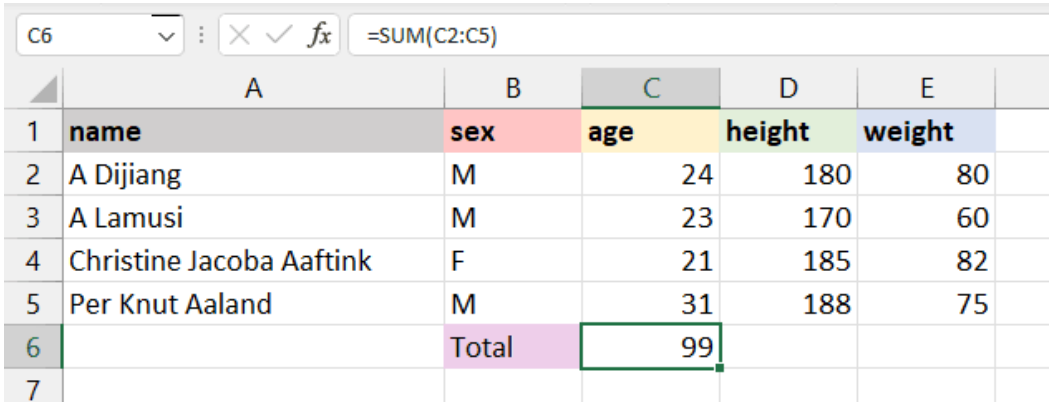
WEEK 1: FORMULAE IN SPREADSHEETS

1. SUM

The SUM() formula performs addition on selected cells. It works on cells containing numerical values and requires two or more cells.

`=SUM(C2:C5)`

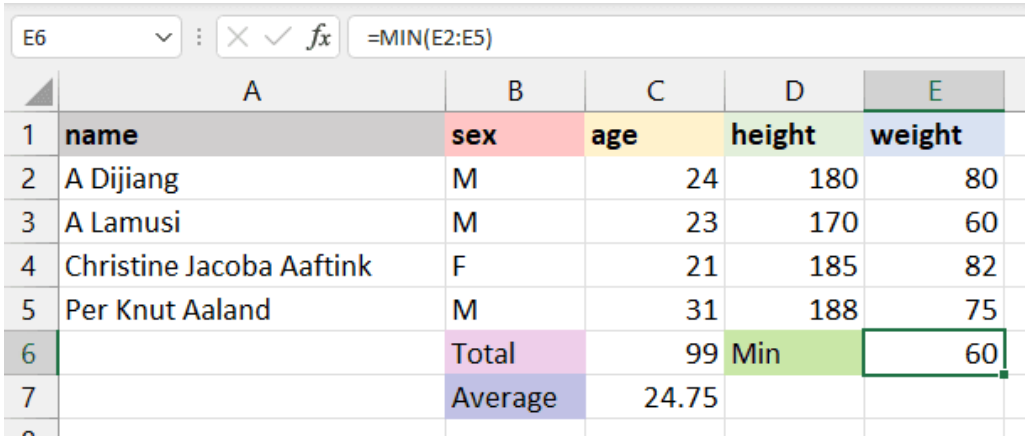


	A	B	C	D	E
1	**name**	**sex**	**age**	**height**	**weight**
2	A Dijiang	M	24	180	80
3	A Lamusi	M	23	170	60
4	Christine Jacoba Aaftink	F	21	185	82
5	Per Knut Aaland	M	31	188	75
6		Total	99		
7					

2. MIN and MAX

The MIN() formula requires a range of cells, and it returns the minimum value.

`=MIN(E2:E5)`



	A	B	C	D	E
1	**name**	**sex**	**age**	**height**	**weight**
2	A Dijiang	M	24	180	80
3	A Lamusi	M	23	170	60
4	Christine Jacoba Aaftink	F	21	185	82
5	Per Knut Aaland	M	31	188	75
6		Total	99	Min	60
7		Average	24.75		

The MAX() formula is the opposite of MIN(). It will return the maximum value from the selected range of cells.

`=MAX(E2:E5)`

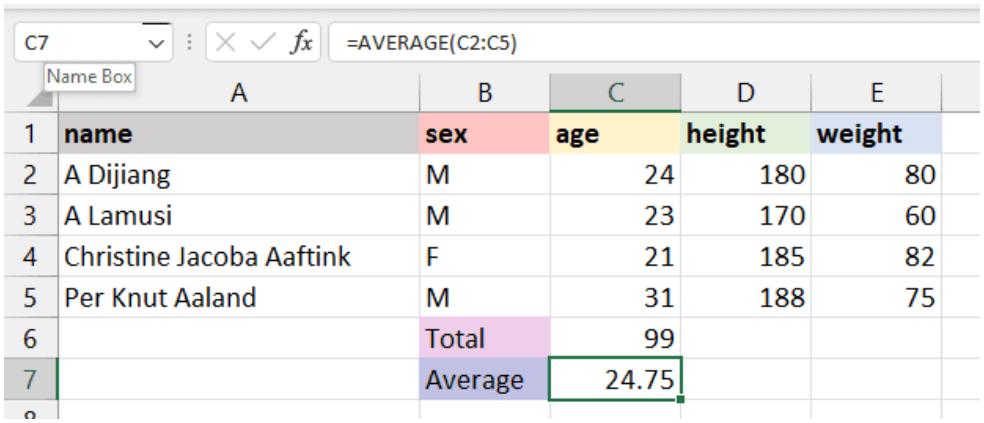
E7 =MAX(E2:E5)

	A	B	C	D	E
1	**name**	**sex**	**age**	**height**	**weight**
2	A Dijiang	M	24	180	80
3	A Lamusi	M	23	170	60
4	Christine Jacoba Aaftink	F	21	185	82
5	Per Knut Aaland	M	31	188	75
6		Total	99	Min	60
7		Average	24.75	Max	82
8					

3. AVERAGE

The AVERAGE() formula calculates the average of selected cells.

```
=AVERAGE(C2:C5)
```



	A	B	C	D	E
1	**name**	**sex**	**age**	**height**	**weight**
2	A Dijiang	M	24	180	80
3	A Lamusi	M	23	170	60
4	Christine Jacoba Aaftink	F	21	185	82
5	Per Knut Aaland	M	31	188	75
6		Total	99		
7		Average	24.75		

4. COUNT

The COUNT() formula counts the total number of selected cells. It will not count the blank cells and different data formats other than numeric.

```
=COUNT(E2:E5)
```

To count all types of cells (date-time, string, numerical), you need to use the COUNTA() formula.

The COUNTA formula does not count missing values. For blank cells, use COUNTBLANK().

E8 =COUNT(E2:E5)

	A	B	C	D	E
1	**name**	**sex**	**age**	**height**	**weight**
2	A Dijiang	M	24	180	80
3	A Lamusi	M	23	170	60
4	Christine Jacoba Aaftink	F	21	185	82
5	Per Knut Aaland	M	31	188	75
6		Total	99	Min	60
7		Average	24.75	Max	82
8				Count	4

5. POWER

POWER(D2/100,2)

F2 =POWER(D2/100,2)

	A	B	C	D	E	F
1	**name**	**sex**	**age**	**height**	**weight**	**power**
2	A Dijiang	M	24	180	80	3.24
3	A Lamusi	M	23	170	60	2.89
4	Christine Jacoba Aaftink	F	21	185	82	3.4225
5	Per Knut Aaland	M	31	188	75	3.5344
6		Total	99	Min	60	
7		Average	24.75	Max	82	
8				Count	4	

6. CEILING and FLOOR

The CEILING() formula rounds a number **up** to the nearest given multiple.

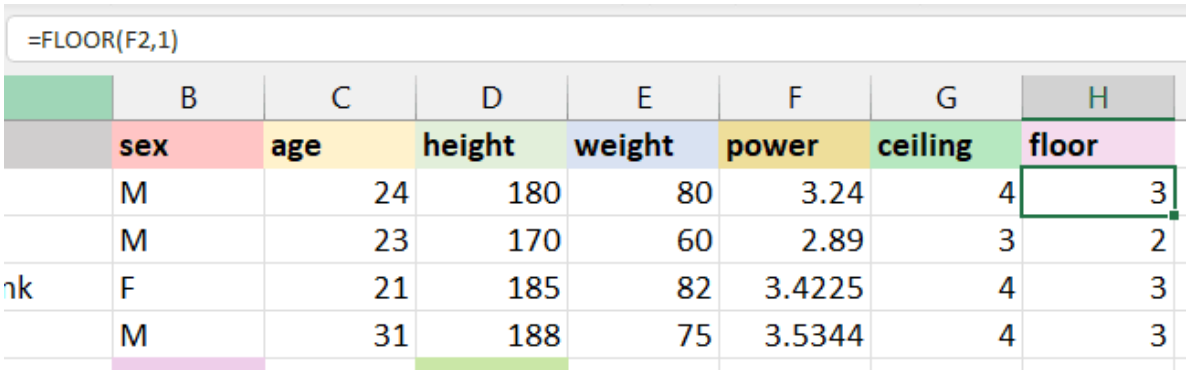
=CEILING(F2,1)

G2 =CEILING(F2,1)

	A	B	C	D	E	F	G
1	**name**	**sex**	**age**	**height**	**weight**	**power**	**ceiling**
2	A Dijiang	M	24	180	80	3.24	4
3	A Lamusi	M	23	170	60	2.89	3
4	Christine Jacoba Aaftink	F	21	185	82	3.4225	4
5	Per Knut Aaland	M	31	188	75	3.5344	4

The FLOOR() rounds a number **down** to the nearest given multiple.

```
=FLOOR(F2,1)
```

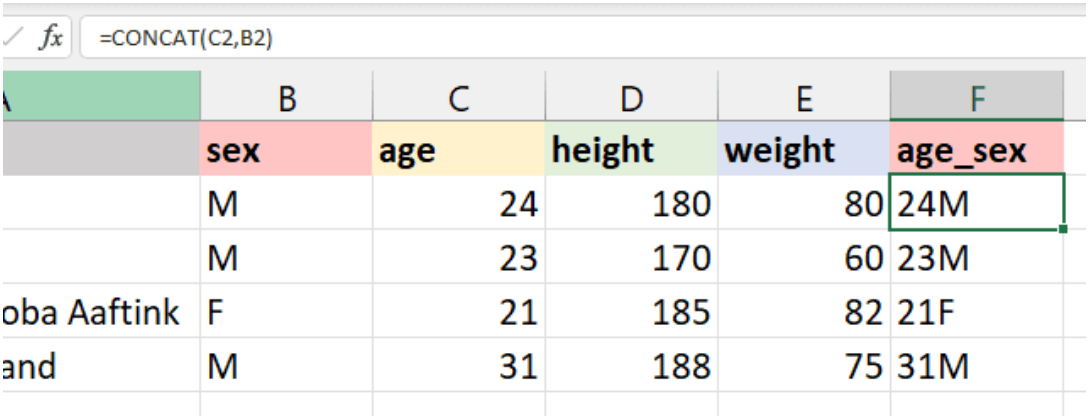


	B	C	D	E	F	G	H
	sex	age	height	weight	power	ceiling	floor
	M	24	180	80	3.24	4	3
	M	23	170	60	2.89	3	2
nk	F	21	185	82	3.4225	4	3
	M	31	188	75	3.5344	4	3

7. CONCAT

The CONCAT() Excel formula joins or merges multiple strings or cells with strings into one.

```
=CONCAT(C2,B2)
```



	B	C	D	E	F
	sex	age	height	weight	age_sex
	M	24	180	80	24M
	M	23	170	60	23M
oba Aaftink	F	21	185	82	21F
and	M	31	188	75	31M

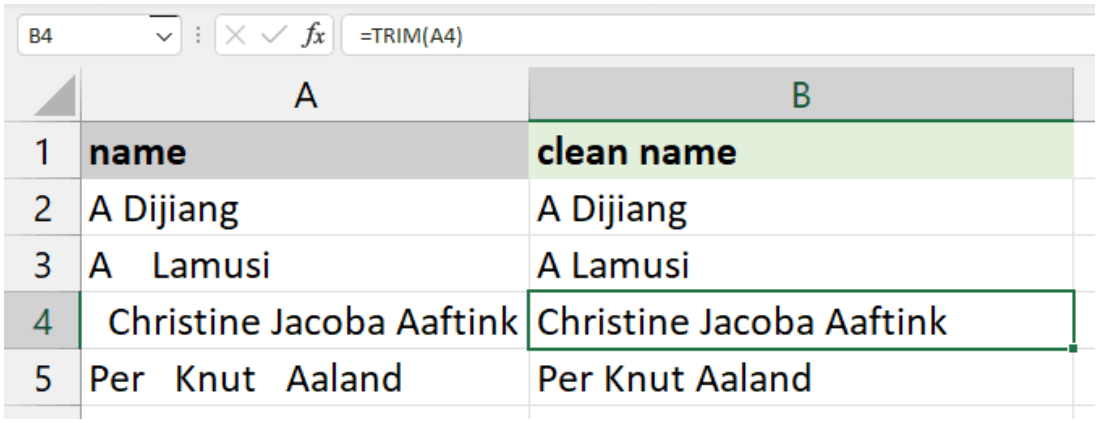
8. TRIM

TRIM is used to remove extra spaces from the start, middle, and end. It is commonly used to identify duplicate values in cells, and for some reason, extra space makes it unique.

```
=TRIM(A4)
```

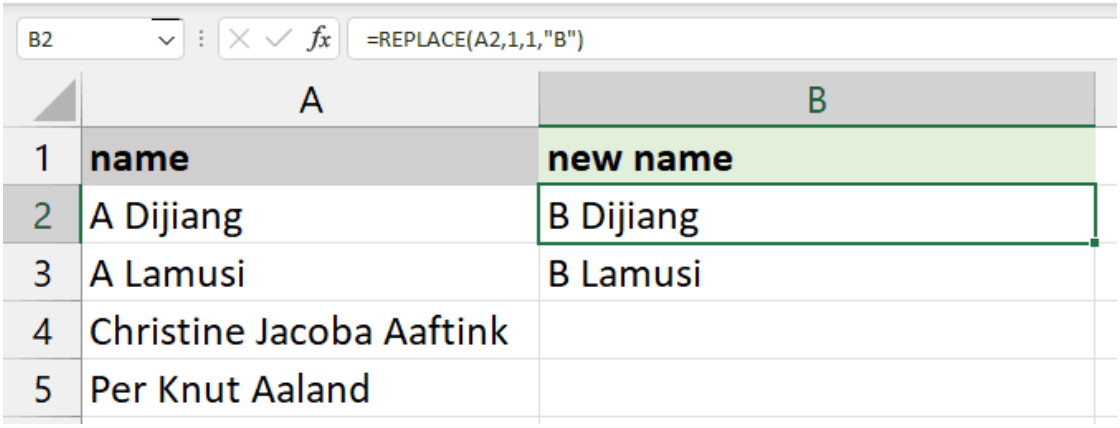
9. REPLACE and SUBSTITUTE

REPLACE is used for replacing part of the string with a new string.



REPLACE(old_text, start_num, num_chars, new_text)

- old_text is the original text or cell containing the text.
- start_num is the index position that you want to start replacing the character.
- num_chars refers to the number of characters you want to replace.
- new_text indicates the new text that you want to replace with old text.

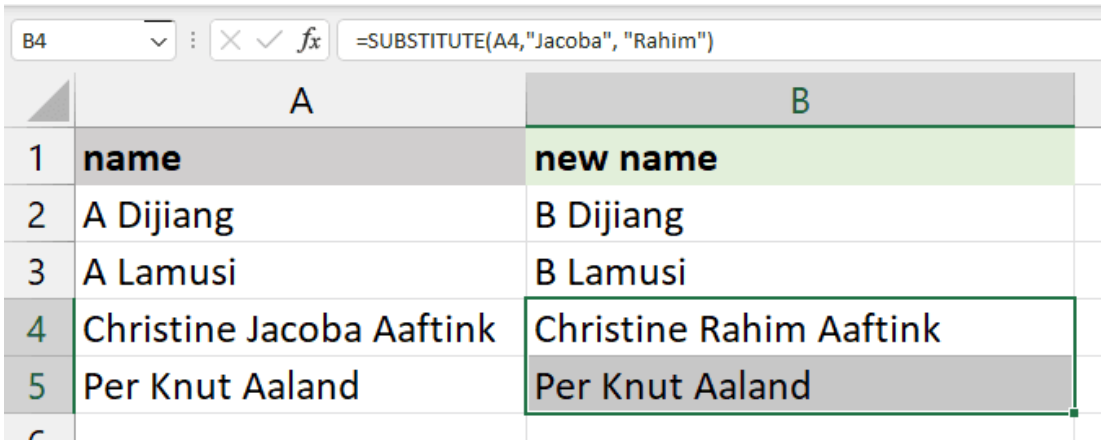


=REPLACE(A2,1,1,"B")

The SUBSTITUTE formula is similar to REPLACE. Instead of providing the location of a character or the number of characters, we will only provide old text and new text.

SUBSTITUTE(text, old_text, new_text, [instance_num])

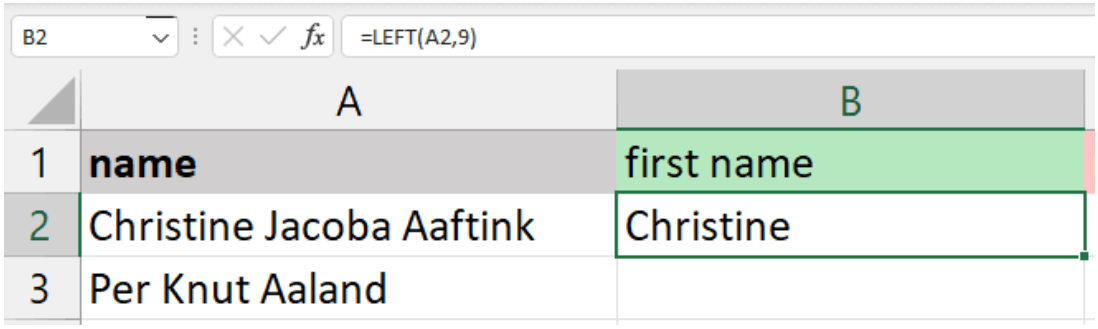
=SUBSTITUTE(A4,"Jacoba","Rahim")



10. LEFT, RIGHT, and MID

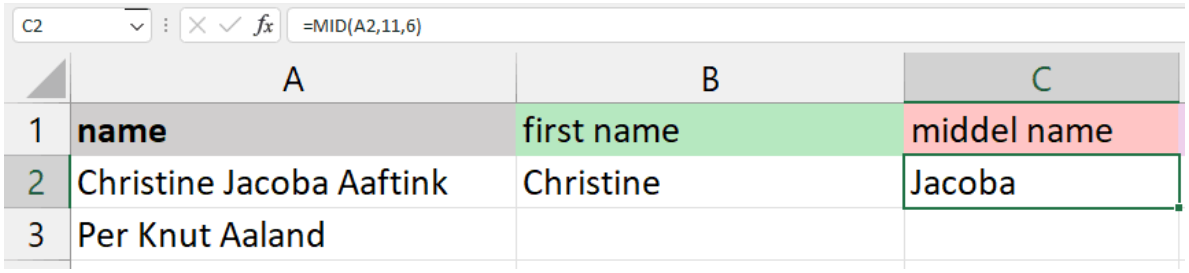
The LEFT returns the number of characters from the start of the string or text.

```
=LEFT(A2,9)
```



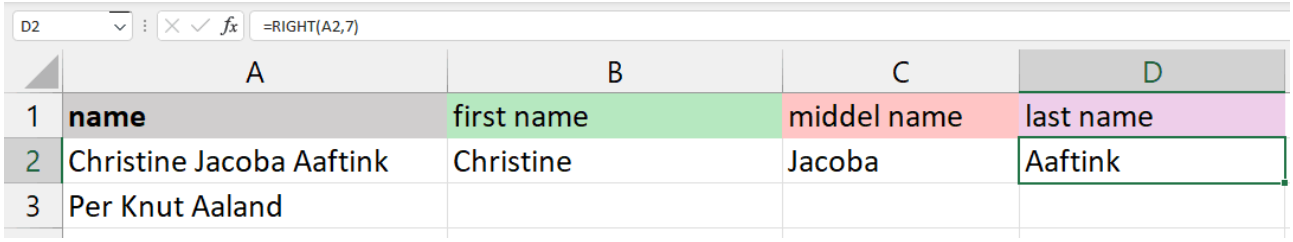
The MID formula requires starting position and length to extract the characters from the middle.

```
=MID(A2,11,6)
```



The RIGHT will return the number of characters from the end. You just need to provide a number of characters.

=RIGHT(A2,7)

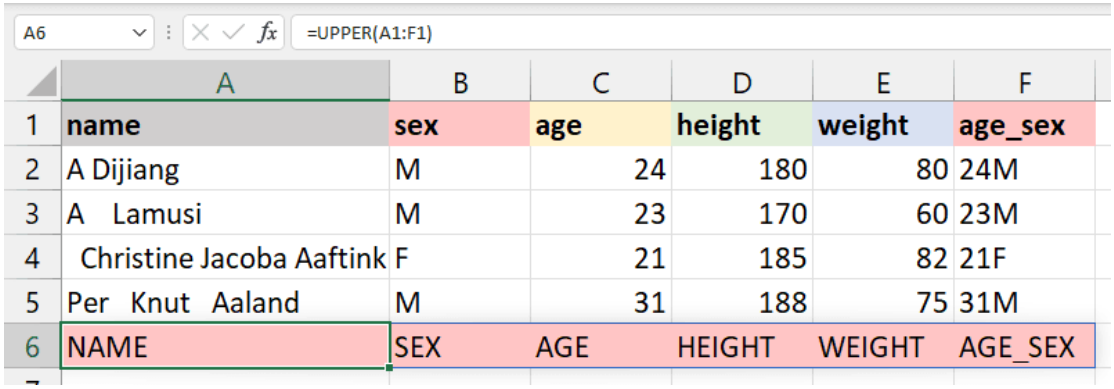


	A	B	C	D
1	**name**	first name	middel name	last name
2	Christine Jacoba Aaftink	Christine	Jacoba	Aaftink
3	Per Knut Aaland			

11. UPPER, LOWER, and PROPER

The UPPER, LOWER, and PROPER are basic string operations. UPPER will convert all the letters in the text to uppercase.

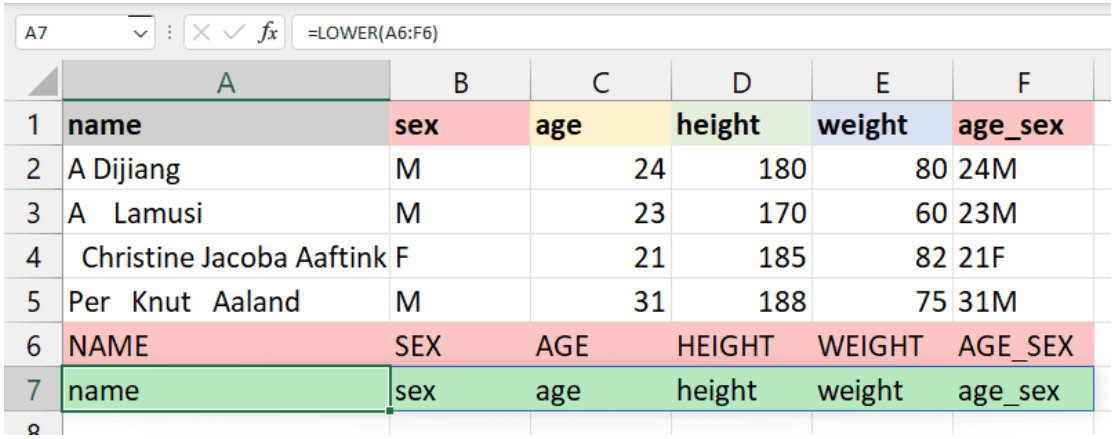
=UPPER(A1:F1)



	A	B	C	D	E	F
1	**name**	**sex**	**age**	**height**	**weight**	**age_sex**
2	A Dijiang	M	24	180	80	24M
3	A Lamusi	M	23	170	60	23M
4	Christine Jacoba Aaftink	F	21	185	82	21F
5	Per Knut Aaland	M	31	188	75	31M
6	NAME	SEX	AGE	HEIGHT	WEIGHT	AGE_SEX

LOWER will convert the selected text lower case.

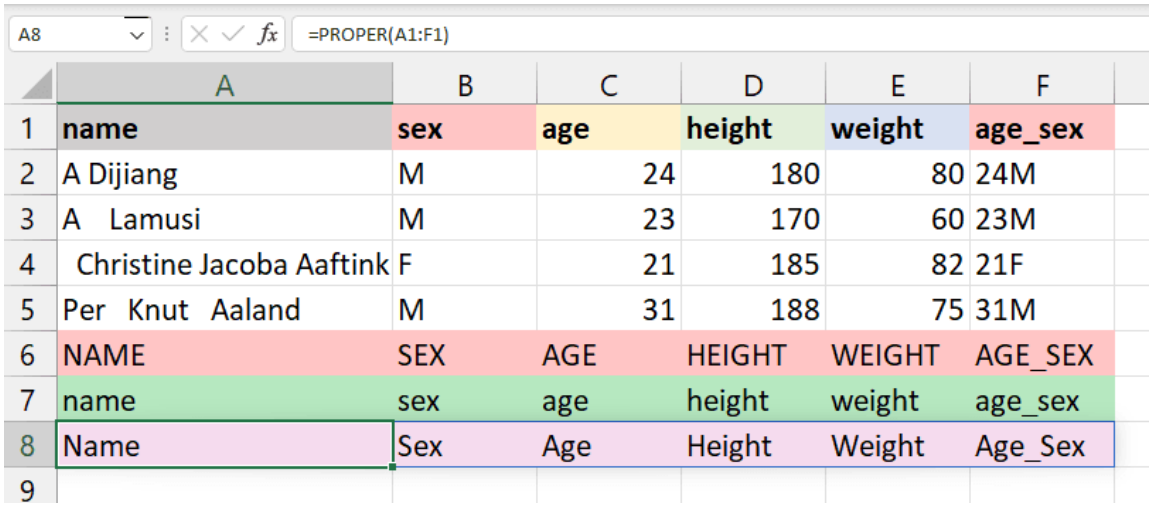
=LOWER(A1:F1)



	A	B	C	D	E	F
1	**name**	**sex**	**age**	**height**	**weight**	**age_sex**
2	A Dijiang	M	24	180	80	24M
3	A Lamusi	M	23	170	60	23M
4	Christine Jacoba Aaftink	F	21	185	82	21F
5	Per Knut Aaland	M	31	188	75	31M
6	NAME	SEX	AGE	HEIGHT	WEIGHT	AGE_SEX
7	name	sex	age	height	weight	age_sex

PROPER will convert the string to the proper case.

```
=PROPER(A1:F1)
```

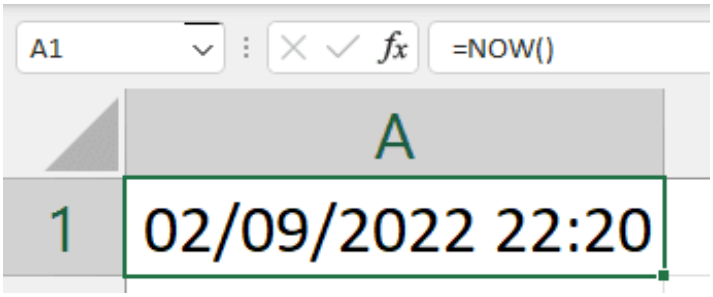


	A	B	C	D	E	F
1	**name**	**sex**	**age**	**height**	**weight**	**age_sex**
2	A Dijiang	M	24	180	80	24M
3	A Lamusi	M	23	170	60	23M
4	Christine Jacoba Aaftink	F	21	185	82	21F
5	Per Knut Aaland	M	31	188	75	31M
6	NAME	SEX	AGE	HEIGHT	WEIGHT	AGE_SEX
7	name	sex	age	height	weight	age_sex
8	Name	Sex	Age	Height	Weight	Age_Sex
9						

12. NOW and TODAY

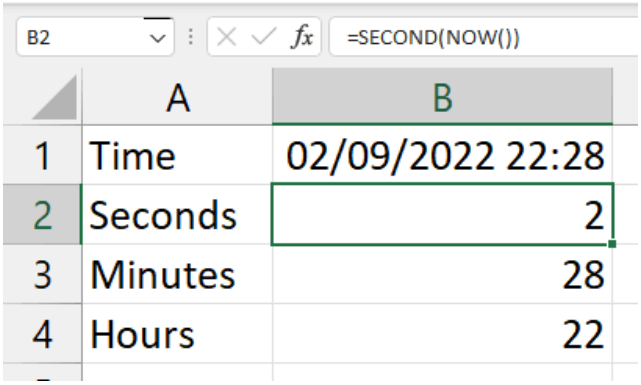
NOW returns the current time and date, and TODAY returns only the current date.

```
=NOW()
```



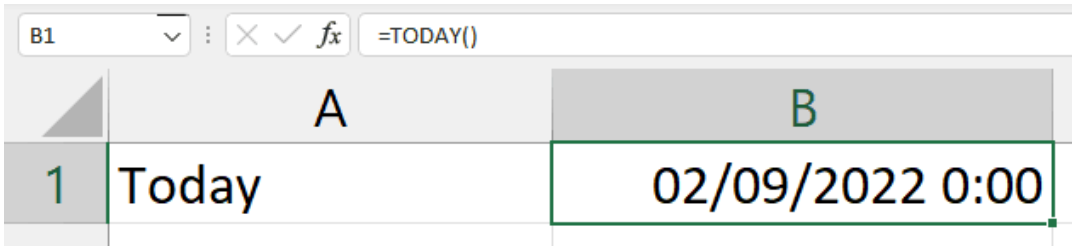
To extract the seconds from the time, you will use the SECOND() formula.

```
=SECOND(NOW())
```



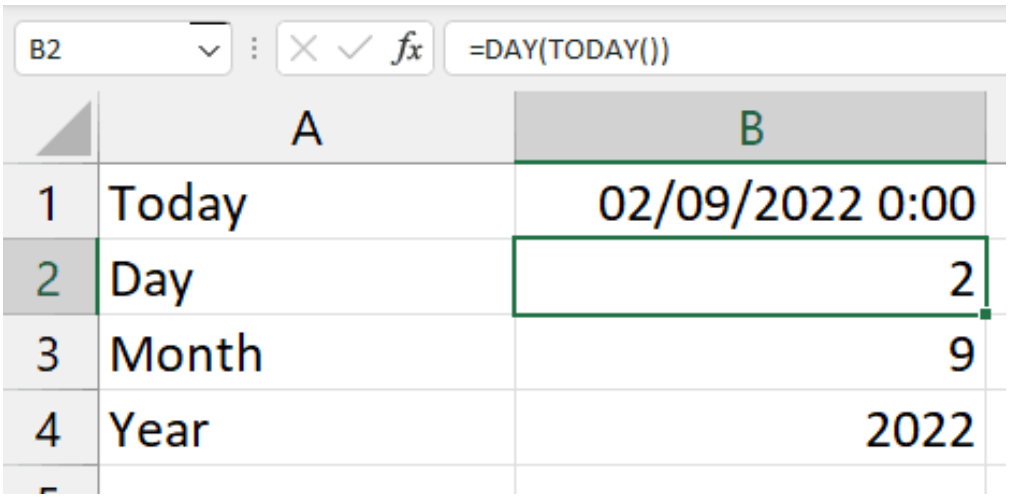
Similarly, TODAY will return only the current date.

=TODAY()



To extract the day, you will use the DAY() formula.

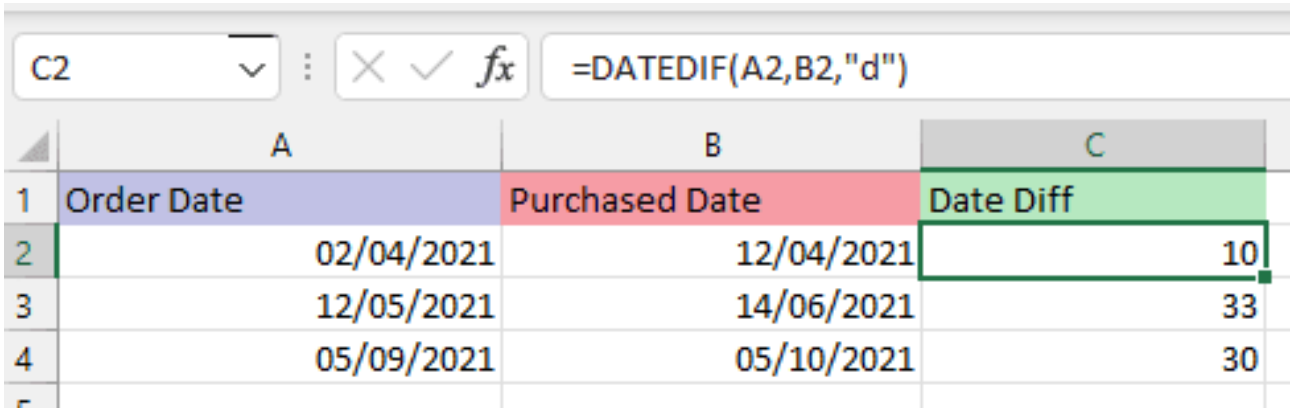
=DAY(TODAY())



13. DATEDIF

The DATEDIF calculates the difference between two dates and returns the number of days, months, weeks, or years based on your preference.

```
=DATEDIF(A2,B2,"d")
```



	A	B	C
1	Order Date	Purchased Date	Date Diff
2	02/04/2021	12/04/2021	10
3	12/05/2021	14/06/2021	33
4	05/09/2021	05/10/2021	30

14. VLOOKUP and HLOOKUP

The VLOOKUP formula searches for the value in the leftmost column of the table array and returns the value from the same row from the specified columns.

VLOOKUP(lookup_value, table_array, col_index, range_lookup)

- **lookup_value**: the value you are looking for that is present in the first column.
- **table_array**: the range of the table, worksheet, or selected cell with multiple columns.
- **col_index:** the position of the column to extract the value.
- **range_lookup**: “True” is used for the approximate match (default), and “FALSE” is used for the exact match.

```
=VLOOKUP(A2,worksheet1!B2:H20,6,FALSE)
```

	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	name	sex	age	height	weight	team	noc	games	year	season	city	sport	event	medal
2	A Dijiang	M	24	180	80	China	CHN	1992 Summer	1992	Summer	Barcelona	Basketball	Basketball M	null
3	A Lamusi	M	23	170	60	China	CHN	2012 Summer	2012	Summer	London	Judo	Judo Men's	null
4	Gunnar Nielsen Aaby	M	24	null	null	Denmark	DEN	1920 Summer	1920	Summer	Antwerpen	Football	Football Me	null
5	Edgar Lindenau Aabye	M	34	null	null	Denmark/Sweden	DEN	1900 Summer	1900	Summer	Paris	Tug-Of-War	Tug-Of-War	Gold
6	Christine Jacoba Aaftink	F	21	185	82	Netherlands	NED	1988 Winter	1988	Winter	Calgary	Speed Skating	Speed Skati	null
7	Christine Jacoba Aaftink	F	21	185	82	Netherlands	NED	1988 Winter	1988	Winter	Calgary	Speed Skating	"Speed Skat	null
8	Christine Jacoba Aaftink	F	25	185	82	Netherlands	NED	1992 Winter	1992	Winter	Albertville	Speed Skating	Speed Skati	null
9	Christine Jacoba Aaftink	F	25	185	82	Netherlands	NED	1992 Winter	1992	Winter	Albertville	Speed Skating	"Speed Skat	null
10	Christine Jacoba Aaftink	F	27	185	82	Netherlands	NED	1994 Winter	1994	Winter	Lillehammer	Speed Skating	Speed Skati	null
11	Christine Jacoba Aaftink	F	27	185	82	Netherlands	NED	1994 Winter	1994	Winter	Lillehammer	Speed Skating	"Speed Skat	null
12	Per Knut Aaland	M	31	188	75	United States	USA	1992 Winter	1992	Winter	Albertville	Cross Country Skiing	Cross Count	null
13	Per Knut Aaland	M	31	188	75	United States	USA	1992 Winter	1992	Winter	Albertville	Cross Country Skiing	Cross Count	null
14	Per Knut Aaland	M	31	188	75	United States	USA	1992 Winter	1992	Winter	Albertville	Cross Country Skiing	Cross Count	null
15	Per Knut Aaland	M	31	188	75	United States	USA	1992 Winter	1992	Winter	Albertville	Cross Country Skiing	Cross Count	null

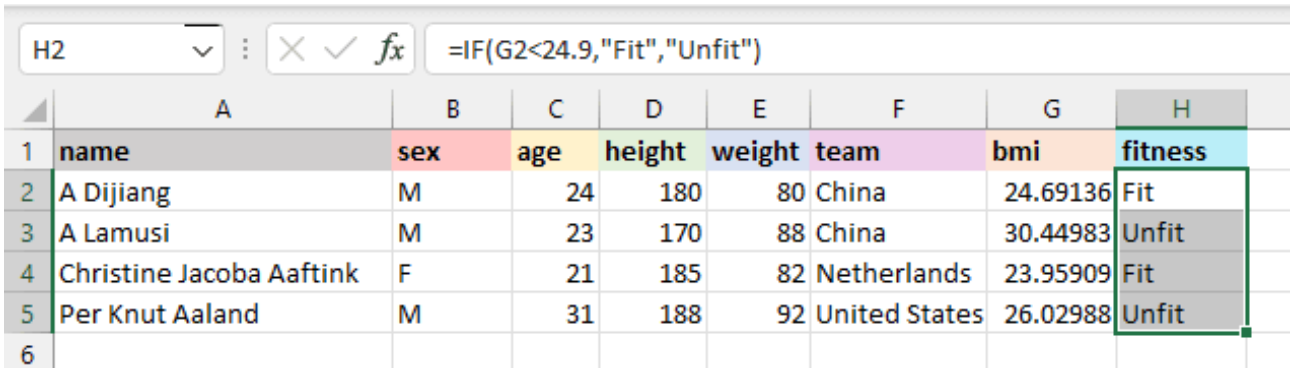
The HLOOKUP searches for the value in the first row instead of the first column. It returns the value from the same column and the row you specified.

HLOOKUP(lookup_value, table_array, row_index, range_lookup)

15. IF

The IF Excel formula is straightforward. It is similar to an if-else statement in a programming language. If the logic is correct, it will return a certain value; if the logic is False, it will return a different value.

```
=IF(G2<24.9,"Fit,"Unfit")
```



	A	B	C	D	E	F	G	H
1	name	sex	age	height	weight	team	bmi	fitness
2	A Dijiang	M	24	180	80	China	24.69136	Fit
3	A Lamusi	M	23	170	88	China	30.44983	Unfit
4	Christine Jacoba Aaftink	F	21	185	82	Netherlands	23.95909	Fit
5	Per Knut Aaland	M	31	188	92	United States	26.02988	Unfit
6								

Reference: https://www.datacamp.com/tutorial/basic-excel-formulas-for-everyone

QUESTIONS

Sales and Financial Data Analysis

1. **Total Sales Calculation:**
    - You have sales data in column B from B2 to B20. Write a formula to calculate the total sales.
    - **Answer:** `=SUM(B2:B20)`
2. **Profit Calculation:**
    - The cost price is in column C, and the selling price is in column D. How do you calculate the profit for each item in column E?
    - **Answer:** `=D2 - C2` (Copy this formula down from E2 for all items)
3. **Commission Calculation:**
    - If a salesperson earns a 5% commission on total sales, and their total sales are listed in cell F2, write a formula to calculate the commission.
    - **Answer:** `=F2 * 0.05`
4. **Calculating Yearly Total:**
    - Monthly sales are listed in cells G2. Write a formula to calculate the yearly total.
    - **Answer:** `=SUM(G2:G13)`

Data Validation and Logical Operations

5. **Pass/Fail Determination:**
    - Scores are listed in column H. Write a formula in column I to show "Pass" if the score is 60 or above, and "Fail" otherwise.
6. **Applying a Discount:**
    - If a discount is applied only to purchases over $100 in column J, and the discount rate is 10%, write a formula to apply the discount to the price.
7. **Detecting Outliers:**
    - You have temperature readings in column K. Write a formula to highlight readings above 100.

Advanced Data Handling (SPOT)

8. **Categorizing Expenses:**
    - Expenses are listed in column L, and you want to categorize them as "High" for values over $1000, "Medium" for $500 to $1000, and "Low" for below $500. Write a formula in column M.

9. **Using VLOOKUP to Find Prices:**

   - You have a product list with product codes in column P and prices in column Q. Write a formula to find the price of a product based on its code (stored in cell R2).

Time and Date Calculations

10. Calculating Days Between Dates:

   - Start dates are listed in column S and end dates in column T. Write a formula to calculate the number of days between each pair of dates.
   -

11. Calculating Hours Worked:

   - Clock-in times are in column U and clock-out times are in column V. Write a formula to calculate the total hours worked.