9.18 FORMULA

Formulas are equations that perform calculations on data values in the worksheet. Like a calculator, Excel can execute formulas that add, subtract, multiply, and divide. A formula can be a combination of constant values, cell references and mathematical operators (+, -, /, *, =).

A formula starts with an equal sign (=).

Note: The cell address in a formula is known as the cell reference.

Example:

The following formula multiplies 5 by 10 and then adds the value in cell A2 to the result:

=A2+5*10

Here,

- 5 and 10 are constant values.
- + and * are mathematical operators.
- A2 is the cell reference, which returns the value in cell A2.

The formula is visible only in the *Formula bar*. A formula's result will change as different numbers are entered into the cells included in the formula's definition.

C1 ▾ fx =A2+5*10

	A	B	C
1	1	6	52
2	2	7	

Fig. 9.64 (Formula Visible in the Formula bar)

9.18.1 COPY AND PASTE FORMULA

The process to copy and paste a formula is identical to that process used to copy and paste text.

To Copy and Paste a Formula:

- Select the cell that contains the formula to be copied.

Fig. 9.65 (Copy a Formula)

- To copy the formula, click on the **Home** tab → **Clipboard** group → **Copy** command.

Fig. 9.66 (Copy Command)

OR

Press **Ctrl+C**.

- Now, select the cell where the copied formula is to be pasted.
- To paste the formula, click on the **Home** tab → **Clipboard** group → **Paste** command.

Fig. 9.67 (Paste Command)

OR

Press **Ctrl+V**.

OR

Press the **Enter** key. The formula is copied to the new location.

Fig. 9.68 (Paste a Formula)

Note: The cell references in a formula are automatically updated when the formula is copied to other cell in the worksheet.

9.18.2 REVISING FORMULA

You can revise any formula that was previously written in a worksheet.

To Revise a Formula:

- **Double-click** the cell that contains the formula you want to revise.
- The cursor can now move left and right between the values in the formula.

- Make the necessary changes to the formula. Like, replace cell A2 with cell A3 in the formula.

- Press the **Enter key** to accept the new formula.

9.19 CELL REFERENCING

The cell address in a formula is known as the *cell reference*. With the help of cell references, you can use the data in different parts of a worksheet.

Types of Cell Referencing:

There are three types of cell references:

(1) Relative Reference

When you create a formula, references to cell(s) are usually based on the position relative to the cell. When you copy or move a formula to other cells, the reference cell automatically changes.

Example:

In **Figure 9.69**, the formula in **A3** is = **A1+A2.** When you copy the formula from **A3** to **B3,** Excel automatically changes the reference to match the location of cells i.e. it becomes **B3=B1+B2.**

Fig. 9.69 (Relative Reference: Simple formula)

Fig. 9.70 (Relative Reference: Copy and Paste the formula)

(2) Absolute Reference

Absolute reference is used when you do not want to change the address of the cell on copying the formula to another cell. For this purpose, you have to add the dollar symbol ($) before the column and the row number.

Example:

- Enter the numbers **(Figure 9.71)** you want to calculate (e.g., 34,567.00 in cell B2 and 1,234.00 in cell B3).
- Then, create a simple formula (=B2+B3) in cell B5.

Fig. 9.71 (Absolute Reference: Simple formula)

- To create an absolute reference in the formula just created, insert a **$ symbol** before the B (column reference) and 2 (row reference) in the reference to B2 so the new formula reads, **(=$B$2+B3). (Fig. 9.72)**

Fig. 9.72 (Absolute Reference: Create an absolute reference)

- **Copy and Paste** the formula to another adjacent cell **(D5)**. The formula now includes an absolute reference to B2, **(=$B$2+D3)**.

Fig. 9.73 (Absolute Reference: Observe the Cell Reference once the formula is applied)

(3) Mixed Reference

It is a combination of *Relative* and *Absolute* reference. In this type of reference, either row or column has to remain fixed.

Example:

- Enter the numbers you want to calculate.
  (e.g., 10 in cell A1 and 20 in cell A2). **(Fig. 9.74)**
- Then, create a simple formula (=A1+A2) in cell A3.

Fig. 9.74 (Mixed Reference: Simple formula)

- To create a mixed reference in the formula just created, insert a **$ symbol** before the A (column reference) for A1 and a **$ symbol** before the 2 (row reference) for A2 in the formula bar. The new formula reads, **(=$A1+A$2). (Fig. 9.75)**

Fig. 9.75 (Mixed Reference: Create a mixed reference)

- **Copy and Paste** the formula to another adjacent cell **(B3)**. The formula now includes a mixed reference for the cell B3 **(=$A1+B$2)**.

Fig. 9.76 (Mixed Reference: Observe the Cell Reference Once the formula is applied)

9.19.1 DEACTIVATING AUTOMATIC CHANGES

By default, Excel recalculates all the formulas in your worksheet automatically when you open your worksheet or change any entries, formulas, or names on which your formulas depend. If your worksheet is large, with many formulas, this can take several seconds or minutes. Moreover, while the formulas are being recalculated, you can not make any changes to the worksheet.

You may want to temporarily turn off automatic calculation to save time until you are finished entering and changing the formulas in your worksheet.

To Deactivate Automatic Calculations:

- Click **Formulas** tab → **Calculation** group → **Calculation Options**. A drop down list will be appeared.
- Select **Manual** from the list of options.

Fig. 9.77 (Deactivating Automatic Calculations)

9.20 FUNCTIONS

Functions are predefined formulas that perform calculations by using specific values, called *arguments*, in a particular order. Functions can be used to perform simple or complex calculations. Functions save you the time of writing lengthy formulas.

For example, you can use an Excel function called *Average*, to quickly find the average of range of numbers.

Each function has a specific order, called *syntax*, which must be strictly followed for the function to work correctly.

Syntax Order:

1. All functions begin with the = sign.
2. After the = sign, define the *function name* (e.g., SUM).
3. After the function name, define *argument(s)* enclosed by parentheses (numbers, text or cell references). If there is more than one argument, separate each by a comma.

An example of a function with one argument that adds a range of cells, B3 through B10:

Fig. 9.78 (Function with One Argument)

An example of a function with more than one argument that calculates the average of numbers in a range of cells, B3 through B10, and C3 through C10:

Fig. 9.79 (Function with more than One Argument)

Excel provides hundreds of functions to assist you in different sort of calculation. Some of the commonly used functions are discussed below:

9.20.1 MATHEMATICAL FUNCTIONS

Excel's Mathematical functions can be used to perform common mathematical operations such as addition, multiplication and rounding numbers. Some of the commonly used mathematical functions are discussed below:

(1) SUM

The SUM function adds together a supplied set of numbers and returns the sum of these values.

Example:

In the following spreadsheet, the SUM function is used to calculate the sum of the numbers 5, 6, 7, 8 & 9. In each of the five methods, the numbers are supplied to the SUM function in a different way.

Formulas:

	A	B
1	5	=SUM(5, 6, 7, 8, 9)
2	6	=SUM({5,6,7}, 8, 9)
3	7	=SUM(A1, A2, A3, A4, A5)
4	8	=SUM(A1, A2, A3, "8", "9")
5	9	=SUM(A1:A5)

Results:

	A	B
1	5	35
2	6	35
3	7	35
4	8	35
5	9	35

(2) PRODUCT

The PRODUCT function returns the product of a supplied set of numerical values.

Example:

In the following spreadsheet, the PRODUCT function is used to calculate the product of the numbers 3, 6, 2, 8 & 5. In each of the five methods, the numbers are supplied to the PRODUCT function in a different way.

Formulas:

	A	B
1	3	=PRODUCT(3, 6, 2, 8, 5)
2	6	=PRODUCT({3,6,2}, 8, 5)
3	2	=PRODUCT(A1, A2, A3, A4, A5)
4	8	=PRODUCT(A1, A2, A3, "8", "5")
5	5	=PRODUCT(A1:A5)

Results:

	A	B
1	3	1440
2	6	1440
3	2	1440
4	8	1440
5	5	1440

(3) POWER

The POWER function calculates a given number, raised to a supplied power.

Example:

The following spreadsheet shows the use of POWER function:

Formulas:

	A	B	C
1			=POWER(2, 3)
2	5.5	3	=POWER(A2, B2)

Results:

	A	B	C
1			8
2	5.5	3	166.375

(4) SQRT

The SQRT function calculates the positive square root of a supplied number. If the supplied number is negative, the SQRT function returns the **#NUM!** Error.

Example:

The following spreadsheet shows the use of SQRT function:

Formulas:

	A	B
1		=SQRT(25)
2	15625	=SQRT(A2)
3	6.5536	=SQRT(A3)

Results:

	A	B
1		5
2	15625	125
3	6.5536	2.56

(5) MOD

The MOD function returns the remainder of a division between two supplied numbers.

Example:

The following spreadsheet shows the use of MOD function:

Formulas:

	A	B	C
1			=MOD(6, 4)
2			=MOD(6, 3)
3	6	2.5	=MOD(A3, B3)

Results:

	A	B	C
1			2
2			0
3	6	2.5	1

(6) ROUND

The ROUND function rounds a supplied number up or down, to a specified number of decimal places.

Example:

The following spreadsheet shows the use of ROUND function:

Formulas:

	A	B
1	100.319	=ROUND(A1, 1)
2	5.28	=ROUND(A2, 1)
3	5.9999	=ROUND(A3, 3)
4	99.5	=ROUND(A4, 0)
5	-6.3	=ROUND(A5, 0)

Results:

	A	B
1	100.319	100.3
2	5.28	5.3
3	5.9999	6
4	99.5	100
5	-6.3	-6

9.20.2 STATISTICAL FUNCTIONS

Excel provides a wide range of statistical functions that perform calculations, from computing basic mean (average) to the more complex analytical tests. Some of the commonly used statistical functions are discussed below:

(1) AVERAGE

The AVERAGE function is used to calculate the average or the arithmetic mean of a list of supplied numbers.

Example:

In the following spreadsheet, the AVERAGE function is used to calculate the arithmetic mean of the numbers 8, 7, 9, 6 & 10. In each case, the values are supplied to the function in different ways.

Formulas:

	A	B
1	8	=AVERAGE(8, 7, 9, 6, 10)
2	7	=AVERAGE({8,7,9}, 6, 10)
3	9	=AVERAGE(A1, A2, A3, A4, A5)
4	6	=AVERAGE(A1:A5)
5	10	

Results:

	A	B
1	8	8
2	7	8
3	9	8
4	6	8
4	10	

(2) MIN

The MIN function returns the smallest value from a supplied set of numeric values.

Example:

The following spreadsheet shows the use of MIN fo...

Formulas:

	A	B
1	4	=MIN(A1:A5)
2	3	
3	1	
4	5	
5	2	

Results:

	A	B
1	4	1
2	3	
3	1	
4	5	
5	2	

(3) MAX

The MAX function returns the largest value from a supplied set of numeric values.

Example:

The following spreadsheet shows the use of MAX function:

Formulas:

	A	B
1	4	=MAX(A1:A5)
2	3	
3	1	
4	5	
5	2	

Results:

	A	B
1	4	5
2	3	
3	1	
4	5	
5	2	

(4) COUNT

The COUNT function returns the count of numeric values in a supplied set of cells or values. This count includes both *numbers* and *dates*.

Example:

The following spreadsheet shows the use of COUNT function:

Formulas:

	A	B	C
1	5	0	=COUNT(A1:A5)
2	text		=COUNT(A1:A5, B1)
3	FALSE		=COUNT(A1:B5)
4	01/01/2015		
5	#N/A	10	

Results:

	A	B	C
1	5	0	2
2	text		3
3	FALSE		4
4	01/01/2015		
5	#N/A	10	

(5) COUNTIF

The COUNTIF function returns the number of cells within a supplied range, that satisfy a given criteria or condition.

Example:

	A	B	C	D
1	Sunday	07-Sep-2008	0	TRUE
2	Monday	08-Sep-2008	2.1	TRUE
3	Wednesday	10-Sep-2008	2	TRUE
4	Thursday	11-Sep-2008	3	FALSE
5	Wednesday	17-Sep-2008	2.5	FALSE
6	Tuesday	23-Sep-2008	3	FALSE
7	Wednesday	24-Sep-2008	6	FALSE
8	Sunday	05-Oct-2008	4	FALSE
9	Saturday	11-Oct-2008	0	FALSE

Based on the above spreadsheet, the following COUNTIF functions will return the different results:

Formulas:

	A
11	=COUNTIF(A1:A9, "Wednesday")
12	=COUNTIF(A1:A9, "<>Wednesday")
13	=COUNTIF(B1:B9, ">01/10/2008")
14	=COUNTIF(C1:C9, 0)
15	=COUNTIF(C1:C9, ">=3")
16	=COUNTIF(D1:D9, TRUE)

Results:

	A
11	3
12	6
13	2
14	2
15	4
16	3

9.20.3 LOGICAL FUNCTIONS

In Excel, Logical functions are used frequently for testing conditions and making decisions. Some of the commonly used logical functions are discussed below:

(1) IF

The IF function checks whether a condition is met or not. It returns *one value* if the condition is TRUE and *another value* if the condition is FALSE.

Example:

In the following spreadsheet, select cell **C1**, enter the function =IF(A1>=33,"PASS","FAIL") and Press *Enter*.

C1 ▾ f_x =IF(A1>=33,"PASS","FAIL")

	A	B	C	D	E
1	33	20	PASS		
2					

Here, the IF function returns PASS in cell C1 because the value in cell A1 is equals to 33.

(2) AND

The AND function returns TRUE if all conditions are true and returns FALSE if any of the conditions are false.

Example:

In the following spreadsheet, select cell **C1**, enter the function =IF(AND(A1>=60,B1<100),"FIRST","SECOND") and Press *Enter*.

C1 ▾ fx =IF(AND(A1>=60,B1<100),"FIRST","SECOND")

	A	B	C	D	E	F	G
1	50	70	SECOND				
2							

Here, the AND function returns FALSE because the value in cell A1 is not greater than or equals to 60, though the value in cell B1 is less than 100. So in this function, the second condition is true, but the first condition is false. As a result, this function returns FALSE and put SECOND in cell C1.

(3) OR

The OR function returns TRUE if any of the conditions are TRUE and returns FALSE if a conditions are false.

Example:

In the following spreadsheet, select cell **C1**, enter the functi =IF(OR(A1>=60,B1<100),"FIRST","SECOND") and Press *Enter*.

C1 ▾ fx =IF(OR(A1>=60,B1<100),"FIRST","SECOND")

	A	B	C	D	E	F	G
1	50	70	FIRST				
2							

Here, the OR function returns TRUE because the value in cell B1 is less than 100, thou value in cell A1 is not greater than or equals to 60. So in this function, out of two conditions, true. As a result, this function returns TRUE and put FIRST in cell C1.

(4) NOT

The NOT function returns the opposite to a supplied logical value. That is, if the supplie is TRUE, the NOT function returns FALSE and if the supplied value is FALSE, the NOT f returns TRUE.

Example:

The following spreadsheet shows the use of NOT function:

Formulas:

	A	B
1	=NOT(TRUE)	
2	=NOT(B1=1)	

Results:

	A	B
1	FALSE	
2	TRUE	

9.20.4 DATE AND TIME FUNCTIONS

Excel provides a number of functions to work with dates and times. Some of the commonly used date and time functions are discussed below:

(1) DATE

The DATE function converts a supplied year, month and day into an Excel date.

Example:

The following spreadsheet shows the use of DATE function:

Formulas:

	A	B	C	D
1	Day	Month	Year	Date
2				=DATE(2001, 1, 2)
3	31	5	1998	=DATE(C3, B3, A3)
4	21	5	1984	=DATE(C4, B4, A4)
5	9	1	2012	=DATE(C5, B5, A5)

Results:

	A	B	C	D
1	Day	Month	Year	Date
2				02-Jan-2001
3	31	5	1998	31-May-1998
4	21	5	1984	21-May-1984
5	9	1	2012	09-Jan-2012

(2) TIME

The TIME function accepts three integer arguments representing hours, minutes and seconds, and returns an Excel time i.e. it returns the decimal value that represents the time in Excel.

Example:

The following spreadsheet shows the use of TIME function:

Formulas:

	A	B	C	D	E
1	Hrs	Mins	Secs		Time
2					=TIME(5, 44, 32)
3	5	21	55		=TIME(A4, B4, C4)
4	0	0	73		=TIME(A5, B5, C5)

Results:

	A	B	C	D	E
1	Hrs	Mins	Secs		Time
2					05:44:32
3	5	21	55		05:21:55
4	0	0	73		00:01:13

(3) NOW

The NOW function returns the current date and time. This function receives no arguments. The NOW function updates every time your Excel worksheet is refreshed, and so any cell(s) containing this function will be continually changing.

Example:

The following spreadsheet shows the use of NOW function:

Formula:

	A
1	=NOW()

Result:

	A
1	08/08/2015 08:40

(4) TODAY

The TODAY function returns the current date. The function has no arguments.

Example:

The following spreadsheet shows the use of TODAY function:

Formula:

	A
1	=TODAY()

Result:

	A
1	01-Sep-2015

(5) DAY

The DAY function returns an integer representing the day of the month (from 1 - 31) of a supplied date.

Example:

The following spreadsheet shows the use of DAY function:

Formulas:

	A	B
1	31-May-2015	=DAY(A1)
2	21-Mar-1984	=DAY(A2)
3		=DAY(DATE(2016, 1, 1))

Results:

	A	B
1	31-May-2015	31
2	21-Mar-1984	21
3		1

(6) MONTH

The MONTH function returns an integer, representing the month (from 1 - 12) of a supplied date.

Example:

The following spreadsheet shows the use of MONTH function:

Formulas:

	A	B
1	29-May-2016	=MONTH(A1)
2	05-Mar-1984	=MONTH(A2)
3		=MONTH(DATE(2015, 7, 1))

Results:

	A	B
1	29-May-2016	5
2	05-Mar-1984	3
3		7

(7) YEAR

The YEAR function returns an integer representing the year of a supplied date.

Example:

The following spreadsheet shows the use of YEAR function:

Formulas:

	A	B
1	Date	Year
2	29-May-2015	=YEAR(A2)
3	05/03/1984	=YEAR(A3)
4		=YEAR(DATE(2016, 1, 1))

Results:

	A	B
1	Date	Year
2	29-May-2015	2015
3	05/03/1984	1984
4		2016

(8) HOUR

The HOUR function returns an integer representing the hour component of a supplied time.

Example:

The following spreadsheet shows the use of HOUR function:

Formulas:

	A	B
1		=HOUR("13:00:55")
2		=HOUR("1:00 PM")
3	13:00:55	=HOUR(A3)
4	08:32:55	=HOUR(A4)
5	29:11:22	=HOUR(A5)
6	12/09/2015 08:55	=HOUR(A6)

Results:

	A	B
1		13
2		13
3	13:00:55	13
4	08:32:55	8
5	29:11:22	5
6	12/09/2015 08:55	8

(9) MINUTE

The MINUTE function returns an integer representing the minute component of a supplied time.

Example:

The following spreadsheet shows the use of MINUTE function:

Formulas:

	A	B
1		=MINUTE("13:35:55")
2	13:35:55	=MINUTE(A2)
3	08:17:55	=MINUTE(A3)
4	12/09/2015 08:55	=MINUTE(A4)

Results:

	A	B
1		35
2	13:35:55	35
3	08:17:55	17
4	12/09/2015 08:55	55

(10) SECOND

The SECOND function returns an integer representing the second component of a supplied time.

Example:

The following spreadsheet shows the use of SECOND function:

Formulas:

	A	B
1		=SECOND("13:35:55")
2	13:35:55	=SECOND(A2)
3	08:17:00	=SECOND(A3)
4	12/09/2011 08:17:23	=SECOND(A4)

Results:

	A	B
1		55
2	13:35:55	55
3	08:17:00	0
4	12/09/2011 08:17:23	23

9.20.5 STRING FUNCTIONS / TEXT FUNCTIONS

Excel has many functions to offer when it comes to manipulating text or strings. Some of the commonly used text functions are discussed below:

(1) LEFT

The LEFT function is used to extract the leftmost characters from a string. It returns a specified number of characters from the start of a supplied text string.

Example:

The following spreadsheet shows the use of LEFT function:

Formulas:

	A	B
1	Original Text	=LEFT(A1)
2	Original Text	=LEFT(A2, 4)

Results:

	A	B
1	Original Text	O
2	Original Text	Orig

(2) RIGHT

The RIGHT function is used to extract the rightmost characters from a string. It returns specified number of characters from the end of a supplied text string.

Example:

The following spreadsheet shows the use of RIGHT function:

Formulas:

	A	B
1	Original Text	=RIGHT(A1)
2	Original Text	=RIGHT(A2, 4)

Results:

	A	B
1	Original Text	t
2	Original Text	Text

(3) MID

The MID function is used to extract a substring, starting in the middle of a string. It returns specified number of characters from the middle of a supplied text string.

Example:

The following spreadsheet shows the use of MID function:

Formulas:

	A	B
1	Original Text	=MID(A1, 7, 1)
2	Original Text	=MID(A2, 4, 7)
3	255 years	=MID(A3, 3, 1)

Results:

	A	B
1	Original Text	a
2	Original Text	ginal T
3	255 years	5

(4) LEN

The LEN function is used to get the length of a string. It returns the length of a supplied text

Example:

The following spreadsheet shows the use of LEN function:

Formulas:

	A	B
1	test string	=LEN(A1)
2	test string 2	=LEN(A2)
3		=LEN(A3)

Results:

	A	B	C
1	test string	11	
2	test string 2	13	
3		0	- empty string has length 0

(5) FIND

The FIND function is used to find the position of a substring in a string. It returns the position of a specified character or sub-string within a supplied text string.

Example:

The following spreadsheet shows the use of FIND function:

Formulas:

	A	B
1	Original Text	=FIND("T", A1)
2	Original Text	=FIND("t", A2)
3	Original Text	=FIND("i", A3)
4	Original Text	=FIND("i", A4, 4)

Results:

	A	B
1	Original Text	10
2	Original Text	13
3	Original Text	3
4	Original Text	5

(6) LOWER

The LOWER function converts all characters in a supplied text string to lower case.

Example:

The following spreadsheet shows the use of LOWER function:

Formulas:

	A	B
1	test	=LOWER(A1)
2	TEST	=LOWER(A2)
3	Test	=LOWER(A3)
4	TEST 332	=LOWER(A4)

Results:

	A	B
1	test	test
2	TEST	test
3	Test	test
4	TEST 332	test 332

(7) UPPER

The UPPER function converts all characters in a supplied text string to upper case.

Example:

The following spreadsheet shows the use of UPPER function:

Formulas:

	A	B
1	test	=UPPER(A1)
2	TEST	=UPPER(A2)
3	Test	=UPPER(A3)
4	test 332	=UPPER(A4)

Results:

	A	B
1	test	TEST
2	TEST	TEST
3	Test	TEST
4	test 332	TEST 332

8) TRIM

The TRIM function removes extra spaces (i.e. all spaces except for single spaces between words r characters) from a supplied text string.

Example:

The following spreadsheet shows the TRIM function applied to four different text strings:

Formulas: Results

	A	B
1	=TRIM(" trimmed text")	*- has spaces at start*
2	=TRIM("trimmed text ")	*- has spaces at end*
3	=TRIM("trimmed text")	*- has additional spaces in the middle*
4	=TRIM(" trimmed text ")	*- has additional spaces at the start, end & in the middle*

In all four of the above cases, the result is the string **"trimmed text"**.

- with no spaces at the start or end and just one space in the middle.

20.6 TRIGONOMETRIC FUNCTIONS

PI

The Excel PI function returns the value of the mathematical constant π (pi), accurate to 15 digits decimal places). This function returns the value 3.14159265358979.

Example:

The following spreadsheet shows the use of PI function:

ormulas:

	A	B
1	=PI( )	
2	= SIN(PI( )/2)	
3	=2 *PI( ) *5	–circumference of a circle with radius 5

Results:

	A
1	3.141592654
2	1
3	31.41592654

(2) DEGREES

The Excel Degrees function converts radians into degrees.

Syntax of the function is:

DEGREES(angle)

Where, the angle argument is the angle, in radians, that is to be converted into degrees.

Example:

The following spreadsheet shows the use of DEGREES function:

Formulas:

	A
1	=DEGREES(1)
2	=DEGREES(–2.5)
3	=DEGREES(PI ( ))
4	=DEGREES(2*PI())

Results:

	A
1	57.29577951
2	–143.2394488
3	180
4	360

(3) RADIANS

The Excel Radians function converts radians into degrees.

Syntax of the function is:

RADIANS(angle)

Where, the angle argument is the angle, in degrees, that is to be converted into radians.

Example:

The following spreadsheet shows the use of RADIANS function:

Formulas:

	A
1	=RADIANS(50)
2	=RADIANS(–180)
3	=RADIANS(180)
4	=RADIANS(360)

Results:

	A
1	0.872664626
2	–3.141592654
3	3.141592654
4	6.283185307

Note that in the above example spreadsheet, 180 degrees converts to π radians and 360 degrees converts to 2π radians.

(4) COS

The Excel COS function calculates the cosine of a given angle.

Syntax of the function is:

COS(number)

Where, the number argument is the angle, in radians that you want to calculate the cosine of.

Example:

The following spreadsheet shows the use of COS function:

Formulas:			Results:	
	A	B		A
1	=COS(0.785398163)	–cos of 0.785398163 Radians	1	0.707106781
2	=COS(0)	–cos of 0 Radians	2	1
3	=COS(–PI()/3)	–cos of –π/3 Radians	3	0.5
4	=COS(RADIANS(–30))	–cos of –30 Degrees	4	0.866025404

(5) SIN

The Excel SIN function calculates the sine of a given angle.

Syntax of the function is:

SIN(number)

Where, the number argument is the angle (in radians), that you want to calculate the sine of.

Example:

The following spreadsheet shows the use of SIN function:

Formulas:			Results:	
	A	B		A
1	=SIN(0.785398163)	–sin of 0.785398163 Radians	1	0.707106781
2	=SIN(PI()/6)	–sin of 0 Radians	2	0.5
3	=SIN(–PI()/3)	–sin of –π/3 Radians	3	0.866025404
4	=SIN(RADIANS(–30))	–sin of –30 Degrees	4	–0.5

(6) TAN

The Excel TAN function calculates the tangent of a given angle.

Syntax of the function is:

TAN(number)

Where, the number argument is the angle, in radians that you want to calculate the tangent of.

Example:

The following spreadsheet shows the use of TAN function:

Formulas:			Results:	
	A	B		A
1	=TAN(1.047197551)	–tan of 1.047197551 Radians	1	1.732050807
2	=TAN(0)	–tan of 0 Radians	2	0
3	=TAN(–PI()/4)	–tan of –π/4 Radians	3	1
4	=TAN(RADIANS(–45))	–tan of –45 Degrees	4	–1

9.20.7 DATABASE FUNCTIONS

Excel has a number of database functions that you can use to find specific information from the database based on set criteria.

The database functions perform basic operations, such as sum, average, count, etc., but they also have criteria arguments, that allow you to only perform the calculation for a specified subset of the records in your database.