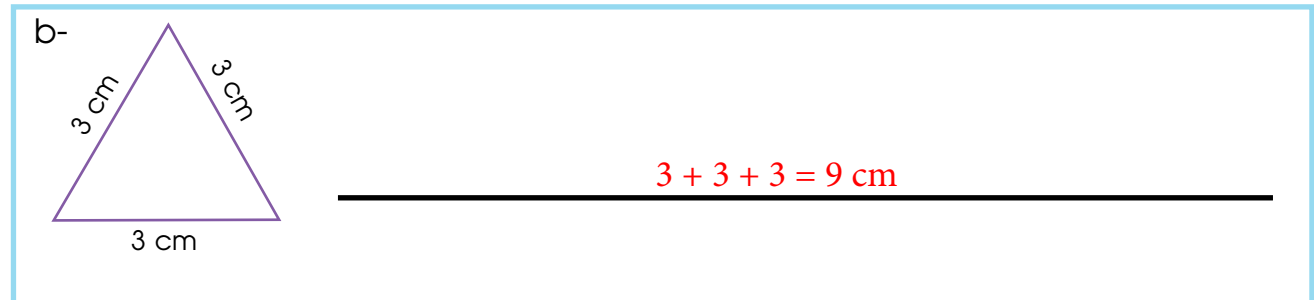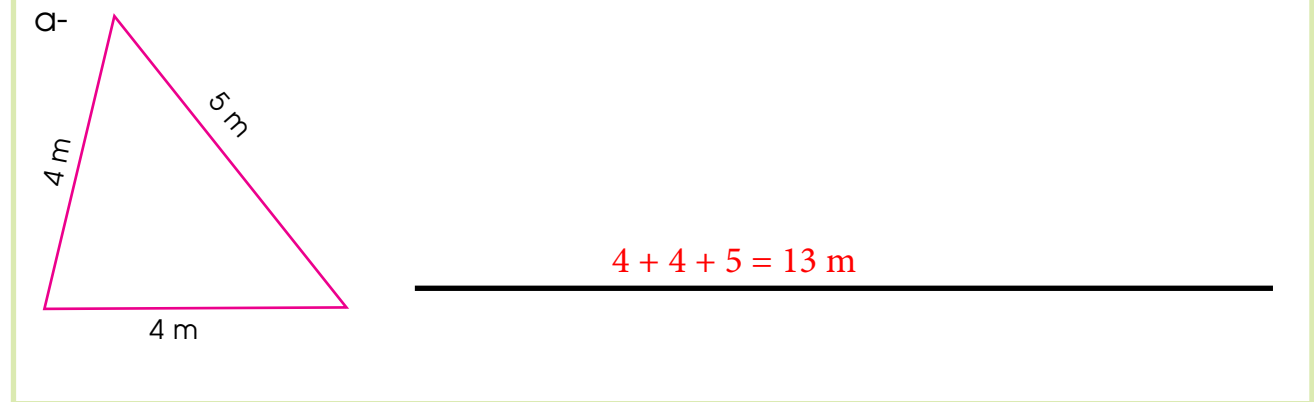
Go back to the previous exercise and classify the triangles according to the above categories.

▪ **Exercise** ▼

Draw three triangles, one for each category, and mention the lengths of the sides.

To find the perimeter of a triangle, all you have to do is find the sum of the lengths of all the sides.

a-

4 + 4 + 5 = 13 m

b-

3 + 3 + 3 = 9 cm

c-

6+5+8=19 m

d-

3+2+3=8 cm

e-

6 m

5 m

4 m

$6 + 4 + 5 = 15$ m

f-

5 cm

3 cm

3 cm

$5 + 3 + 3 = 11$ cm

g-

6 m

5 cm

5 cm

5 cm

$5 + 5 + 5 = 15$ cm

h-

3 cm

4 cm

6 cm

$3 + 4 + 6 = 13$ cm

- A circle is a plane figure. All the points on the circle are the same distance from a given point called the center.

- Any line segment with end points at the center of the circle and on the circle is a radius.

- Any line segment that passes through the center of the circle and has both end points on the circle is a diameter.

- Any line segment with both end points on the circle is a chord.
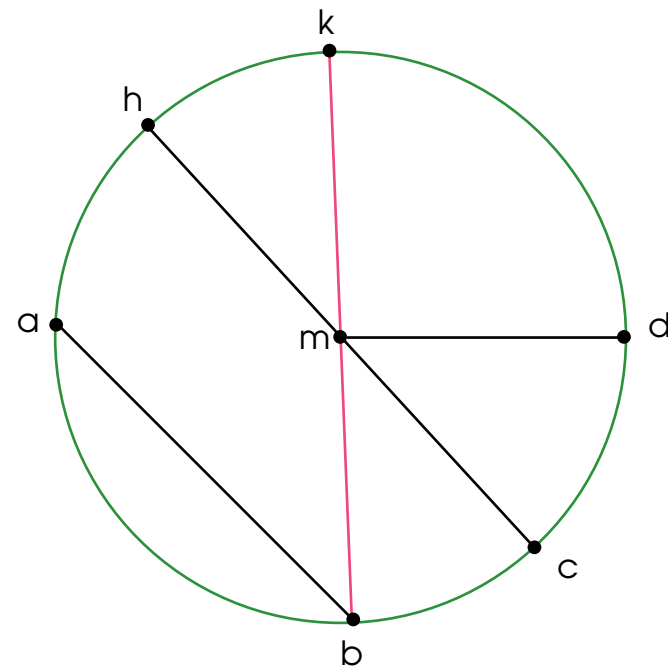
o
Point on the circle

a

c
Center

b

k
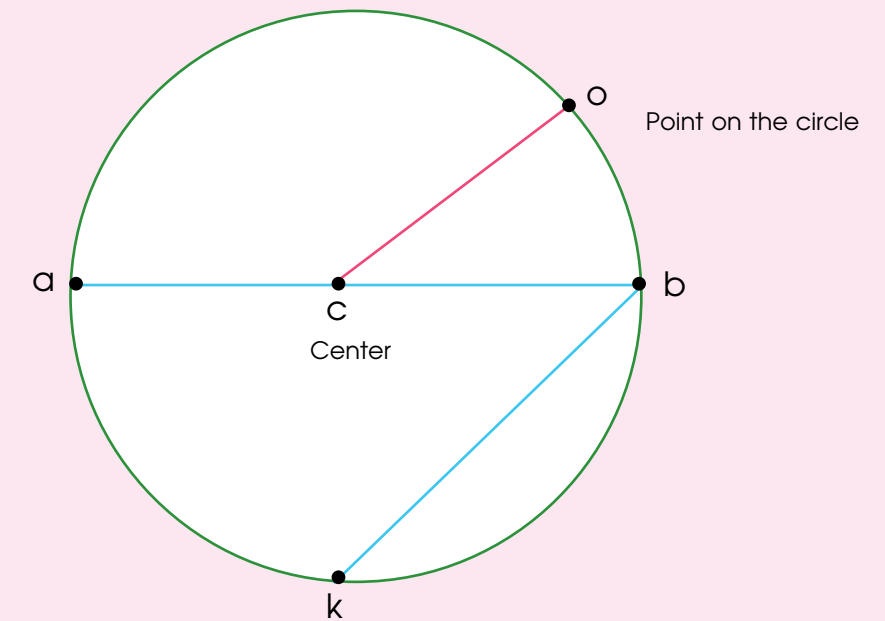
c is a center   _____

co is a radius.   _____

ab is a diameter.   _____

kb is a chord.   _____

Is ab a chord?   _____

A diameter is a special chord.
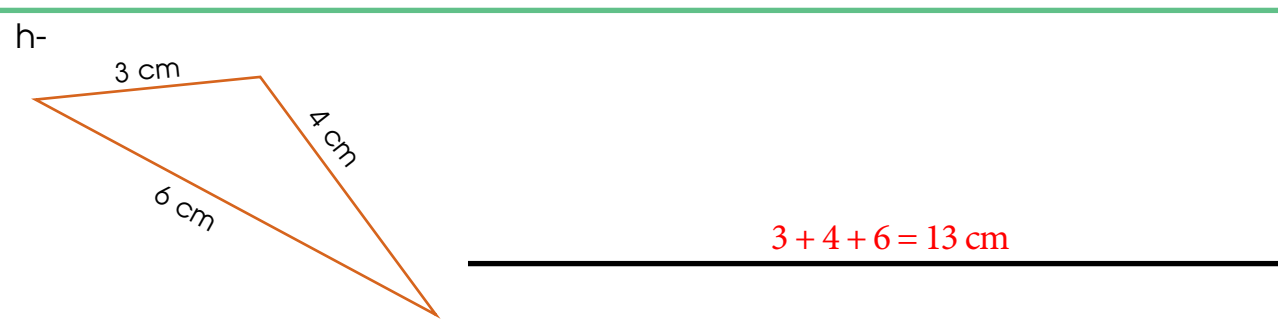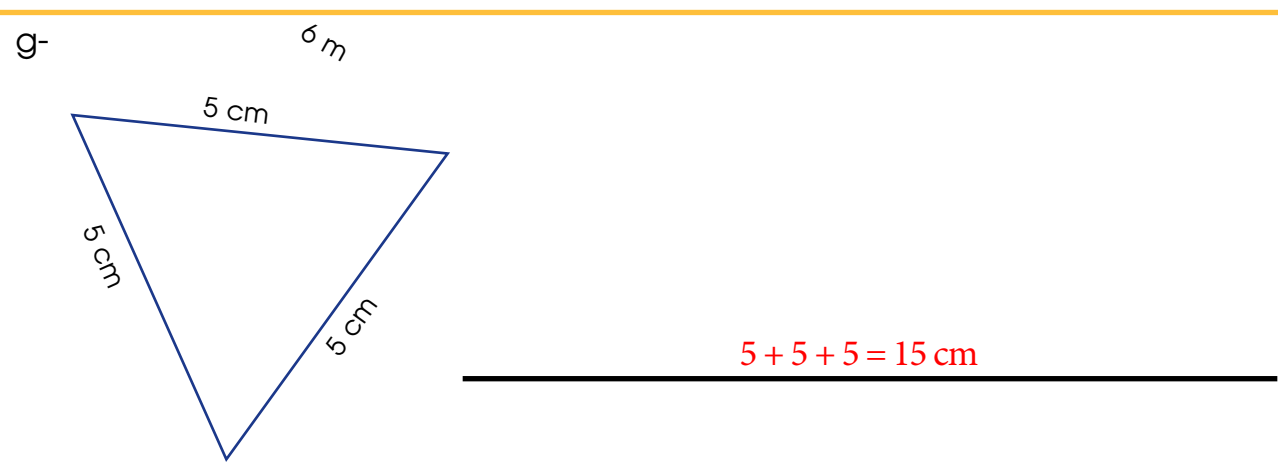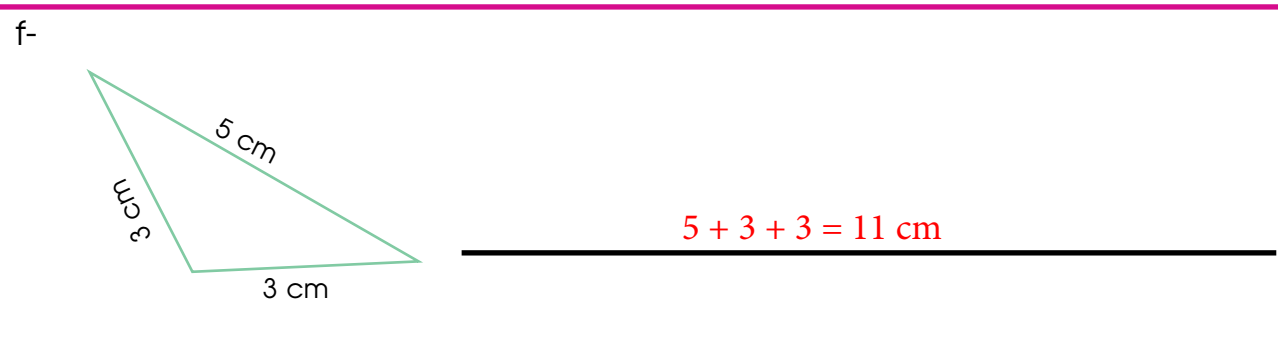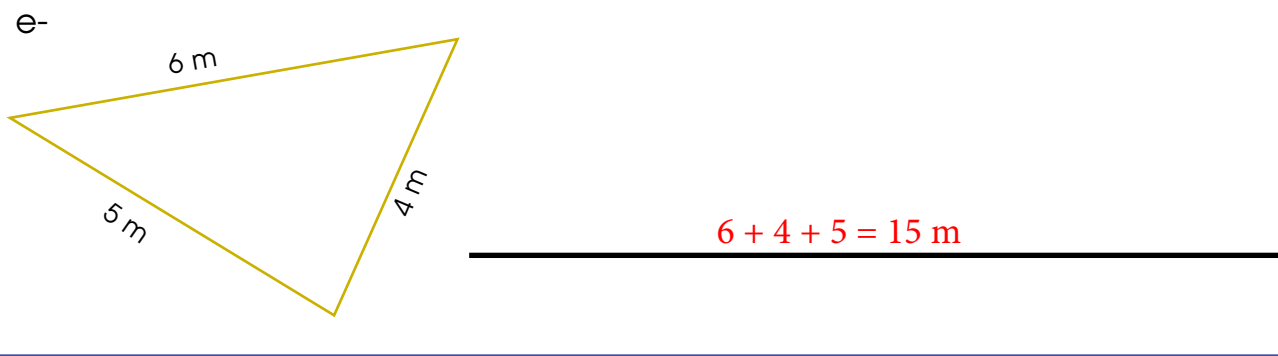
Exercise

Look at the circle and answer the following question.

1- Name six points on the circle. ab , hm , mc , md , km , mb

2- Name the center. m

3- Name five radii. km , md , mc , mb , mh

4- How many diameters are shown? Name them. 2 diameters - kb , hc

5- How many chords are shown? Name them. 1 chord - ab

6- Name the line segments that are chords and diameters at the same time.

A graph is a special kind of representation which can display quickly, easily and clearly, a collection of numerical facts.

Graphs are widely used in newspapers, magazines and books. The purpose of a graph is to show numerical facts in a simple visual form and in an interesting time-saving way. The idea is based upon using lengths of lines or area as to represent numbers. Here, we shall discuss only four types of graphs.

1 Bar graphs   2 Line graphs   3 Surveys and line plots

4 Circle graphs

8.1   Line Graphs

A line graph is the most widely used of all graphs. It shows different quantities by means of a line or curve drawn on a grid. Changes in the direction of the line show how the quantities vary and make it possible to see a trend. To draw a line graph, axes are marked with suitable units. In a line graph, the data is marked in the form of points and then the points are joined together. The greater the number of points, the more accurate the graph.

Look at the figure at the right (the price of pens in dollars).

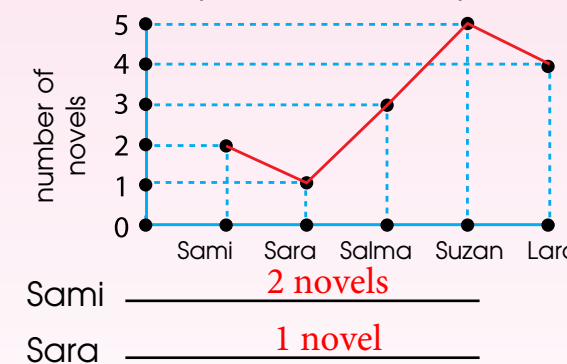From this line graph, you can see that:

1 pen costs $2

2 pens cost $4

3 pens cost $6
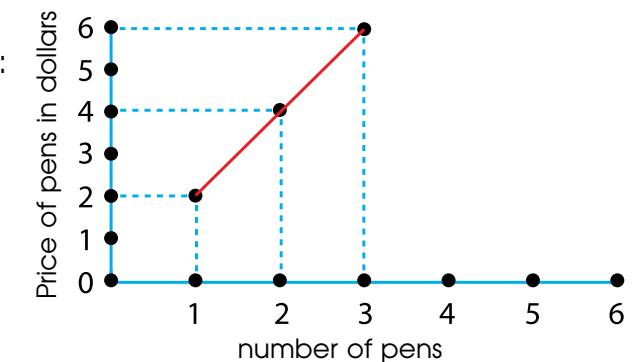
Exercise
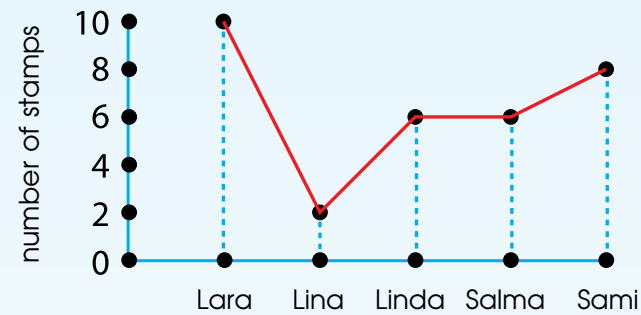
1- How many novels did they read?

Sami ___ 2 novels ___

Sara ___ 1 novel ___

Salma ___ 3 novels ___

Suzan ___ 5 novels ___

Lara ___ 4 novels ___

2- Look at the line graph, then answer the questions.

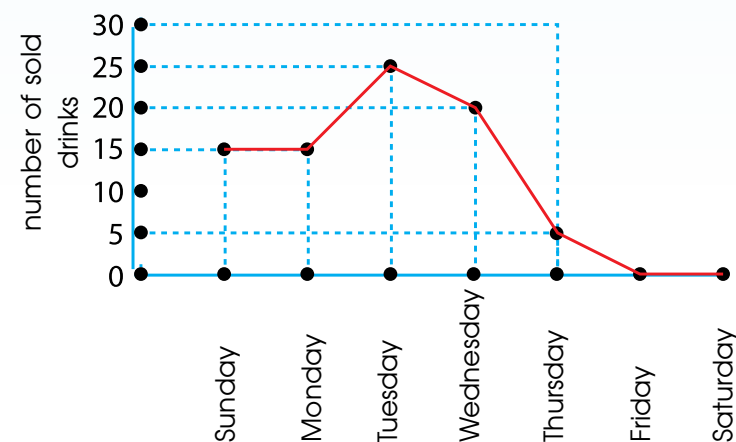How many stamps do they have?

Lara has _____10_____ stamps.

Lina has _____2_____ stamps.

Linda and Salma have _____8_____ stamps. $2 + 6 = 8$

Sami has _____8_____ stamps.

_____Lina_____ has the fewest number of stamps.

_____Lara_____ has the largest number of stamps.

3-The line graph shows the number of drinks sold at the school canteen in a week. Answer the following questions.

a) On which day(s) did the canteen sell the most drinks? __Tuesday__

b) On which day(s) did the canteen sell the fewest drinks? __Friday & Saturday__

c) On which days did the canteen sell an equal number of drinks? __Sunday & Monday__

d) How many drinks did the canteen sell on Wednesday? __20 Drinks__

A bar graph uses lengths of bars to represent numbers or numerical data. The length or height of the bar is determined by the number it represents. The width of all the bars is the same. There should be a uniform distance between two bars.
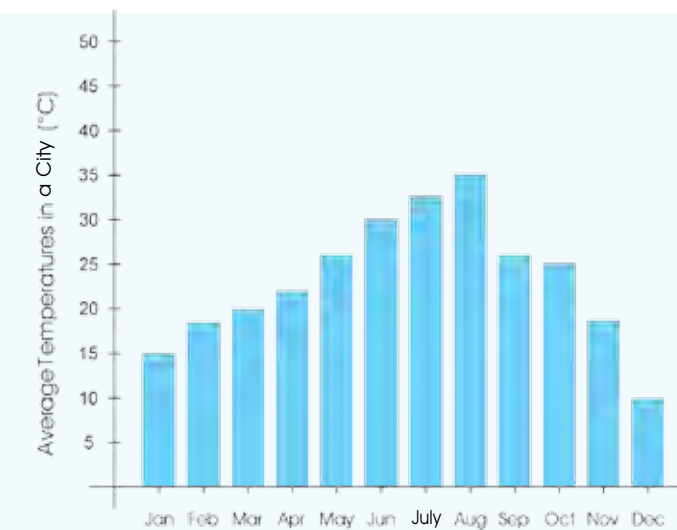
Example

Average Monthly Temperatures in a City

| Month	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec
Temperature (°)	°15	°18	°20	°23	°27	°30	°33	°35	°27	°25	°19	°10

1 cm on horizontal scale is 1 month.
1 cm on vertical scale is °5 C.

This bar graph represents the average temperatures in a city. The height of the bar is the temperature. The graph gives an idea about the temperature in a given month at once.
Now study the graph and answer the questions.

1- Which month shows is the highest temperature?
   Answer: August

2- Which month shows the lowest temperature?
   Answer: December.
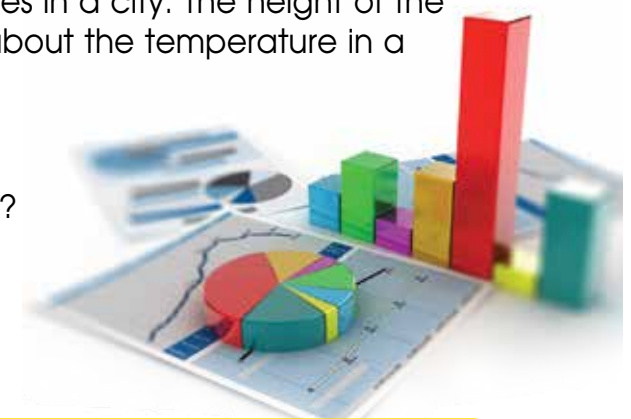
3- In which months does the temperature stay the same?

Answer: May and September.

4- What is the temperature in November?

Answer: 19°C.

This is just one example of a bar graph. However, a bar graph can be used to display a variety of information. Try to collect data about something which you think can be shown by a bar graph.

1- Study this graph and answer the questions.
The following graph represents shops in a shopping center.
Study it and answer the questions.
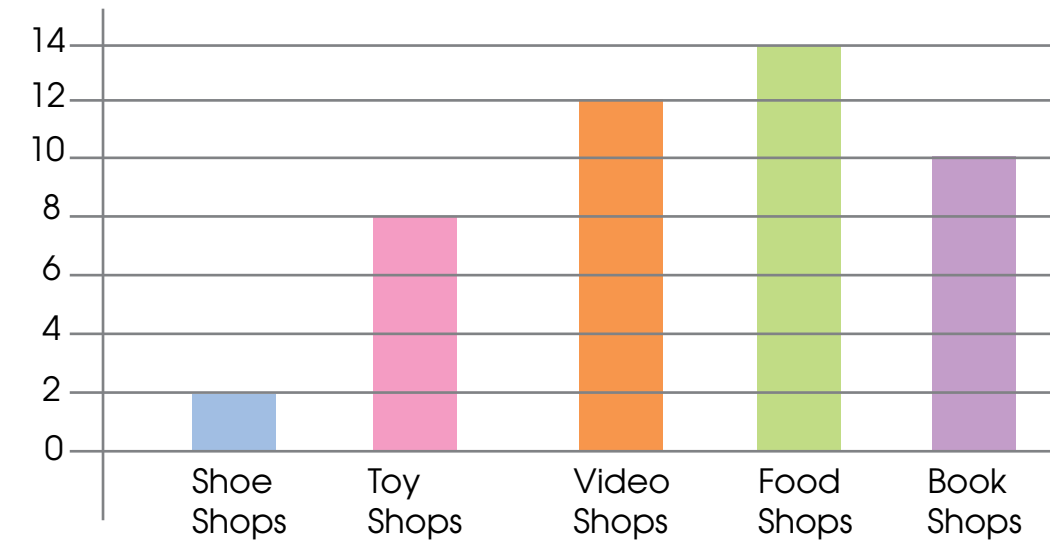
There are ....2......... shoe shops.

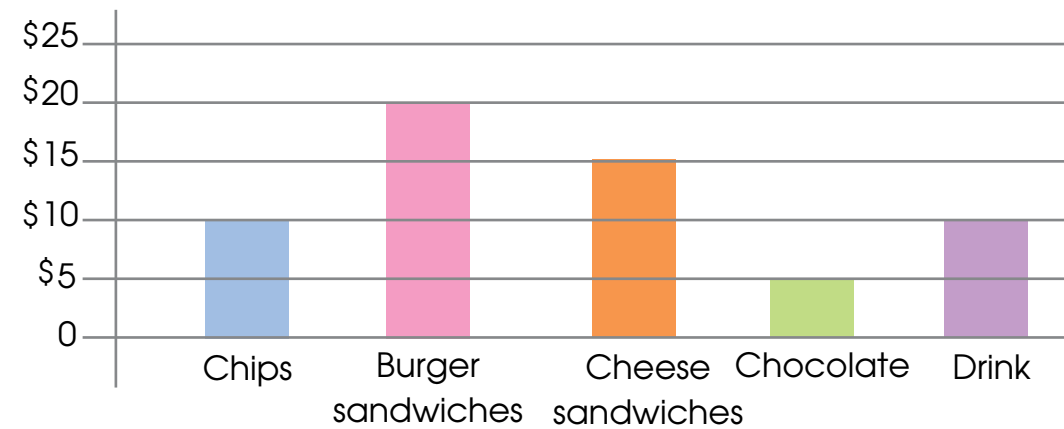There are ....8......... toy shops.

There are ....12......... video shops.

There are ....14......... food shops.

There are ....10......... book shops.

There are ....4......... more video shops than shoe shops. 12 - 8 = 4

2- This graph represents the items sold in a school canteen. Study it and answer the questions.

$25 |
$20 |
$15 |
$10 |
$5 |
0 |

Chips Burger sandwiches Cheese sandwiches Chocolate Drink

- A packet of chips is $____10____.
- A burger sandwich is $____20____ .
- A cheese sandwich is $____15____ .
- A bar of chocolate is $____5____ .
- A drink is $____10____ .
- ____Chocolate____ is the least priced item.

What is the difference in price between a burger sandwich and a drink?

$ 20 - $ 10 = $ 10

8.3   Survey and Line Plots

A survey is away to collect data by asking questions.

- Zena took a survey of her class. She asked her friends how many hours they spent studying daily.
- Zena used the result of her survey to create a line plot.

Answer the following questions after you study the line plot table.

Hours Spent on Studying	
Hours	Tally
1	ⅢⅢ ⅢⅢ
2	ⅢⅢ IIII
3	IIIII
4	
5	II

a) What is the mode? ____5____

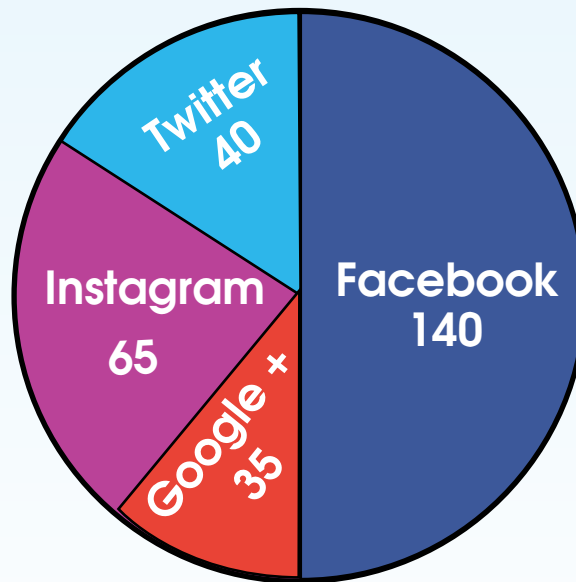**Hint:** the mode is the number that occurs most frequently in the data set.

b) What is the range? ____5 - 0 = 5____

Hint: the range is the difference between the greatest number and the least number.

c) How many students spend 2 hours studying daily? ____9____

d) How many students study more than 4 hours daily? ____2____

a) How many people prefer to use twitter? _____40_____

b) Which social media platform is chosen the most by people? ____Facebook____

c) How many people were surveyed in the street? _____0_____

d) Which social media platform was chosen the least by people?____Google +____