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**Python Math: - Exercises, Practice, Solution**

Last update on May 08 2023 07:16:25 (UTC/GMT +8 hours)

Python Math [94 exercises with solution]

[***An editor is available at the bottom of the page to write and execute the scripts.*** [Go to the editor](https://www.w3resource.com/python-exercises/math/#EDITOR)]

**1.** Write a Python program to convert degrees to radians.  
Note : The radian is the standard unit of angular measure, used in many areas of mathematics. An angle's measurement in radians is numerically equal to the length of a corresponding arc of a unit circle; one radian is just under 57.3 degrees (when the arc length is equal to the radius).  
*Test Data:*  
Degree : 15  
Expected Result in radians: 0.2619047619047619  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-1.php)

**2.** Write a Python program to convert radians to degrees.  
*Test Data:*  
Radian : .52  
Expected Result : 29.781818181818185  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-2.php)

**3.** Write a Python program to calculate the area of a trapezoid.  
Note : A trapezoid is a quadrilateral with two sides parallel. The trapezoid is equivalent to the British definition of the trapezium. An isosceles trapezoid is a trapezoid in which the base angles are equal so.  
*Test Data:*  
Height : 5  
Base, first value : 5  
Base, second value : 6  
Expected Output: Area is : 27.5  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-3.php)

**4.** Write a Python program to calculate the area of a parallelogram.  
Note : A parallelogram is a quadrilateral with opposite sides parallel (and therefore opposite angles equal). A quadrilateral with equal sides is called a rhombus, and a parallelogram whose angles are all right angles is called a rectangle.  
*Test Data:*  
Length of base : 5  
Height of parallelogram : 6  
Expected Output: Area is : 30.0  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-4.php)

**5.** Write a Python program to calculate the surface volume and area of a cylinder.  
Note: A cylinder is one of the most basic curvilinear geometric shapes, the surface formed by the points at a fixed distance from a given straight line, the axis of the cylinder.  
*Test Data:*  
volume : Height (4), Radius(6)  
Expected Output:  
Volume is : 452.57142857142856  
Surface Area is : 377.1428571428571  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-5.php)

**6.** Write a Python program to calculate the surface volume and area of a sphere.  
Note: A sphere is a perfectly round geometrical object in three-dimensional space that is the surface of a completely round ball.  
*Test Data:*  
Radius of sphere : .75  
Expected Output :  
Surface Area is : 7.071428571428571  
Volume is : 1.7678571428571428  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-6.php)

**7.** Write a Python program to calculate the arc length of an angle.  
Note: In a planar geometry, an angle is the figure formed by two rays, called the sides of the angle, sharing a common endpoint, called the vertex of the angle. Angles formed by two rays lie in a plane, but this plane does not have to be a Euclidean plane.  
*Test Data:*  
Diameter of a circle : 8  
Angle measure : 45  
Expected Output :  
Arc Length is : 3.142857142857143  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-7.php)

**8.** Write a Python program to calculate the area of the sector.  
Note: A circular sector or circle sector, is the portion of a disk enclosed by two radii and an arc, where the smaller area is known as the minor sector and the larger being the major sector.  
*Test Data:*  
Radius of a circle : 4  
Angle measure : 45  
Expected Output:  
Sector Area: 6.285714285714286  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-8.php)

**9.** Write a Python program to calculate the discriminant value.  
Note: The discriminant is the name given to the expression that appears under the square root (radical) sign in the quadratic formula.  
*Test Data:*  
The x value : 4  
The y value : 0  
The z value : -4  
Expected Output:  
Two Solutions. Discriminant value is : 64.0  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-9.php)

**10.** Write a Python program to find the smallest multiple of the first n numbers. Also, display the factors.  
*Test Data:*  
If n = (13)  
Expected Output :  
[13, 12, 11, 10, 9, 8, 7]  
360360  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-10.php)

**11.** Write a Python program to calculate the difference between the squared sum of the first n natural numbers and the sum of squared first n natural numbers.(default value of number=2).  
*Test Data:*  
If sum\_difference(12)  
Expected Output :  
5434  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-11.php)

**12.** Write a Python program to calculate the sum of all digits of the base to the specified power.  
*Test Data:*  
If power\_base\_sum(2, 100)  
Expected Output :  
115  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-12.php)

**13.** Write a Python program to find out if the given number is abundant.  
Note: In number theory, an abundant number or excessive number is a number for which the sum of its proper divisors is greater than the number itself. The integer 12 is the first abundant number. Its proper divisors are 1, 2, 3, 4 and 6 for a total of 16.  
*Test Data:*  
If is\_abundant(12)  
If is\_abundant(13)  
Expected Output:  
True  
False  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-13.php)

**14.** Write a Python program to find out if the given number is abundant.  
Note: Amicable numbers are two different numbers so related that the sum of the proper divisors of each is equal to the other number. (A proper divisor of a number is a positive factor of that number other than the number itself. For example, the proper divisors of 6 are 1, 2, and 3.)  
*Test Data:*  
If amicable\_numbers\_sum(9999)  
If amicable\_numbers\_sum(999)  
If amicable\_numbers\_sum(99)  
Expected Output:  
31626  
504  
0  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-14.php)

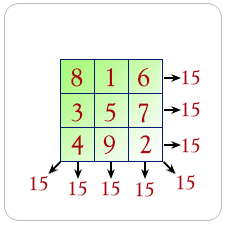
**15.** Write a Python program to return the sum of all divisors of a number.  
*Test Data:*  
If number = 8  
If number = 12  
Expected Output:  
7  
16  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-15.php)

**16.** Write a Python program to print all permutations of a given string (including duplicates).  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-16.php)

**17.** Write a Python program to print the first n lucky numbers.  
Lucky numbers are defined via a sieve as follows.  
Begin with a list of integers starting with 1 :  
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, . . . .  
Now eliminate every second number :  
1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, ...  
The second remaining number is 3, so remove every 3rd number:  
1, 3, 7, 9, 13, 15, 19, 21, 25, ...  
The next remaining number is 7, so remove every 7th number:  
1, 3, 7, 9, 13, 15, 21, 25, ...  
Next, remove every 9th number and so on.  
Finally, the resulting sequence is the lucky numbers.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-17.php)

**18.** Write a Python program to compute square roots using the Babylonian method.  
Perhaps the first algorithm used for approximating √S is known as the Babylonian method, named after the Babylonians, or "Hero's method", named after the first-century Greek mathematician Hero of Alexandria who gave the first explicit description of the method. It can be derived from (but predates by 16 centuries) Newton's method. The basic idea is that if x is an overestimate to the square root of a non-negative real number S then S / x will be an underestimate and so the average of these two numbers may reasonably be expected to provide a better approximation.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-18.php)

**19.** Write a Python program to multiply two integers without using the \* operator.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-19.php)

**20.** Write a Python program to calculate the magic square.  
A magic square is an arrangement of distinct numbers (i.e., each number is used once), usually integers, in a square grid, where the numbers in each row, and in each column, and the numbers in the main and secondary diagonals, all add up to the same number, called the "magic constant." A magic square has the same number of rows as it has columns, and in conventional math notation, "n" stands for the number of rows (and columns) it has. Thus, a magic square always contains n2 numbers, and its size (the number of rows [and columns] it has) is described as being "of order n".  
  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-20.php)

**21.** Write a Python program to print all primes (Sieve\_of\_Eratosthenes) smaller than or equal to a specified number.  
In mathematics, the sieve of Eratosthenes, one of a number of prime number sieves, is a simple, ancient algorithm for finding all prime numbers up to any given limit. It does so by iteratively marking as composite (i.e., not prime) the multiples of each prime, starting with the multiples of 2.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-21.php)

**22.** Write a Python program to find the next smallest palindrome of a specified number.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-22.php)

**23.** Write a Python program to find the next and previous palindromes of a specified number.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-23.php)

**24.** Write a Python program to convert a float to ratio.

Expected Output :

21/5

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-24.php)

**25.** Write a Python program for the nth Catalan numbers.  
In combinatorial mathematics, the Catalan numbers form a sequence of natural numbers that occur in various counting problems, often involving recursively-defined objects. They are named after the Belgian mathematician Eugène Charles Catalan (1814 –1894).  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-25.php)

**26.** Write a Python program to display numbers separated by commas as thousands.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-26.php)

**27.** Write a Python program to calculate the distance between two points using latitude and longitude.

Expected Output :

Input coordinates of two points:

Starting latitude: 23.5

Ending longitude: 67.5

Starting latitude: 25.3

Ending longitude: 69.5

The distance is 284.73km.

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-27.php)

**28.** Write a Python program to calculate the area of a regular polygon.

Expected Output :

Input number of sides: 4

Input the length of a side: 25

The area of the polygon is: 625.0000000000001

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-28.php)

**29.** Write a Python program to calculate the wind chill index.

Expected Output :

Input wind speed in kilometers/hour: 150

Input air temperature in degrees Celsius: 29

The wind chill index is 31

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-29.php)

**30.** Write a Python program to find the roots of a quadratic function.

Expected Output :

Quadratic function : (a \* x^2) + b\*x + c

a: 25

b: 64

c: 36

There are 2 roots: -0.834579 and -1.725421

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-30.php)

**31.** Write a Python program to convert a decimal number to a binary number.

Expected Output :

Input a binary number: 101011

The decimal value of the number is 43

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-31.php)

**32.** Write a Python program to print a complex number and its real and imaginary parts.

Expected Output :

Complex Number: (2+3j)

Complex Number - Real part: 2.0

Complex Number - Imaginary part: 3.0

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-32.php)

**33.** Write a Python program to add, subtract, multiply, and divide two complex numbers.

Expected Output :

Addition of two complex numbers : (7-4j)

Subtraction of two complex numbers : (1+10j)

Multiplication of two complex numbers : (33-19j)

Division of two complex numbers : (-0.15517241379310348+0.6379310344827587j)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-33.php)

**34.** Write a Python program to get the length and the angle of a complex number.

Expected Output :

Length of a complex number: 5.0

Complex number Angle: 1.5707963267948966

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-34.php)

**35.** Write a Python program to convert Polar coordinates to rectangular coordinates.

Expected Output :

Polar Coordinates: (5.0, 0.9272952180016122)

Polar to rectangular: (-2+2.4492935982947064e-16j)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-35.php)

**36.** Write a Python program to find the maximum and minimum numbers from the specified decimal numbers.

Decimal numbers : 2.45, 2.69, 2.45, 3.45, 2.00, 0.04, 7.25

Expected Output :

Maximum: 7.25

Minimum: 0.04

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-36.php)

**37.** Write a Python program to find the sum of the following decimal numbers and display the numbers in sorted order.

Decimal numbers : 2.45, 2.69, 2.45, 3.45, 2.00, 0.04, 7.25

Expected Output :

Sum: 20.33

Sorted order: [Decimal('0.04'), Decimal('2.00'), Decimal('2.45'), Decimal('2.45'

), Decimal('2.69'), Decimal('3.45'), Decimal('7.25')]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-37.php)

**38.** Write a Python program to get the square root and exponential of a given decimal number.

Decimal number : 1.44

Expected Output :

Square root of 1.44 is : 1.2

exponential of 1.44 is : 4.220695816996552825673328929

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-38.php)

**39.** Write a Python program to retrieve the current global context (public properties) for all decimal.

Expected Output :

Emax = 999999

Emin = -999999

capitals = 1

prec = 28

rounding = ROUND\_HALF\_EVEN

flags = <class 'decimal.InvalidOperation'>: False

........

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-39.php)

**40.** Write a Python program to round a specified decimal by setting precision (between 1 and 4).

Sample Number : 0.26598  
Original Number : 0.26598  
Precision- 1 : 0.3  
Precision- 2 : 0.27  
Precision- 3 : 0.266  
Precision- 4 : 0.2660

Expected Output :

Original Number : 0.26598

Precision- 1 : 0.3

Precision- 2 : 0.27

Precision- 3 : 0.266

Precision- 4 : 0.2660

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-40.php)

**41.** Write a Python program to round a specified number upwards towards infinity and down towards negative infinity with precision 4.

Expected Output :

1/17 = 0.05882352941176470588235294118

Precision: 4

Round upwards towards infinity: 0.05883

Round down towards negative infinity: 0.05882

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-41.php)

**42.** Write a Python program to get the local and default precision.

Expected Output :

Local precision: 2

22/7 = 3.1

Default precision: 28

22 /7 = 3.142857142857142857142857143

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-42.php)

**43.** Write a Python program to display fraction instances of the string representation of a number.

Sample data : '0.7', '2.5', '9.32', '7e-1'

Expected Output :

0.7 = 7/10

2.5 = 5/2

9.32 = 233/25

7e-1 = 7/10

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-43.php)

**44.** Write a Python program to create fraction instances of float numbers.

Sample numbers: 0.2, 0.7, 6.5, 6.0

Expected Output :

0.2 = 3602879701896397/18014398509481984

0.7 = 3152519739159347/4503599627370496

6.5 = 13/2

6.0 = 6

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-44.php)

**45.** Write a Python program to create fraction instances of decimal numbers.

Sample decimal.2' number: Decimal('0), Decimal('0.7'), Decimal('2.5'), Decimal('3.0')

Expected Output :

0.2 = 1/5

0.7 = 7/10

2.5 = 5/2

3.0 = 3

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-45.php)

**46.** Write a Python program to add, subtract, multiply and divide two fractions.

Expected Output :

2/3 + 3/7 = 23/21

2/3 - 3/7 = 5/21

2/3 \* 3/7 = 2/7

2/3 / 3/7 = 14/9

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-46.php)

**47.** Write a Python program to convert a floating point number (PI) to an approximate rational value on the various denominators.

Note: max\_denominator=1000000

Expected Output :

PI = 3.141592653589793

No limit = 3141592653589793/1000000000000000

1 = 3

5 = 16/5

50 = 22/7

90 = 267/85

100 = 311/99

500 = 355/113

1000000 = 3126535/995207

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-47.php)

**48.** Write a Python program to generate random floating numbers in a specific numerical range.

Expected Output :

16.329 17.326 54.024 13.229 68.952 87.039

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-48.php)

**49.** Write a Python program to generate random integers in a specific numerical range.

Expected Output :

24 12 72 13 56 80

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-49.php)

**50.** Write a Python program to generate random even integers in a specific numerical range.

Expected Output :

44 50 46 62 94 14

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-50.php)

**51.** Write a Python program to get a single random element from a specified string.

Expected Output :

h

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-51.php)

**52.** Write a Python program to shuffle the following elements randomly.

Sample elements : [1, 2, 3, 4, 5, 6, 7]

Expected Output :

[2, 1, 7, 5, 3, 4, 6]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-52.php)

**53.** Write a Python program to flip a coin 1000 times and count heads and tails.

Expected Output :

Heads: 5073

Tails: 4927

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-53.php)

**54.** Write a Python program to print a random sample of words from the system dictionary.

Expected Output :

cellophane's

matter's

Whiteley's

airdrop's

sulkiest

whisper's

downturns

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-54.php)

**55.** Write a Python program to randomly select an item from a list.

Expected Output :

Red

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-55.php)

**56.** Write a Python program to calculate the absolute value of a floating point number.

Expected Output :

2.1

0.0

10.1

0.0

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-56.php)

**57.** Write a Python program to calculate the standard deviation of the following data.

Expected Output :

Sample Data: [4, 2, 5, 8, 6]

Standard Deviation : 2.23606797749979

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-57.php)

**58.**Write a Python program to print the floating point of the mantissa, exponent pair.

Expected Output :

Mantissa Exponent Floating point value

-------- -------- --------------------

0.70 -3 0.09

0.30 0 0.30

0.50 3 4.00

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-58.php)

**59.** Write a Python program to split the fractional and integer parts of a floating point number.

Expected Output :

(F) (I)

0/2 = 0.0 (0.0, 0.0)

1/2 = 0.5 (0.5, 0.0)

2/2 = 1.0 (0.0, 1.0)

3/2 = 1.5 (0.5, 1.0)

4/2 = 2.0 (0.0, 2.0)

5/2 = 2.5 (0.5, 2.0)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-59.php)

**60.** Write a Python program to parse math formulas and put parentheses around multiplication and division.

Sample data : 4+5\*7/2

Expected Output :

4+((5\*7)/2)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-60.php)

**61.** Write a Python program to describe linear regression.

Note : A linear regression line has an equation of the form Y = a + bX, where X is the explanatory variable and Y is the dependent variable. The slope of the line is b, and a is the intercept (the value of y when x = 0).

Expected Output :

Enter the number of data points: 2

X1: 1

Y1: 2

X2: 3

Y2: 4

Best fit line:

y = 1.0x + 1.0

Enter a value to calculate: 12

y = 13.0

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-61.php)

**62.** Write a Python program to calculate a grid of hexagon coordinates of the given radius given lower-left and upper-right coordinates. The function will return a list of lists containing 6 tuples of x, y point coordinates. These can be used to construct valid regular hexagonal polygons.

Expected Output :

[[(-5.0, -4.196152422706632), (-5.0, -0.7320508075688767), (-2.0, 1.0), (1.0, -0.

7320508075688767), (1.0, -4.196152422706632), (-2.0, -5.928203230275509), (-5.0,

-4.196152422706632)], [(1.0, -4.196152422706632), (1.0, -0.7320508075688767), (4.

0, 1.0), (7.0, -0.7320508075688767), (7.0, -4.196152422706632).......

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-62.php)

**63.** Write a Python program to create a simple math quiz.

Expected Output :

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\* A Simple Math Quiz \*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. Addition

2. Subtraction

3. Multiplication

4. Integer Division

5. Exit

------------------------

Enter your choice: 1

Enter your answer

1 + 5 = 6

Correct.

.........

Your score is 100.0%. Thank you.

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-63.php)

**64.** Write a Python program to calculate the volume of a tetrahedron.

Note: In geometry, a tetrahedron (plural: tetrahedra or tetrahedrons) is a polyhedron composed of four triangular faces, six straight edges, and four vertex corners. The tetrahedron is the simplest of all the ordinary convex polyhedra and the only one that has fewer than 5 faces.

Expected Output :

117.85

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-64.php)

**65.** Write a Python program to compute the value of e(2.718281827...) using an infinite series.

Expected Output :

The mathematical constant e

2.7182818282861687

2.718281828459045

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-65.php)

**66.** Write a Python program to create an ASCII waveform.

Expected Output :

#

\*

#

\*

.......

#

\*

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-66.php)

**67.** Write a Python program to create a dot string.

Expected Output :

.

.

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[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-67.php)

**68.** Write a Python program to create a Pythagorean theorem calculator.

Note : In mathematics, the Pythagorean theorem, also known as Pythagoras' theorem, is a fundamental relation in Euclidean geometry among the three sides of a right triangle. It states that the square of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the other two sides.

Expected Output :

Pythagorean theorem calculator! Calculate your triangle sides.

Assume the sides are a, b, c and c is the hypotenuse (the side opposite the right

angle

Which side (a, b, c) do you wish to calculate? side>a

Input the length of side b:10

Input the length of side c:20

The length of side a is

17.320508075688775

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-68.php)

**69.** Write a Python function to round up a number to specified digits.

Expected Output :

Original Number: 123.01247

124

123.1

123.02

123.013

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-69.php)

**70.** Write a Python program for a casino simulation.

Expected Output :

Exp 0

Exp 1

Exp 2

Exp 3

Exp 4

.......

Exp 998

Exp 999

Average max amount earned 10493.144 with standard deviation 50.892644498001886

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-70.php)

**71.** Write a Python program to reverse a range.

Expected Output :

range(9, -1, -2)

range(4, 0, -1)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-71.php)

**72.** Write a Python program to create a range for floating numbers.

Expected Output :

[0.0, 0.1, 0.2, 0.30000000000000004, 0.4, 0.5, 0.6000000000000001, 0.700000000000

0001, 0.8, 0.9, 1.0]

01, 0.7000000000000001, 0.8, 0.9, 1.0]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-72.php)

**73.** Write a Python program to generate (given an integer n) a square matrix filled with elements from 1 to n raised to the power of 2 in spiral order.

Expected Output :

[[1, 2, 3], [8, 9, 4], [7, 6, 5]]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-73.php)

**74.** Write a Python program to select a random date in the current year.

Expected Output :

2016-02-08

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-74.php)

**75.** Write a Python program to calculate clusters using the Hierarchical Clustering method.

Expected Output :

Input number of points.> 2

Input point (eg. 1,1)A> 1,2

Input point (eg. 1,1)B> 3,4

Distance matrix no.1:

[0.0, 2.83]

[2.83, 0.0]

Cluster is : [AB]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-75.php)

**76.** Write a Python program to implement the Euclidean Algorithm to compute the greatest common divisor (GCD).

Expected Output :

304 = 2 \* 150 + 4

150 = 37 \* 4 + 2

4 = 2 \* 2 + 0

gcd is 2

.........

6 = 2 \* 3 + 0

gcd is 3

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-76.php)

**77.** Write a Python program to convert RGB color to HSV color.

Expected Output :

(0, 0.0, 100.0)

(120.0, 100.0, 84.31372549019608)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-77.php)

**78.** Write a Python program to find perfect squares between two given numbers.

Expected Output :

[]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-78.php)

**79.** Write a Python program to compute Euclidean distances.

Note: In mathematics, the Euclidean distance or Euclidean metric is the "ordinary" (i.e. straight-line) distance between two points in Euclidean space. With this distance, Euclidean space becomes a metric space. The associated norm is called the Euclidean norm.

Expected Output :

Euclidean distance from x to y: 4.69041575982343

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-79.php)

**80.** Write a Python program to convert an integer to a 2 byte Hex value.

Expected Output :

1 --> 0x01

2 --> 0x02

3 --> 0x03

4 --> 0x04

5 --> 0x05

6 --> 0x06

7 --> 0x07

8 --> 0x08

9 --> 0x09

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-80.php)

**81.** Write a Python program to generate a series of distinct random numbers.

Expected Output :

16

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-81.php)

**82.** Write a Python program to convert a given float value to a ratio.

Expected Output :

21/5

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-82.php)

**83.** Write a Python program to calculate the aliquot sum of a given number.

Expected Output :

Input value: 15

('Aliquot Sum', 9)

Input value: 12

('Aliquot Sum', 16)

Input value: -6

Input must be positive

Input value: 12.22

Input must be an integer

Input value: zz

Input must be an integer

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-83.php)

**84.** Write a Python program to get the nth tetrahedral number from a given integer(n) value.

Expected Output :

Original Number: 1

Tetrahedral number: 1.0

Original Number: 2

Tetrahedral number: 4.0

Original Number: 6

Tetrahedral number: 56.0

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-84.php)

**85.** Write a Python program to get the sum of the powers of all the numbers from start to end (both inclusive).

Expected Output :

650

6084

618507

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-85.php)

**86.** Write a Python program to calculate the Hamming distance between two given values.

Expected Output :

Hamming distance between 2 and 3 is 1

Hamming distance between 43 and 87 is 5

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-86.php)

**87.** Write a Python program to cap a number within the inclusive range specified by the given boundary values x and y.

Expected Output :

4

-1

10

10

5

10

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-87.php)

**88.** Write a Python program to check whether a given number is a Disarium number or an unhappy number.

Expected Output :

Is 25 is Disarium number? False

Is 89 is Disarium number? True

Is 75 is Disarium number? False

Is 125 is Disarium number? False

Is 518 is Disarium number? True

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-88.php)

**89.** Write a Python program to check if a given number is a repdigit number or not. If the given number is repdigit return true otherwise false.  
**Sample Data:**  
(0) -> True  
(1) -> True  
(-1111) -> False  
(9999999) -> True  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-89.php)

**90.** Write a Python program to check if a given number is a Harshad number or not. Return True if the number is Harshad otherwise False.  
**Sample Data:**  
(666) -> True  
(11) -> False  
(-144) -> None  
(200) -> True  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-90.php)

**91.** Write a Python program that accepts an integer number with distinct digits and displays the next number containing only distinct digits.  
**Sample Data:**  
12345) -> 12346  
(99999) -> 102345  
(100) -> 102  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-91.php)

**92.** Write a Python program that checks whether the absolute difference between two consecutive digits is two or not. Return true otherwise false.  
**Sample Data:**  
(666) -> False  
(3579) -> True  
(2468) -> True  
(20420) -> False  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-92.php)

**93.** Write a Python program that takes an integer and rearranges the digits to create two maximum and minimum numbers.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-93.php)

**94.** Write a Python program to calculate the sum of all prime numbers in a given list of positive integers.  
**Sample Data:**  
([1, 3, 4, 7, 9]) -> 10  
([]) -> Empty list!  
([11, 37, 444]) -> 48  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-94.php)

Python Code Editor:

**More to Come !**

**Do not submit any solution of the above exercises at here, if you want to contribute go to the appropriate exercise page.**

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**Python: Tips of the Day**

**Find the index of an element in a tuple**

books = ('Atomic habits', 'Ego is the enemy', 'Outliers', 'Mastery')

print(books.index('Mastery')) # 3

Ref: https://bit.ly/3A1PCO4

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* ▼Python Projects
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* ▼Python NLTK
* [Python Project](https://www.w3resource.com/python-exercises/math/)
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**Python Math: - Exercises, Practice, Solution**

Last update on May 08 2023 07:16:25 (UTC/GMT +8 hours)

Python Math [94 exercises with solution]

[***An editor is available at the bottom of the page to write and execute the scripts.*** [Go to the editor](https://www.w3resource.com/python-exercises/math/#EDITOR)]

**1.** Write a Python program to convert degrees to radians.  
Note : The radian is the standard unit of angular measure, used in many areas of mathematics. An angle's measurement in radians is numerically equal to the length of a corresponding arc of a unit circle; one radian is just under 57.3 degrees (when the arc length is equal to the radius).  
*Test Data:*  
Degree : 15  
Expected Result in radians: 0.2619047619047619  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-1.php)

**2.** Write a Python program to convert radians to degrees.  
*Test Data:*  
Radian : .52  
Expected Result : 29.781818181818185  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-2.php)

**3.** Write a Python program to calculate the area of a trapezoid.  
Note : A trapezoid is a quadrilateral with two sides parallel. The trapezoid is equivalent to the British definition of the trapezium. An isosceles trapezoid is a trapezoid in which the base angles are equal so.  
*Test Data:*  
Height : 5  
Base, first value : 5  
Base, second value : 6  
Expected Output: Area is : 27.5  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-3.php)

**4.** Write a Python program to calculate the area of a parallelogram.  
Note : A parallelogram is a quadrilateral with opposite sides parallel (and therefore opposite angles equal). A quadrilateral with equal sides is called a rhombus, and a parallelogram whose angles are all right angles is called a rectangle.  
*Test Data:*  
Length of base : 5  
Height of parallelogram : 6  
Expected Output: Area is : 30.0  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-4.php)

**5.** Write a Python program to calculate the surface volume and area of a cylinder.  
Note: A cylinder is one of the most basic curvilinear geometric shapes, the surface formed by the points at a fixed distance from a given straight line, the axis of the cylinder.  
*Test Data:*  
volume : Height (4), Radius(6)  
Expected Output:  
Volume is : 452.57142857142856  
Surface Area is : 377.1428571428571  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-5.php)

**6.** Write a Python program to calculate the surface volume and area of a sphere.  
Note: A sphere is a perfectly round geometrical object in three-dimensional space that is the surface of a completely round ball.  
*Test Data:*  
Radius of sphere : .75  
Expected Output :  
Surface Area is : 7.071428571428571  
Volume is : 1.7678571428571428  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-6.php)

**7.** Write a Python program to calculate the arc length of an angle.  
Note: In a planar geometry, an angle is the figure formed by two rays, called the sides of the angle, sharing a common endpoint, called the vertex of the angle. Angles formed by two rays lie in a plane, but this plane does not have to be a Euclidean plane.  
*Test Data:*  
Diameter of a circle : 8  
Angle measure : 45  
Expected Output :  
Arc Length is : 3.142857142857143  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-7.php)

**8.** Write a Python program to calculate the area of the sector.  
Note: A circular sector or circle sector, is the portion of a disk enclosed by two radii and an arc, where the smaller area is known as the minor sector and the larger being the major sector.  
*Test Data:*  
Radius of a circle : 4  
Angle measure : 45  
Expected Output:  
Sector Area: 6.285714285714286  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-8.php)

**9.** Write a Python program to calculate the discriminant value.  
Note: The discriminant is the name given to the expression that appears under the square root (radical) sign in the quadratic formula.  
*Test Data:*  
The x value : 4  
The y value : 0  
The z value : -4  
Expected Output:  
Two Solutions. Discriminant value is : 64.0  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-9.php)

**10.** Write a Python program to find the smallest multiple of the first n numbers. Also, display the factors.  
*Test Data:*  
If n = (13)  
Expected Output :  
[13, 12, 11, 10, 9, 8, 7]  
360360  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-10.php)

**11.** Write a Python program to calculate the difference between the squared sum of the first n natural numbers and the sum of squared first n natural numbers.(default value of number=2).  
*Test Data:*  
If sum\_difference(12)  
Expected Output :  
5434  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-11.php)

**12.** Write a Python program to calculate the sum of all digits of the base to the specified power.  
*Test Data:*  
If power\_base\_sum(2, 100)  
Expected Output :  
115  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-12.php)

**13.** Write a Python program to find out if the given number is abundant.  
Note: In number theory, an abundant number or excessive number is a number for which the sum of its proper divisors is greater than the number itself. The integer 12 is the first abundant number. Its proper divisors are 1, 2, 3, 4 and 6 for a total of 16.  
*Test Data:*  
If is\_abundant(12)  
If is\_abundant(13)  
Expected Output:  
True  
False  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-13.php)

**14.** Write a Python program to find out if the given number is abundant.  
Note: Amicable numbers are two different numbers so related that the sum of the proper divisors of each is equal to the other number. (A proper divisor of a number is a positive factor of that number other than the number itself. For example, the proper divisors of 6 are 1, 2, and 3.)  
*Test Data:*  
If amicable\_numbers\_sum(9999)  
If amicable\_numbers\_sum(999)  
If amicable\_numbers\_sum(99)  
Expected Output:  
31626  
504  
0  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-14.php)

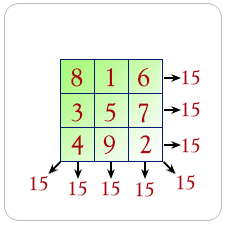
**15.** Write a Python program to return the sum of all divisors of a number.  
*Test Data:*  
If number = 8  
If number = 12  
Expected Output:  
7  
16  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-15.php)

**16.** Write a Python program to print all permutations of a given string (including duplicates).  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-16.php)

**17.** Write a Python program to print the first n lucky numbers.  
Lucky numbers are defined via a sieve as follows.  
Begin with a list of integers starting with 1 :  
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, . . . .  
Now eliminate every second number :  
1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, ...  
The second remaining number is 3, so remove every 3rd number:  
1, 3, 7, 9, 13, 15, 19, 21, 25, ...  
The next remaining number is 7, so remove every 7th number:  
1, 3, 7, 9, 13, 15, 21, 25, ...  
Next, remove every 9th number and so on.  
Finally, the resulting sequence is the lucky numbers.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-17.php)

**18.** Write a Python program to compute square roots using the Babylonian method.  
Perhaps the first algorithm used for approximating √S is known as the Babylonian method, named after the Babylonians, or "Hero's method", named after the first-century Greek mathematician Hero of Alexandria who gave the first explicit description of the method. It can be derived from (but predates by 16 centuries) Newton's method. The basic idea is that if x is an overestimate to the square root of a non-negative real number S then S / x will be an underestimate and so the average of these two numbers may reasonably be expected to provide a better approximation.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-18.php)

**19.** Write a Python program to multiply two integers without using the \* operator.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-19.php)

**20.** Write a Python program to calculate the magic square.  
A magic square is an arrangement of distinct numbers (i.e., each number is used once), usually integers, in a square grid, where the numbers in each row, and in each column, and the numbers in the main and secondary diagonals, all add up to the same number, called the "magic constant." A magic square has the same number of rows as it has columns, and in conventional math notation, "n" stands for the number of rows (and columns) it has. Thus, a magic square always contains n2 numbers, and its size (the number of rows [and columns] it has) is described as being "of order n".  
  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-20.php)

**21.** Write a Python program to print all primes (Sieve\_of\_Eratosthenes) smaller than or equal to a specified number.  
In mathematics, the sieve of Eratosthenes, one of a number of prime number sieves, is a simple, ancient algorithm for finding all prime numbers up to any given limit. It does so by iteratively marking as composite (i.e., not prime) the multiples of each prime, starting with the multiples of 2.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-21.php)

**22.** Write a Python program to find the next smallest palindrome of a specified number.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-22.php)

**23.** Write a Python program to find the next and previous palindromes of a specified number.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-23.php)

**24.** Write a Python program to convert a float to ratio.

Expected Output :

21/5

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-24.php)

**25.** Write a Python program for the nth Catalan numbers.  
In combinatorial mathematics, the Catalan numbers form a sequence of natural numbers that occur in various counting problems, often involving recursively-defined objects. They are named after the Belgian mathematician Eugène Charles Catalan (1814 –1894).  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-25.php)

**26.** Write a Python program to display numbers separated by commas as thousands.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-26.php)

**27.** Write a Python program to calculate the distance between two points using latitude and longitude.

Expected Output :

Input coordinates of two points:

Starting latitude: 23.5

Ending longitude: 67.5

Starting latitude: 25.3

Ending longitude: 69.5

The distance is 284.73km.

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-27.php)

**28.** Write a Python program to calculate the area of a regular polygon.

Expected Output :

Input number of sides: 4

Input the length of a side: 25

The area of the polygon is: 625.0000000000001

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-28.php)

**29.** Write a Python program to calculate the wind chill index.

Expected Output :

Input wind speed in kilometers/hour: 150

Input air temperature in degrees Celsius: 29

The wind chill index is 31

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-29.php)

**30.** Write a Python program to find the roots of a quadratic function.

Expected Output :

Quadratic function : (a \* x^2) + b\*x + c

a: 25

b: 64

c: 36

There are 2 roots: -0.834579 and -1.725421

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-30.php)

**31.** Write a Python program to convert a decimal number to a binary number.

Expected Output :

Input a binary number: 101011

The decimal value of the number is 43

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-31.php)

**32.** Write a Python program to print a complex number and its real and imaginary parts.

Expected Output :

Complex Number: (2+3j)

Complex Number - Real part: 2.0

Complex Number - Imaginary part: 3.0

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-32.php)

**33.** Write a Python program to add, subtract, multiply, and divide two complex numbers.

Expected Output :

Addition of two complex numbers : (7-4j)

Subtraction of two complex numbers : (1+10j)

Multiplication of two complex numbers : (33-19j)

Division of two complex numbers : (-0.15517241379310348+0.6379310344827587j)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-33.php)

**34.** Write a Python program to get the length and the angle of a complex number.

Expected Output :

Length of a complex number: 5.0

Complex number Angle: 1.5707963267948966

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-34.php)

**35.** Write a Python program to convert Polar coordinates to rectangular coordinates.

Expected Output :

Polar Coordinates: (5.0, 0.9272952180016122)

Polar to rectangular: (-2+2.4492935982947064e-16j)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-35.php)

**36.** Write a Python program to find the maximum and minimum numbers from the specified decimal numbers.

Decimal numbers : 2.45, 2.69, 2.45, 3.45, 2.00, 0.04, 7.25

Expected Output :

Maximum: 7.25

Minimum: 0.04

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-36.php)

**37.** Write a Python program to find the sum of the following decimal numbers and display the numbers in sorted order.

Decimal numbers : 2.45, 2.69, 2.45, 3.45, 2.00, 0.04, 7.25

Expected Output :

Sum: 20.33

Sorted order: [Decimal('0.04'), Decimal('2.00'), Decimal('2.45'), Decimal('2.45'

), Decimal('2.69'), Decimal('3.45'), Decimal('7.25')]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-37.php)

**38.** Write a Python program to get the square root and exponential of a given decimal number.

Decimal number : 1.44

Expected Output :

Square root of 1.44 is : 1.2

exponential of 1.44 is : 4.220695816996552825673328929

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-38.php)

**39.** Write a Python program to retrieve the current global context (public properties) for all decimal.

Expected Output :

Emax = 999999

Emin = -999999

capitals = 1

prec = 28

rounding = ROUND\_HALF\_EVEN

flags = <class 'decimal.InvalidOperation'>: False

........

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-39.php)

**40.** Write a Python program to round a specified decimal by setting precision (between 1 and 4).

Sample Number : 0.26598  
Original Number : 0.26598  
Precision- 1 : 0.3  
Precision- 2 : 0.27  
Precision- 3 : 0.266  
Precision- 4 : 0.2660

Expected Output :

Original Number : 0.26598

Precision- 1 : 0.3

Precision- 2 : 0.27

Precision- 3 : 0.266

Precision- 4 : 0.2660

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-40.php)

**41.** Write a Python program to round a specified number upwards towards infinity and down towards negative infinity with precision 4.

Expected Output :

1/17 = 0.05882352941176470588235294118

Precision: 4

Round upwards towards infinity: 0.05883

Round down towards negative infinity: 0.05882

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-41.php)

**42.** Write a Python program to get the local and default precision.

Expected Output :

Local precision: 2

22/7 = 3.1

Default precision: 28

22 /7 = 3.142857142857142857142857143

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-42.php)

**43.** Write a Python program to display fraction instances of the string representation of a number.

Sample data : '0.7', '2.5', '9.32', '7e-1'

Expected Output :

0.7 = 7/10

2.5 = 5/2

9.32 = 233/25

7e-1 = 7/10

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-43.php)

**44.** Write a Python program to create fraction instances of float numbers.

Sample numbers: 0.2, 0.7, 6.5, 6.0

Expected Output :

0.2 = 3602879701896397/18014398509481984

0.7 = 3152519739159347/4503599627370496

6.5 = 13/2

6.0 = 6

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-44.php)

**45.** Write a Python program to create fraction instances of decimal numbers.

Sample decimal.2' number: Decimal('0), Decimal('0.7'), Decimal('2.5'), Decimal('3.0')

Expected Output :

0.2 = 1/5

0.7 = 7/10

2.5 = 5/2

3.0 = 3

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-45.php)

**46.** Write a Python program to add, subtract, multiply and divide two fractions.

Expected Output :

2/3 + 3/7 = 23/21

2/3 - 3/7 = 5/21

2/3 \* 3/7 = 2/7

2/3 / 3/7 = 14/9

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-46.php)

**47.** Write a Python program to convert a floating point number (PI) to an approximate rational value on the various denominators.

Note: max\_denominator=1000000

Expected Output :

PI = 3.141592653589793

No limit = 3141592653589793/1000000000000000

1 = 3

5 = 16/5

50 = 22/7

90 = 267/85

100 = 311/99

500 = 355/113

1000000 = 3126535/995207

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-47.php)

**48.** Write a Python program to generate random floating numbers in a specific numerical range.

Expected Output :

16.329 17.326 54.024 13.229 68.952 87.039

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-48.php)

**49.** Write a Python program to generate random integers in a specific numerical range.

Expected Output :

24 12 72 13 56 80

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-49.php)

**50.** Write a Python program to generate random even integers in a specific numerical range.

Expected Output :

44 50 46 62 94 14

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-50.php)

**51.** Write a Python program to get a single random element from a specified string.

Expected Output :

h

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-51.php)

**52.** Write a Python program to shuffle the following elements randomly.

Sample elements : [1, 2, 3, 4, 5, 6, 7]

Expected Output :

[2, 1, 7, 5, 3, 4, 6]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-52.php)

**53.** Write a Python program to flip a coin 1000 times and count heads and tails.

Expected Output :

Heads: 5073

Tails: 4927

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-53.php)

**54.** Write a Python program to print a random sample of words from the system dictionary.

Expected Output :

cellophane's

matter's

Whiteley's

airdrop's

sulkiest

whisper's

downturns

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-54.php)

**55.** Write a Python program to randomly select an item from a list.

Expected Output :

Red

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-55.php)

**56.** Write a Python program to calculate the absolute value of a floating point number.

Expected Output :

2.1

0.0

10.1

0.0

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-56.php)

**57.** Write a Python program to calculate the standard deviation of the following data.

Expected Output :

Sample Data: [4, 2, 5, 8, 6]

Standard Deviation : 2.23606797749979

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-57.php)

**58.**Write a Python program to print the floating point of the mantissa, exponent pair.

Expected Output :

Mantissa Exponent Floating point value

-------- -------- --------------------

0.70 -3 0.09

0.30 0 0.30

0.50 3 4.00

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-58.php)

**59.** Write a Python program to split the fractional and integer parts of a floating point number.

Expected Output :

(F) (I)

0/2 = 0.0 (0.0, 0.0)

1/2 = 0.5 (0.5, 0.0)

2/2 = 1.0 (0.0, 1.0)

3/2 = 1.5 (0.5, 1.0)

4/2 = 2.0 (0.0, 2.0)

5/2 = 2.5 (0.5, 2.0)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-59.php)

**60.** Write a Python program to parse math formulas and put parentheses around multiplication and division.

Sample data : 4+5\*7/2

Expected Output :

4+((5\*7)/2)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-60.php)

**61.** Write a Python program to describe linear regression.

Note : A linear regression line has an equation of the form Y = a + bX, where X is the explanatory variable and Y is the dependent variable. The slope of the line is b, and a is the intercept (the value of y when x = 0).

Expected Output :

Enter the number of data points: 2

X1: 1

Y1: 2

X2: 3

Y2: 4

Best fit line:

y = 1.0x + 1.0

Enter a value to calculate: 12

y = 13.0

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-61.php)

**62.** Write a Python program to calculate a grid of hexagon coordinates of the given radius given lower-left and upper-right coordinates. The function will return a list of lists containing 6 tuples of x, y point coordinates. These can be used to construct valid regular hexagonal polygons.

Expected Output :

[[(-5.0, -4.196152422706632), (-5.0, -0.7320508075688767), (-2.0, 1.0), (1.0, -0.

7320508075688767), (1.0, -4.196152422706632), (-2.0, -5.928203230275509), (-5.0,

-4.196152422706632)], [(1.0, -4.196152422706632), (1.0, -0.7320508075688767), (4.

0, 1.0), (7.0, -0.7320508075688767), (7.0, -4.196152422706632).......

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-62.php)

**63.** Write a Python program to create a simple math quiz.

Expected Output :

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\* A Simple Math Quiz \*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

1. Addition

2. Subtraction

3. Multiplication

4. Integer Division

5. Exit

------------------------

Enter your choice: 1

Enter your answer

1 + 5 = 6

Correct.

.........

Your score is 100.0%. Thank you.

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-63.php)

**64.** Write a Python program to calculate the volume of a tetrahedron.

Note: In geometry, a tetrahedron (plural: tetrahedra or tetrahedrons) is a polyhedron composed of four triangular faces, six straight edges, and four vertex corners. The tetrahedron is the simplest of all the ordinary convex polyhedra and the only one that has fewer than 5 faces.

Expected Output :

117.85

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-64.php)

**65.** Write a Python program to compute the value of e(2.718281827...) using an infinite series.

Expected Output :

The mathematical constant e

2.7182818282861687

2.718281828459045

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-65.php)

**66.** Write a Python program to create an ASCII waveform.

Expected Output :

#

\*

#

\*

.......

#

\*

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-66.php)

**67.** Write a Python program to create a dot string.

Expected Output :

.

.

.

.

.

.

.

.

.

.

.

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-67.php)

**68.** Write a Python program to create a Pythagorean theorem calculator.

Note : In mathematics, the Pythagorean theorem, also known as Pythagoras' theorem, is a fundamental relation in Euclidean geometry among the three sides of a right triangle. It states that the square of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the other two sides.

Expected Output :

Pythagorean theorem calculator! Calculate your triangle sides.

Assume the sides are a, b, c and c is the hypotenuse (the side opposite the right

angle

Which side (a, b, c) do you wish to calculate? side>a

Input the length of side b:10

Input the length of side c:20

The length of side a is

17.320508075688775

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-68.php)

**69.** Write a Python function to round up a number to specified digits.

Expected Output :

Original Number: 123.01247

124

123.1

123.02

123.013

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-69.php)

**70.** Write a Python program for a casino simulation.

Expected Output :

Exp 0

Exp 1

Exp 2

Exp 3

Exp 4

.......

Exp 998

Exp 999

Average max amount earned 10493.144 with standard deviation 50.892644498001886

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-70.php)

**71.** Write a Python program to reverse a range.

Expected Output :

range(9, -1, -2)

range(4, 0, -1)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-71.php)

**72.** Write a Python program to create a range for floating numbers.

Expected Output :

[0.0, 0.1, 0.2, 0.30000000000000004, 0.4, 0.5, 0.6000000000000001, 0.700000000000

0001, 0.8, 0.9, 1.0]

01, 0.7000000000000001, 0.8, 0.9, 1.0]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-72.php)

**73.** Write a Python program to generate (given an integer n) a square matrix filled with elements from 1 to n raised to the power of 2 in spiral order.

Expected Output :

[[1, 2, 3], [8, 9, 4], [7, 6, 5]]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-73.php)

**74.** Write a Python program to select a random date in the current year.

Expected Output :

2016-02-08

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-74.php)

**75.** Write a Python program to calculate clusters using the Hierarchical Clustering method.

Expected Output :

Input number of points.> 2

Input point (eg. 1,1)A> 1,2

Input point (eg. 1,1)B> 3,4

Distance matrix no.1:

[0.0, 2.83]

[2.83, 0.0]

Cluster is : [AB]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-75.php)

**76.** Write a Python program to implement the Euclidean Algorithm to compute the greatest common divisor (GCD).

Expected Output :

304 = 2 \* 150 + 4

150 = 37 \* 4 + 2

4 = 2 \* 2 + 0

gcd is 2

.........

6 = 2 \* 3 + 0

gcd is 3

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-76.php)

**77.** Write a Python program to convert RGB color to HSV color.

Expected Output :

(0, 0.0, 100.0)

(120.0, 100.0, 84.31372549019608)

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-77.php)

**78.** Write a Python program to find perfect squares between two given numbers.

Expected Output :

[]

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-78.php)

**79.** Write a Python program to compute Euclidean distances.

Note: In mathematics, the Euclidean distance or Euclidean metric is the "ordinary" (i.e. straight-line) distance between two points in Euclidean space. With this distance, Euclidean space becomes a metric space. The associated norm is called the Euclidean norm.

Expected Output :

Euclidean distance from x to y: 4.69041575982343

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-79.php)

**80.** Write a Python program to convert an integer to a 2 byte Hex value.

Expected Output :

1 --> 0x01

2 --> 0x02

3 --> 0x03

4 --> 0x04

5 --> 0x05

6 --> 0x06

7 --> 0x07

8 --> 0x08

9 --> 0x09

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-80.php)

**81.** Write a Python program to generate a series of distinct random numbers.

Expected Output :

16

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-81.php)

**82.** Write a Python program to convert a given float value to a ratio.

Expected Output :

21/5

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-82.php)

**83.** Write a Python program to calculate the aliquot sum of a given number.

Expected Output :

Input value: 15

('Aliquot Sum', 9)

Input value: 12

('Aliquot Sum', 16)

Input value: -6

Input must be positive

Input value: 12.22

Input must be an integer

Input value: zz

Input must be an integer

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-83.php)

**84.** Write a Python program to get the nth tetrahedral number from a given integer(n) value.

Expected Output :

Original Number: 1

Tetrahedral number: 1.0

Original Number: 2

Tetrahedral number: 4.0

Original Number: 6

Tetrahedral number: 56.0

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-84.php)

**85.** Write a Python program to get the sum of the powers of all the numbers from start to end (both inclusive).

Expected Output :

650

6084

618507

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-85.php)

**86.** Write a Python program to calculate the Hamming distance between two given values.

Expected Output :

Hamming distance between 2 and 3 is 1

Hamming distance between 43 and 87 is 5

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-86.php)

**87.** Write a Python program to cap a number within the inclusive range specified by the given boundary values x and y.

Expected Output :

4

-1

10

10

5

10

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-87.php)

**88.** Write a Python program to check whether a given number is a Disarium number or an unhappy number.

Expected Output :

Is 25 is Disarium number? False

Is 89 is Disarium number? True

Is 75 is Disarium number? False

Is 125 is Disarium number? False

Is 518 is Disarium number? True

[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-88.php)

**89.** Write a Python program to check if a given number is a repdigit number or not. If the given number is repdigit return true otherwise false.  
**Sample Data:**  
(0) -> True  
(1) -> True  
(-1111) -> False  
(9999999) -> True  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-89.php)

**90.** Write a Python program to check if a given number is a Harshad number or not. Return True if the number is Harshad otherwise False.  
**Sample Data:**  
(666) -> True  
(11) -> False  
(-144) -> None  
(200) -> True  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-90.php)

**91.** Write a Python program that accepts an integer number with distinct digits and displays the next number containing only distinct digits.  
**Sample Data:**  
12345) -> 12346  
(99999) -> 102345  
(100) -> 102  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-91.php)

**92.** Write a Python program that checks whether the absolute difference between two consecutive digits is two or not. Return true otherwise false.  
**Sample Data:**  
(666) -> False  
(3579) -> True  
(2468) -> True  
(20420) -> False  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-92.php)

**93.** Write a Python program that takes an integer and rearranges the digits to create two maximum and minimum numbers.  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-93.php)

**94.** Write a Python program to calculate the sum of all prime numbers in a given list of positive integers.  
**Sample Data:**  
([1, 3, 4, 7, 9]) -> 10  
([]) -> Empty list!  
([11, 37, 444]) -> 48  
[Click me to see the sample solution](https://www.w3resource.com/python-exercises/math/python-math-exercise-94.php)

Python Code Editor:

**More to Come !**

**Do not submit any solution of the above exercises at here, if you want to contribute go to the appropriate exercise page.**

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**Python: Tips of the Day**

**Find the index of an element in a tuple**

books = ('Atomic habits', 'Ego is the enemy', 'Outliers', 'Mastery')

print(books.index('Mastery')) # 3

Ref: https://bit.ly/3A1PCO4

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