Tender Heart High School

Class IX and X Computer Application

15.07.2024

Subject Teacher : Prabhdeep kaur

Topic :- Mathematical Library Function in Java

built in function in java package and avalble in java.lang and Stored in Math class (capital)

Function Name	Return-type	Example
Math.min()	depends on the argment int/long/ float/double/byte etc.	return minimum of two values. int n = Math.min(5,3); (n=3) float a = Math.min(2.5, 3.5); (a=2.5)
Math.max()		double P = Math.max(-1392, -1295) (P=-1295)
Math.pow() power.	double	double x = Math.pow(3.0, 2.0) $=3^2$ (x=9.0) return always in double if it is 3 only still return 9.0 double a = Math.pow(5.0, -2.0) $=5^{-2}$ $=\frac{1}{5^2}=\frac{1}{25}$ = a = 0.04
Math.sqrt()	double	double a = Math.sqrt(16.0) (a=4.0) number should always be +ve. double a = Math.sqrt(-5.25) (Nan) we cannot calculate the sqrt of a -ve number so the output is Nan(Not a number)

Function	Return type	Example
Math.cbrt() cuberoot of -ve & +ve both always return	double type value	double n = Math.cbrt (27.0) → n = 3.0 double x = Math.cbrt (-8.0) → x = -2.0
Math.abs() absolute value of number without Sign.	depends on the args.type	int n = Math.abs (-3); → n = 3 double a = Math.abs (2.75); → a = 2.75 Float p = Math.abs (-7.5); → p = 7.5
Math.ceil()	double	double a = Math.ceil (+3.2); → a = 4.0 double a = Math.ceil (-3.2); → a = -3.0
Math.floor()	double	double a = Math.floor (3.2); → a = 3.0 double a = Math.floor (-3.2); → a = -4.0
Math.log() calculate natural logarithm of given number.	double	double n = Math.log (6.25); → n = 1.8325

if 3.2 → 3.0 nearest lowest value; 4.0 nearest highest value

if -3.2 → -3.0 nearest highest value; -4.0 nearest lowest value

Camlin

Function	return type	Example
Math.rint() return the integrated or truncated value of double type.	double	double a = Math.rint(7.0); (7.0) double a = Math.rint(7.5); (7.0) double a = Math.rint(8.9); (9.0) double a = Math.rint(-7.5); (-8.0) double a = Math.rint(-7.4); (-7.0)
upto .5 its or less return same number.		
if above .5 then return next integrated number		
Math.round() it rounds off the value and return value in long and integer. From .0 to 1.5 (less than) it returns the same integer value but if .5 or above than return next integer value. but in case of -ve number from -.0 to -.5 return same value and above return next integral value.	int/long	int a = Math.round(7.0); (7) int a = Math.round(7.5); (8) int a = Math.round(8.9); (9) int a = Math.round(-7.5); (-7) int a = Math.round(-7.4); (-7)

Function	return type	Example
Math.random()	double	double d = Math.random(); 0.32539756 0.39425625

it will return random number between 0 and 1 always return different number.

Try the given questions:

1. What will the following Function return when executed:
   (i) Math.max(-16, -18)
   (ii) Math.ceil(6.8)
2. Give the output of the following program segment:

```
double x=3.9, y=3.5;
System.out.println(Math.min(Math.floor(x), y));
System.out.println(Math.max(Math.ceil(x), y));
```

3. Predict the return datatype of the following functions:
   (i) Math.sqrt()
   (ii) Math.floor()
   (iii) Math.long()
   (iv) Math.round()
4. Give the output of Math.sqrt(a), when a=25.0
5. Write the syntax of the following:
   (i) To find the absolute value of a number p.
   (ii) To find the rounded off of a number m.
   (iii) To find the bigger value between two numbers m and n.
   (iv) To find the cube root of a number p.

Answers:

1. (i) -16 (ii) 7.0
2. 3.0
   4.0
3. (i) double (ii) double (iii) double
   (iv) int or long
4. 5.0
5. (i) Math.abs(p)
   (ii) Math.round(m)
   (iii) Math.max(m,n)
   (iv) Math.cbrt(p)

Questions based on this chapter are:

1. Output based
2. Return type
3. Writing java expression
4. Name class/package

1. Output based:

(i) if x = -9.99, calculate Math.abs(x);
x = 9.99

(ii) if x = 9.0, calculate Math.sqrt(x);
x = 3.0

(i) Math.max(-17, -19)
-17

(ii) Math.ceil(7.8)
8.0 [return double type]

(i) double b = -15.6;
double a = Math.rint(Math.abs(b));
System.out.println("a:" +a);

(i) Math.rint(15.6)

(a = 16.0)

```
float x = 8.87;
System.out.println(Math.ceil(x));
System.out.println(Math.floor(x));
```

9.0
8.0

x = 9.0
value is 9.0 ✗ wrong output

Evaluate :-

```
double a = Math.round(7.9);
```
double a = 8.0

```
double x = Math.max(Math.min(8,4),5)
```
4,5

double x = 5.0

```
double x = Math.floor(-5.4)
```
double x = -6.0

Give the return data type :-

Math.random() :- double
Math.pow() :- double
Math.log() :- double
Math.min() :- depends upon arguments type

- during writing down return type write double d should be small not D (capital) because otherwise it become wrapper class.

2. Expression for :-

$$c = \sqrt[3]{x^2+2y-z}$$

```
double c = Math.cbrt(x*x+2*y-z)
```

3 Write the java statement to generate and print a number between 0 and 1.

```
System.out.print(Math.random());
```

\always without argument

4 Name the class and package that is used for different mathematical functions. Give two examples of mathematical functions.

Class :- Math

Package :- java.lang

Eg. Math.sqrt()

Math.pow()

Some previous year questions:

1. Give the output of the following program segment

```
double x = 2.9, y = 2.5;
System.out.println(Math.min(Math.floor(x), y));
System.out.println(Math.max(Math.ceil(x), y));
```

2. If int n[] = {1,2,3,5,7,9,13,16}; what are the value of x and y?

```
x = Math.pow(n[4], n[2]);
y = Math.sqrt(n[5] + n[7]);
```

3. What are the final values stored in variable x and y below?

```
double a = -6.35;
double b = 14.74;
double x = Math.abs(Math.ceil(a));
double y = Math.rint(Math.max(a,b));
```

4. What is the value stored in variables given below:

```
double res = Math.pow("345".indexOf('5'),3);
```

5. Name the mathematical function which is used to find sine of an angle given in radians.

6. Give the output of the following Math functions:
   (i) Math.ceil (4.2);
   (ii) Math.abs (-4);

7. What are the values stored in variables r1 and r2 :
   (i) double r1 = Math.abs(Math.min(-2.83, -5.83));
   (ii) double r2 = Math.Sqrt(Math.floor(16.3));

8. Give the output of the following
   (i) Math.floor (-4.7);
   (ii) Math.ceil (3.4) + Math.pow(2,3)

9 Write the return type of the following function
   random ()

10 Give the output of the following
   Math.Sqrt(Math.max(9,16));

Answers with Explaination

1. 2.0 Math.min (2.0, 2.5) = 2.0
   3.0 Math.max (3.0, 2.5) = 3.0
2. x = 343 Math.pow (7,3) = 343
   y = 5 Math.Sqrt (9+16) = 5
3. x = 6.0 x = Math.abs (-6.0) = 6.0
   y = 15.0 y = Math.rint (14.74) = 15.0
4. res = 8.0 Math.pow (2,3) = 8.0
5. Math.Sin()
6. 5.0 4
7. r1 = 5.83 r1 = Math.abs (-5.83) = 5.83
   r2 = 4.0 r2 = Math.Sqrt (16.0) = 4.0
8. -5.0
   12.0 4.0 + 8.0 = 12.0
9. double
10. 4.0 Math.Sqrt (16) = 4.0