Java Math Class Practice

Equation 1: Calculate the Height of a Right Triangle

Input:
Base (b) = 2.5
Angle (θ) = 45°

Formula:
height = b × tan(θ)

In Java:
height = base * Math.tan(Math.toRadians(theta));

Math Methods Used:
- Math.tan()
- Math.toRadians()

Output:
Height = 2.4999999999999996

Equation 2: Compound Interest Calculation

Input:

Principal (P) = 500

Annual Interest Rate (r as decimal) = 2.5

Compounds per year (n) = 5

Time (t) = 10 years

Formula:

$A = P \times (1 + r/n)^{(n \times t)}$

In Java:

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

Math Methods Used:

- Math.pow()

Output:

Total Amount = 3.188107501070248E11

Equation 3: Convert Cartesian to Polar Coordinates

Input:

$x = 2.5$

$y = 4.56$

Formula:

$r = \text{sqrt}(x^2 + y^2)$

$\theta = \tan^{-1}(y/x)$

In Java:

```
r = Math.sqrt(Math.pow(x, 2) + Math.pow(y, 2));
θ = Math.toDegrees(Math.atan(y / x));
```

Math Methods Used:

- Math.sqrt()
- Math.pow()
- Math.atan()
- Math.toDegrees()

Output:

Radius = 5.200346142325528

Angle = 61.266437252561616°

Equation 4: Calculate Distance Between Two Points

Input:

$(x_1, y_1) = (2.4, -4.5)$

$(x_2, y_2) = (-4.2, 6.5)$

Formula:

$d = \text{sqrt}((x_2 - x_1)^2 + (y_2 - y_1)^2)$

In Java:

```
distance = Math.sqrt(Math.pow(x2 - x1, 2) + Math.pow(y2 - y1, 2));
```

Math Methods Used:

- Math.sqrt()
- Math.pow()

Output:

Distance = 12.828094168659 66

Equation 5: Solve Quadratic Equation

Formula:

$x = (-b \pm \sqrt{b^2 - 4ac}) / (2a)$

In Java:

```
discriminant = Math.pow(b, 2) - 4 * a * c;
root1 = (-b + Math.sqrt(discriminant)) / (2 * a);
root2 = (-b - Math.sqrt(discriminant)) / (2 * a);
```

Math Methods Used:

- Math.pow()
- Math.sqrt()

List of Math Methods Used

Method	Description
Math.toRadians()	Converts degrees to radians
Math.tan()	Returns the tangent of an angle
Math.pow()	Returns a raised to the power of b
Math.sqrt()	Returns the square root of a number
Math.atan()	Returns the arc tangent (inverse tangent)
Math.toDegrees()	Converts radians to degrees