

Chapter 2 Programming Exercises

- 1. Declare and assign a variable, course, the value of 102.**
`int course = 102; System.out.println("course = " + course);`
- 2. Declare and assign a variable, num, the value of 6.33.**
`double num = 6.33; System.out.println("num = " + num);`
- 3. Declare and assign a constant, GR, the value of 1.618.**
`final double GR = 1.618; System.out.println("GR = " + GR);`
- 4. Declare and assign a variable, dataIn, which can read input from the user.**
`Scanner scanner = new Scanner(System.in); String dataIn = scanner.nextLine();`
- 5. On the previous step, what Java statement do you have to have prior to the program's beginning? Make the answer display to the screen.**
`import java.util.Scanner; System.out.println("The import statement 'import java.util.Scanner' is required prior to the program's beginning.");`
- 6. Ask the user for a number. Ask the user for another number. Add these two numbers together and display to the screen both of the numbers and the sum.**
`Scanner scanner = new Scanner(System.in);
System.out.print("Enter the first number: ");
int number1 = scanner.nextInt();
System.out.print("Enter the second number: ");
int number2 = scanner.nextInt();
int sum = number1 + number2;
System.out.println("Number 1: " + number1);
System.out.println("Number 2: " + number2);
System.out.println("Sum: " + sum);`
- 7. Declare and assign a variable, side, the value of 17.**
`int side = 17;`
- 8. Declare a variable, number, and assign it a value of 10, display it to the screen. Reassign the number variable to the value of 100 and display the change to the screen, tell the user what happened.**
`int number = 10;
System.out.println("Initial value of number: " + number);
number = 100;
System.out.println("Updated value of number: " + number);
System.out.println("The variable 'number' was reassigned from 10 to 100.");`
- 9. Take the variable, number, cast it to a double and divide it by 3, display the result to the screen (the decimal portion of the answer has to be showing), tell the user what happened.**
`double result = (double) number / 3;
System.out.println("Result of division: " + result);
System.out.println("The variable 'number' was cast to double and divided by 3.");`
- 10. Write a Java statement for the equation: $P = 4 \times \text{side}$. Tell the user what is happening and display the answer to the screen.**
`int P = 4 * side;
System.out.println("Perimeter (P) is calculated as 4 times the value of side.");
System.out.println("P = " + P);`
- 11. Write a Java statement for the equation: $A = \text{side}^2$. Tell the user what is happening and display the answer to the screen.**
`int A = side * side;
System.out.println("Area (A) is calculated as the square of side.");
System.out.println("A = " + A);`

12. **Write a Java statement for the equation: $SA = 6 \times \text{side}^2$. Tell the user what is happening and display the answer to the screen.**
int SA = 6 * side * side;
System.out.println("Surface Area (SA) is calculated as 6 times the square of side.");
System.out.println("SA = " + SA);
13. **Declare a variable, base, the value of 2.**
int base = 2;
14. **Declare a variable, height, the value of 5.**
int height = 5;
15. **Write a Java statement for the equation: $V = \text{base} \times \text{height} / 3$. Tell the user what is happening and display the answer to the screen. Hint: you will have to modify (cast) one of those variables to get the correct answer.**
double V = (double) (base * height) / 3;
System.out.println("Volume (V) is calculated as the product of base and height divided by 3.");
System.out.println("V = " + V);
16. **Declare a variable, number, the value of 5.**
int number = 5;
17. **Write a Java statement that will tell me what the remainder is when number is divided by 2.**
int remainder = number % 2;
System.out.println("The remainder when dividing number by 2 is: " + remainder);
18. **Translate the following equation into a Java statement and display the result, tell the user what happened:**

$$A = P \left(1 + \frac{r}{100} \right)^n$$

- double A = P * Math.pow(1 + r/100, n);
System.out.println("The value of A is calculated using the formula: $A = P(1 + r/100)^n$ ");
System.out.println("A = " + A);
19. **Declare a constant that holds the value of 0.3048. Ask the user for how many feet they would like to convert to meters, perform the calculation, and display the result.**
final double FEET_TO_METERS = 0.3048;
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the number of feet to convert to meters: ");
double feet = scanner.nextDouble();
double meters = feet * FEET_TO_METERS;
System.out.println(feet + " feet is equal to " + meters + " meters.");
20. **Declare a constant that holds the value of 3.2808. Ask the user for how many meters they would like to convert to feet, perform the calculation, and display the result.**
final double METERS_TO_FEET = 3.2808;
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the number of meters to convert to feet: ");
double meters = scanner.nextDouble();
double feet = meters * METERS_TO_FEET;
System.out.println(meters + " meters is equal to " + feet + " feet.");
21. **Declare a constant that holds the value of 0.9144. Ask the user for how many yards they would like to convert to meters, perform the calculation, and display the result.**
final double YARDS_TO_METERS = 0.9144;
Scanner scanner = new Scanner(System.in);
System.out.print("Enter the number of yards to convert to meters: ");
double yards = scanner.nextDouble();

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double meters = yards * YARDS_TO_METERS;  
System.out.println(yards + " yards is equal to " + meters + " meters.");
```

- 22. Declare a constant that holds the value of 32. Ask the user for the temperature in Fahrenheit, perform the calculation that will convert this temperature to Celsius and display the result (remember how `int` division works! Make sure your answer is correct!).**

$$C = (F - 32) * \frac{5}{9}$$

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final double FAHRENHEIT_TO_CELSIUS_CONSTANT = 32.0;  
Scanner scanner = new Scanner(System.in);  
System.out.print("Enter the temperature in Fahrenheit: ");  
double fahrenheit = scanner.nextDouble();  
double celsius = (fahrenheit - FAHRENHEIT_TO_CELSIUS_CONSTANT) * 5 / 9;  
System.out.println("The temperature in Celsius is: " + celsius + "°C.");
```

- 23. Convert inches to feet. Ask the user for inches and convert to feet, make sure to show the left over inches.**

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Scanner scanner = new Scanner(System.in);  
System.out.print("Enter the number of inches: ");  
int inches = scanner.nextInt();  
int feet = inches / 12;  
int remainingInches = inches % 12;  
System.out.println(inches + " inches is equal to " + feet + " feet and " + remainingInches + "  
inches.");
```