

Class 9

Chapter -7(2026-27)

Mathematical Library Method

✓ A. Tick (✓) the correct answer

1. What is the output of `Math.pow(Math.sqrt(4), 2)`?

- a. 2.0
- b. 4.0
- c. 8.0
- d. None of these

Answer: b. 4.0 ✓

Explanation: $\sqrt{4} = 2 \rightarrow 2^2 = 4$

2. How many arguments can be passed into `Math.max()`?

- a. 1
- b. 2
- c. 3
- d. 4

Answer: b. 2 ✓

3. How many arguments can be passed into `Math.random()`?

- a. 0
- b. 1
- c. 2
- d. 3

Answer: a. 0 ✓

4. What is the output of `Math.max(-3.5, 2.3) + Math.min(2.4, 1.4)`?

- a. 2.3
- b. 1.2
- c. 3.7
- d. 4

Answer: c. 3.7 ✓

Explanation: $\max = 2.3, \min = 1.4 \rightarrow \text{sum} = 3.7$

5. Which of the following returns the cube root of a number?

- a. Math.pow()
- b. Math.random()
- c. Math.cbrt()
- d. Math.abs()

Answer: c. Math.cbrt() ✓

6. Which of the following is the return type of Math.round()?

- a. boolean
- b. double
- c. int
- d. Both b and c

Answer: d. Both b and c ✓

Explanation: Depends on input → int or long

7. What will be the output of Math rint(3.4)?

- a. 4.0
- b. 3.0
- c. 3.4
- d. None of these

Answer: b. 3.0 ✓

8. What is the output of

```
System.out.println(Math.max(Math.min(4.5, 7.4), 5.3));
```

- a. 7.4
- b. 4.5
- c. 5.3
- d. None of these

Answer: c. 5.3 ✓

Explanation: $\min = 4.5 \rightarrow \max(4.5, 5.3) = 5.3$

9. Name the mathematical function used to find cosine (radians).

- a. Math.cos()
- b. Math.pow()
- c. Math.cosine()
- d. None of these

Answer: a. Math.cos() ✓

10. Which Java expression represents $(a+b)^3 a - b \sqrt{\frac{(a+b)^3}{a-b}} a - b(a+b)^3$

- a. $((a + b), 3) / \text{Math.abs}(a - b)$
- b. $\text{Math.sqrt}((a + b), 3) / \text{Math.abs}(a - b)$
- c. $\text{Math.sqrt}(\text{Math.pow}(a + b, 3) / (a - b))$
- d. $\text{Math.sqrt}(\text{Math.pow}(a + b, 3) / \text{Math.abs}(a - b))$

Answer: d. $\text{Math.sqrt}(\text{Math.pow}(a + b, 3) / \text{Math.abs}(a - b))$ ✓

✓ B. Fill in the blanks

1. _____ is the output of $\text{Math.max}(4.5, 5)$.

Answer: 5

2. _____ function is used to find the cube root of the argument.

Answer: $\text{Math.cbrt}()$

3. Return type of $\text{Math.sqrt}()$ is _____.

Answer: double

4. The result of $\text{Math.pow}(2, 3) + \text{Math.sqrt}(4)$ is _____.

Answer: 10.0

5. The expression $\sqrt{a^2 + b^3}$ is _____.

Answer: $\text{Math.sqrt}(a*a + \text{Math.pow}(b,3))$

6. The Java expression of \sqrt{ab} is _____.

Answer: $\text{Math.sqrt}(a*b)$

7. Output of $\text{Math.floor}(27)$ is _____.

Answer: 27.0

8. The output of $\text{Math.round}(2.4)$ is _____.

Answer: 2

9. Output of `Math.min(-3.4, -2.3) + Math.max(-3.4, -2.1)` is _____.

Answer: -5.5

10. The return type of `Math rint()` is _____.

Answer: double

✓ C. Answer the following questions

1. What is the difference between library method and user-defined method?

Answer:

- Library → Predefined (`Math.sqrt`)
- User-defined → Created by programmer

2. Give examples of `Math.max()` and `Math.pow()`.

Answer:

- `Math.max(5, 10) → 10`
- `Math.pow(2, 3) → 8`

3. How many arguments are required for `Math.sqrt()`?

Answer: 1

4. Write Java expression of $A = P(1 + r/n)^{nt}$

Answer:

```
A = P * Math.pow((1 + r/n), n*t);
```

5. Write difference between `Math.ceil()` and `Math.floor()`

Answer:

- `ceil` → next higher integer
- `floor` → lower integer

6. Output of `Math.sqrt(49) + Math.pow(2, 3)`

Answer: $7 + 8 = 15$

7. Output of `System.out.println(Math.floor(-0.88));`

Answer: -1.0

✓ D. Assertion and Reasoning

Assertion (A): `Math.max()` finds maximum

Reason (R): Return type depends on argument

Answer: b. Both true but not correct explanation ✓

✓ E. More unsolved programs (with main method)

1. Surface area and volume of cone

```
class Cone
{
    public static void main(String args[])
    {
        double r = 3, h = 5, l = 6;

        double surface = Math.PI*r*l + Math.PI*r*r;
        double volume = (Math.PI*r*r*h)/3;

        System.out.println("Surface Area = " + surface);
        System.out.println("Volume = " + volume);
    }
}
```

2. Pendulum time period

```
class Pendulum
{
    public static void main(String args[])
    {
        double l = 2;
        double g = 9.8;

        double T = 2*Math.PI*Math.sqrt(l/g);

        System.out.println("Time Period = " + T);
    }
}
```

3. Input 3 numbers and find cube root expression

```
class CubeRoot
{
    public static void main(String args[])
    {
        double a=2,b=3,c=4;

        double r = Math.cbrt(a*a + b*b*b + c*c*c);

        System.out.println("Result = " + r);
    }
}
```

4. Area and circumference of circle

```
class Circle
{
    public static void main(String args[])
    {
        double r = 7;

        double area = Math.PI*r*r;
        double circumference = 2*Math.PI*r;

        System.out.println("Area = " + area);
        System.out.println("Circumference = " + circumference);
    }
}
```

5. Population growth

```
class Population
{
    public static void main(String args[])
    {
        double p0 = 1000, r = 0.05, t = 2;

        double p = p0 * Math.exp(r*t);

        System.out.println("Population = " + p);
    }
}
```

Java Math Functions –

Questions & Answers(2025-26)

A. Multiple Choice Questions

1. What is the output of `Math.pow(Math.sqrt(4), 2)`?

- a) 2.0
 - b) 4.0 ✓
 - c) 8.0
 - d) None of these
-

2. How many arguments can be passed into `Math.max()`?

- a) 1
 - b) 2 ✓
 - c) 3
 - d) 0
-

3. How many arguments can be passed into `Math.random()`?

- a) 0 ✓
 - b) 1
 - c) 2
 - d) 3
-

4. What is the output of `Math.max(-3.5, 2.3) + Math.min(2.4, 1.4)`?

- a) 2.3
 - b) 3.7 ✓
 - c) 12
 - d) 4
-

5. Which of the following returns the cube root of a number?

- a) `Math.pow()`
 - b) `Math.random()`
 - c) `Math.cbrt()` ✓
 - d) `Math.abs()`
-

6. Which of the following is the return type of `Math.round()` ?

- a) boolean
 - b) double
 - c) int ✓
 - d) None
-

7. What will be the output of `Math rint(3.4)` ?

- a) 4.0
 - b) 3.0 ✓
 - c) 3.4
 - d) None of these
-

8. What is the output of

```
System.out.println(Math.max(Math.min(4.5, 7.4), 5.3));
```

- a) 4.5
 - b) 5.3 ✓
 - c) 7.4
 - d) None of these
-

9. Name the mathematical function which is used to find cosine of an angle in radians.

- a) `Math.cos()` ✓
 - b) `Math.pow()`
 - c) `Math.cosine()`
 - d) None of these
-

10. Which Java expression represents $(a+b)^3|a-b|\sqrt{\frac{(a+b)^3}{|a-b|}}|a-b|(a+b)^3$?

- a) `(a+b,3)/Math.abs(a-b)`
 - b) `Math.sqrt((a+b),3)/Math.abs(a-b)`
 - c) `Math.sqrt((Math.pow(a+b),3)/(a-b))`
 - d) `Math.sqrt((Math.pow(a+b,3))/Math.abs(a-b))` ✓
-

B. Fill in the Blanks

1. The output of `Math.max(4.5, 5)` is **5.0**
2. The output of `Math.pow(4, 2)` is **16.0**
3. Return type of `Math.sqrt()` is **double**
4. The result of `Math.pow(2, 3)+Math.sqrt(4)` is **10.0**
5. Java expression of $\sqrt{(a^2+b^2)}$ → **`Math.sqrt(Math.pow(a,2)+Math.pow(b,2))`**
6. Java expression of $(2ab\sqrt{abc})$ → **`2abcMath.sqrt(a*b)`**
7. The output of `Math.cbrt(27)` is **3.0**
8. The output of `Math.round(2.4)` is **2**

- The output of `Math.min(-3.4, -2.3) + Math.max(-3.4, -2.1)` is **-5.5**
- The return type of `Math rint()` is **double**

C. Short Answer Questions

- What is a library method?**
→ A predefined method provided by Java library (e.g., `Math.sqrt()`).
- What are the two types of methods in Java?**
→ Library methods & User-defined methods.
- Examples of Math methods:**
 - `Math.max(5, 9)` → 9
 - `Math.pow(2, 3)` → 8.0
- How many arguments are required for `Math.sqrt()`?**
→ 1 argument.
- Write expression for $A = P(1+r/n)^{rt}$.**
→ `A = P * Math.pow(1 + r/n, r*t)`
- Difference between `Math.ceil()` and `Math.floor()`.**
 - `ceil(x)`: rounds UP to nearest integer.
 - `floor(x)`: rounds DOWN to nearest integer.
- Difference between library method and user-defined method.**
 - Library method: built-in (e.g., `Math.pow()`).
 - User-defined: created by programmer.
- Java expression for $\sqrt{2a^2+u^2}$.**
→ `Math.sqrt(2*a*a + u*u)`
- Output of `Math.sqrt(9)`.**
→ 3.0
- Output of `System.out.println(Math.floor(-0.88));`**
→ -1.0

✓ D. More Unsolved Programs

Here are **Java codes** for each program 

1. Maturity amount

```
import java.util.*;
class Maturity {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter Principal: ");
        double P = sc.nextDouble();
        System.out.print("Enter Rate of Interest: ");
        double r = sc.nextDouble();
        System.out.print("Enter Time (years): ");
        double t = sc.nextDouble();

        double amount = P * Math.pow((1 + r/100), t);
```

```
        System.out.println("Maturity Amount = " + amount);
    }
}
```

2. Surface area & volume of a cone

```
import java.util.*;
class Cone {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        double pi = Math.PI;
        System.out.print("Enter radius: ");
        double r = sc.nextDouble();
        System.out.print("Enter slant height: ");
        double l = sc.nextDouble();
        System.out.print("Enter height: ");
        double h = sc.nextDouble();

        double surfaceArea = (pi * r * l) + (pi * r * r);
        double volume = (pi * r * r * h) / 3;

        System.out.println("Surface Area = " + surfaceArea);
        System.out.println("Volume = " + volume);
    }
}
```

3. Pendulum time period

```
import java.util.*;
class Pendulum {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        double pi = Math.PI;
        System.out.print("Enter length: ");
        double l = sc.nextDouble();
        System.out.print("Enter gravity: ");
        double g = sc.nextDouble();

        double T = 2 * pi * Math.sqrt(l / g);
        System.out.println("Time Period = " + T);
    }
}
```

4. Formula $r = \sqrt[3]{a + b^2 - \sqrt[3]{c}}$

```
import java.util.*;
class Formula {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a: ");
        double a = sc.nextDouble();
        System.out.print("Enter b: ");
        double b = sc.nextDouble();
        System.out.print("Enter c: ");
        double c = sc.nextDouble();

        double r = Math.cbrt(a) + Math.pow(b,2) - Math.cbrt(c);
    }
}
```

```
    System.out.println("Result = " + r);
}
}
```

5. Area & circumference of circle (given diameter)

```
import java.util.*;
class Circle {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        double pi = Math.PI;
        System.out.print("Enter diameter: ");
        double d = sc.nextDouble();
        double r = d / 2;

        double area = pi * r * r;
        double circumference = 2 * pi * r;

        System.out.println("Area = " + area);
        System.out.println("Circumference = " + circumference);
    }
}
```

6. Population growth (Pe^{rt})

```
import java.util.*;
class Population {
    public static void main(String args[]) {
        Scanner sc = new Scanner(System.in);
        double e = 2.71828;
        System.out.print("Enter starting population P0: ");
        double P0 = sc.nextDouble();
        System.out.print("Enter rate r: ");
        double r = sc.nextDouble();
        System.out.print("Enter time t (years): ");
        double t = sc.nextDouble();

        double population = P0 * Math.pow(e, r*t);
        System.out.println("Population after " + t + " years = " + population);
    }
}
```

A. Tick (✓) the correct answer

1. `Math.pow(Math.sqrt(4), 2)`

- `Math.sqrt(4) → 2.0`
 - `Math.pow(2.0, 2) → 4.0`
- ✓ b. 4.0
-

2. How many arguments can be passed into `Math.max()`?

- Overloaded method: 2 arguments always.

✓ 2

3. How many arguments can be passed into `Math.random()` ?

- No arguments.

✓ a. 0

4. `Math.max(-3.5, 2.3) + Math.min(2.4, 1.4)`

- `Math.max(-3.5, 2.3) = 2.3`

- `Math.min(2.4, 1.4) = 1.4`

- Sum = 3.7

✓ 3.7

5. Cube root of a number → `Math.cbrt()`

✓ c. `Math.cbrt()`

6. Return type of `Math.round()` → long (for double input) / int (for float input).

Since general case → int

✓ c. int

7. `Math rint(3.4)` → rounds to nearest integer as double → 3.0

✓ b. 3.0

8. `System.out.println(Math.max(Math.min(4.5, 7.4), 5.3));`

- `Math.min(4.5, 7.4) = 4.5`

- `Math.max(4.5, 5.3) = 5.3`

✓ 5.3

9. Cosine of an angle in radians → `Math.cos()`

✓ a. `Math.cos()`

10. Expression $(a+b)^3/|a-b|(a+b)^3 / |a-b|(a+b)^3/|a-b|$ inside square root →
✓ d. `Math.sqrt((Math.pow(a + b, 3)/Math.abs(a - b)))`

✓ B. Fill in the blanks

1. `Math.max(4.5, 5)` → **5.0**
2. `Math.pow(4, 2)` → **16.0**
3. Return type of `Math.sqrt()` → **double**
4. `Math.pow(2, 3)+Math.sqrt(4)` = $8 + 2 =$ **10.0**
5. Java expression of $\sqrt{(a^2+b^2)}$ → **`Math.sqrt(Math.pow(a,2)+Math.pow(b,2))`**
6. Expression of $(2abc\sqrt{ab})$ → **`2abcMath.sqrt(a*b)`**
7. `Math.cbrt(27)` → **3.0**
8. `Math.round(2.4)` → **2**
9. `Math.min(-3.4, -2.3)+Math.max(-3.4, -2.1)` = $-3.4 + -2.1 =$ **-5.5**
10. Return type of `Math rint()` → **double**

✓ C. Short Answer Questions

1. **Library method** → Predefined method provided by Java libraries (e.g., `Math.sqrt()`).
2. **Two types of methods** → Library methods & User-defined methods.
3. Examples:
 - `Math.max(5, 9)` → 9
 - `Math.pow(2, 3)` → 8.0
4. Arguments for `Math.sqrt()` → **1 argument.**
5. Expression: $A = P * \text{Math.pow}(1 + r/n, r*t)$
6. `Math.ceil(x)` → rounds UP to nearest integer.
`Math.floor(x)` → rounds DOWN to nearest integer.
7. **Library method:** built-in, reusable (e.g., `Math.sqrt()`).
User-defined: written by programmer for specific need.
8. Expression $\sqrt{(2a^2+u^2)}$ → `Math.sqrt(2*a*a + u*u)`
9. `Math.sqrt(9)` → 3.0
10. `Math.floor(-0.88)` → -1.0