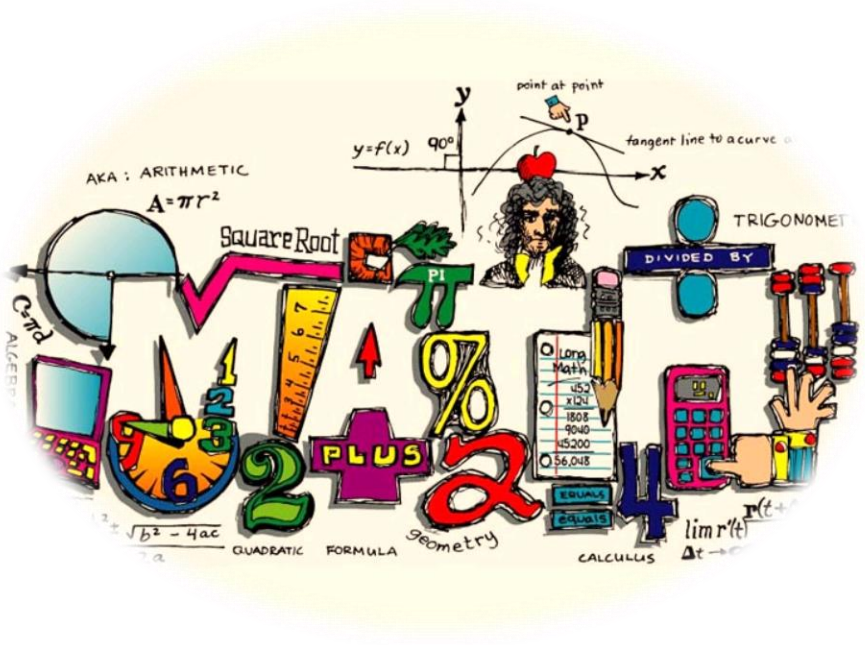
Year 8 – MYP 2

Math

"The Number System – Rounding - Estimation"



2019-2020

The Hindu-Arabic Number System

(The Hindu-Arabic numeration system evolved around A.D. 800. It is basically the numeration system that is widely used today.)

ordinal number	one	two	three	four	five	six	seven	eight	nine
Hindu-Arabic numeral	١	٢	٣	٤	٥	٦	٧	٨	٩
modern numeral	1	2	3	4	5	6	7	8	9

Interesting Facts

- The numbers we use for counting such as 1,2,3 .. are usually called the natural numbers or natural numbers.
- The possible combination of natural numbers is endless. There is no largest natural number, so we say the set of all natural numbers is infinite.
- If we include the number zero (“0”), then our set now has a new name, which is the set of whole numbers.
- The Hindu-Arabic system uses only 10 digits to construct all the natural numbers.
- Each digit in a number has a <u>place value</u>.
- It uses the digit 0 (zero) to show an empty place value.

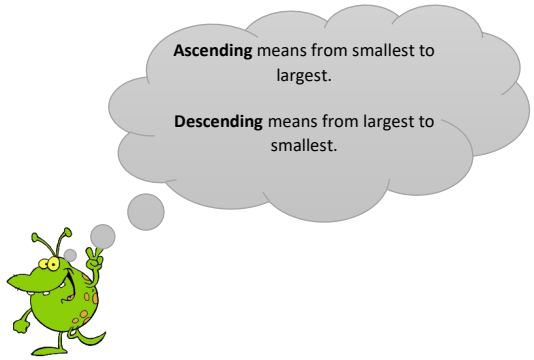
Exercise 1

What number (***place value***) is represented by the digit 5 in the following?

(Example: in number 356, the 5 digit represents the tens so it actually represents number 50)

1. 35
2. 153
3. 521
4. 5000
5. 15
6. 5
7. 1534890

Exercise 2



Put the following numbers is ascending order:

1. 67, 4, 72, 19, 5
2. 550, 50, 5, 500, 505
3. 4090, 4909, 4900, 4009, 4990
4. 77, 777, 770, 70, 7

Exercise 3

Write the following quantities in order, beginning with the smallest:

1. thirty euros, one hundred and fifty euros, thirteen euros, forty five euros

2. 15lt, 105lt, 51lt, 1lt

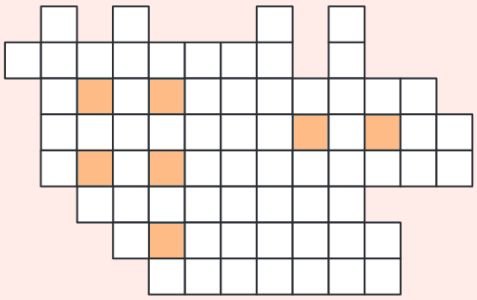
3. Adam 165cm, Roy 156cm, Elias 172cm, Nicky 185 cm

4. 77 m^2 , 777 m^2, 770 m^2, 70 m^2, 7 m^2

Activity

The aim is to fill all the numbers into the grid using each number only once. There is only one way in which all of the numbers will fit.

Search 1:



2 digits
89, 92, 56

3 digits
183

4 digits
6680

5 digits
69 235

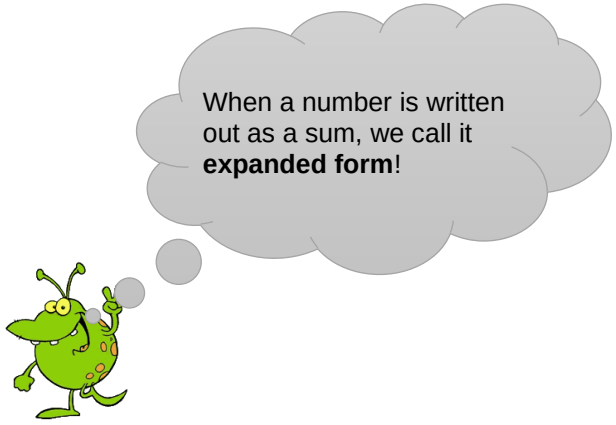
6 digits
949 875

7 digits
8 097 116
3 291 748
6 709 493
7 264 331
4 387 096
3 872 095

8 digits
62 658 397
79 408 632
10 343 879
91 863 432
81 947 368

In **expanded notation** we write the number as the sum of its place values

For example, 5042 = (5 x 1000) + (4 x 10) + (2 x 1)



Exercise 4

Write the simplest numerals for each of the following:

1. (8 x 100 000) + (6 x 10 000) + (2 x 1000) + (9 x 100) + (5 x 10) +(3 x 1) =
2. (3 x 1 000 000) + (5 x 10 000) + (7 x 100) + (9 x 1) =
3. 9 thousand and 8 hundred and 3 tens and 6 units
4. 8 hundred thousands + 9 ten thousands + 6 hundreds + 3 tens and seven units

Exercise 5

Write these numbers using expanded notation

1. 9738
2. 29782
3. 40404
4. 657931
5. 800888
6. 1247091

Exercise 6

Write the following numbers:

1. Two less than 8
2. Two more than 1000
3. Two greater than twenty
4. The smallest two digit number
5. 5 more than 2096

Exercise 7

Use each digit 1, 9, 0 only once:

1. to make the largest 3-digit number you can.

2. to make the smallest 3-digit number you can.

Rounding to a number of figures

We round to a number of significant (most important) figures if we believe this number of digits is important.

The rules for rounding off are:

- If the digit **after** the one being rounded off is **less than 5**, i.e., 0, 1, 2, 3 or 4, then we **round down**.
- If the digit **after** the one being rounded off is **5 or more**, i.e., 5, 6, 7, 8 or 9, then we **round up**.

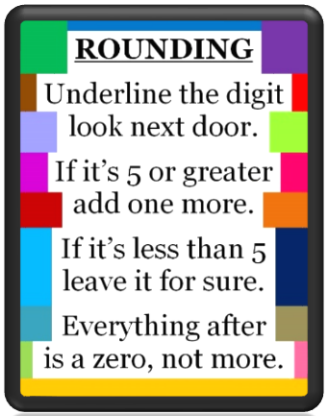
Examples

Round off the following numbers:

a) 345 to one significant figure
b) 23656 to two significant figures
c) 2349 to three significant figures
d) 43 to one significant figure

Answers

a) 345≈300 {to one significant figure}
b) 23656≈24000 {to two significant figures}
c) 2349≈2350 {to three significant figures}
d) 43≈40 {to one significant figure}



Exercise 8

Round to the nearest 10

1. 21
2. 167
3. 778
4. 98
5. 58
6. 949
7. 841
8. 132
9. 841
10. 132

Exercise 9

Round to the nearest 100

1. 210
2. 1670
3. 778
4. 985
5. 586
6. 9497
7. 8412
8. 13257

Exercise 10

Round to the nearest 1000

1. 21076
2. 16705
3. 778568
4. 985189
5. 586984
6. 9497
7. 8412
8. 13257

Exercise 11

Round off the numbers to the accuracy given:

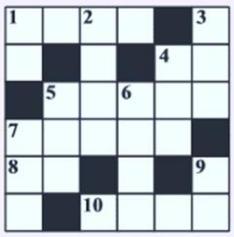
a. 2345 (to one significant figure)

b. 567 (to two significant figures)

c. 98777 (to three significant figures)

d. 120999 (to one significant figure)

Activity



Across

1 4866 to the nearest 10
4 64 to the nearest 10
5 10 938 to the nearest 100
7 27 194 to the nearest 1000
8 85 to the nearest 10
10 2629 to the nearest 1000

Down

1 44 to the nearest 10
2 7247 to the nearest 100
3 751 to the nearest 100
4 550 to the nearest 100
5 165 to the nearest 10
6 8500 to the nearest 1000
7 293 to the nearest 10
9 45 to the nearest 10

Exercise 12 (Sensible Rounding)

Work through these questions. **Think whether to round up or down.**

1. One box can hold 4 pens. How many boxes must I buy, if I have 18 pens?

2. A bus can hold 52 people. How many busses are needed for 150 students who want to go on a trip?

3. Alexi wants to bake a cake. A cake needs 4 eggs. How many cakes can she bake if she has 15 eggs?

4. A soccer team has 11 players. How many soccer teams can you have with 21 players?

5. It takes 21 sheets of paper to make a note-book. How many note books can you make with 80 sheets of paper?

6. Viki is making a fruit punch for her birthday party. The bowl for the fruit punch will hold 5 litres. The local shop only sells fruit juice in 150ml containers. How many does she need to fill the bowl?

7. **Now make up some of your own problems in which the answer has to be rounded.**