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Define/explain the following:

1. Variables-reserved memory block in ram that has been assigned a name and that can be assigned a value
2. Constants-a constant is a memory block whose value does not change
3. Data Types-the types of information that can be stored in a variable
4. Numbers-these refer to integers (whole numbers) and floats(decimal numbers)
5. Strings-data enclosed in quotation marks and usually consisting of letters, symbols and even numbers
6. Booleans-true and false
7. Let statements-to declare a variable
8. Variable Naming-no spaces, no unusual characters i.e. *,&,) etc., use camel case or _ for spaces and be descriptive
9. Math Operators-a symbol that operates on numbers mathematically to produce a result
10. * multiplication
11. ** exponentiation
12. Math.PI a predefined constant that contains a accurate value for PI
13. % modulus remainder
14. x=x+1 add 1 to the current value of x
15. x++ also means to add 1 to x and is called a shortcut operator
16. a*=2 a shortcut operator to multiply and reassign the variable a by the value 2 (a=a*2)
17. a - - shortcut to subtract 1 from a and reassign it
18. / division

- What are the final values of all variables a, b, c and d after the code below?

```
let a = 1

let b = 1;

b++;

//the value of b as this point is 2

c=b;

//c is now 2

d=a+b;

//a is 1

//b is 2

//c is  2

//d is  3
```

- What are the values of a and x after the code below?

```
let a = 2;

let x = 1 + (a *= 2);

//a is now 4 and x is now 5
```

Exercise :Volume of a Cylinder

- Create a program that displays the volume of a cylinder with a height of 10cm and a diameter of 15cm.

```
let diameter=10;
let radius=diameter/2;
let height=15;
let volume=Math.PI*radius**2*height;
console.log('The volume of a cylinder with a diameter of 10cm and height of 15cm is ' + volume + ' cubed.');
```

Exercise : Surface Area of a Cube

- Create a program that displays the surface area of a cube with a side length of 2.25m.

```
let length=2.25;

let surfaceArea= 6*length**2;

console.log('The surface area of a cube with a side length of 2.25cm is ' + surfaceArea + '.');
```

Exercise : Investment

- Create a program that determines how much money you would have in an investment if you invested $10,986.98 for 5 years at 4.3%. The formula for this is $A=P(1+i)^n$, where P in your principal investment, i is the interest rate as a decimal and n is the number of years.

Exercise : Hours to Seconds

Write a program that calculates the number of seconds in 4.5 hours.

```
let hoursInput=4.5;

const minutesToHours=60;

const secondsToMinutes=60;

let seconds=hoursInput*minutesToHours*secondsToMinutes;

console.log("There are "+seconds+ " seconds in " +hoursInput + " hours");

exit;
```

Exercise : Input Hours to Seconds

Write a program that takes in a number that represents hours and converts it to seconds. The program should return the number of seconds.

```
let hoursInput=+prompt("How many hours do you wanted converted to second?");

const minutesToHours=60;

const secondsToMinutes=60;

let seconds=hoursInput*minutesToHours*secondsToMinutes;

console.log("There are "+seconds+ " seconds in " +hoursInput + " hours");

exit;
```

Exercise : Area of a Triangle

Write a program that displays the area of the triangle with a base length of 10cm and a height of 15cm.

```
let baseInput= 10;

let heightInput= 15;

let answerOfTriangle=(baseInput*heightInput)/2;
```

```
console.log('The area of your triangle with a base of ' + baseInput + ' cm and a height of ' + heightInput + ' cm is ' + answerOfTriangle + ' cm squared.');
```

Exercise : Input Area of a Triangle

Write a program that takes two numbers that represent the base and the height of a triangle and returns the area of the triangle.

```
let baseInput= prompt('Input your base value below!');

let heightInput= prompt('Input your height value below');

let answerOfTriangle=(baseInput*heightInput)/2;

console.log('The area of your triangle with a base of ' + baseInput + ' cm and a height of ' + heightInput + ' cm is ' + answerOfTriangle + ' cm squared.');
```

Exercise : ERA

A pitcher's ERA (earned runs average) is calculated by multiplying the earned runs times total innings in the game (usually 9) and then dividing by the total innings that the pitcher pitched.

```
let earnedRuns=7;

let totalInnings=9;

let pitches=4;

let earnedRunsAverage=earnedRuns*totalInnings/pitches;

console.log('The ERA is ' + earnedRunsAverage + '.');
```

Write a program that assumes that there were 9 innings in the game, an earned runs of 7 and the innings pitched of 4. The program should display the ERA.

Input Exercise : ERA

A pitcher's ERA (earned runs average) is calculated by multiplying the earned runs times total innings in the game (usually 9) and then dividing by the total innings that the pitcher pitched.

Write a function that assumes that there were 9 innings in the game and takes in two numbers that represent the earned runs and the innings pitched. The function should return the ERA.

```
//Input Exercise : ERA

let earnedRuns=+prompt("How many earned runs were there?");

let totalInnings=9;

let pitcherInnings=+prompt("How many innings did the pitcher pitch?");

answer= (earnedRuns*totalInnings)/pitcherInnings;

console.log("The ERA of the pitcher is "+answer);
```

Exercise : Area of a Circle w/ Radius

Write a program that displays the area of a circle given the radius of 24.98 mm.

Use the constant `Math.PI` from the `Math` class.

```
let radius=24.98

let area=0;

const pi=Math.PI;

areaOfCircle=Math.PI*radius**2

console.log("The area of the circle with a radius of 24.98 mm is "+areaOfCircle+" mm squared");
```

Input Exercise : Area of a Circle w/ Radius

Write a method that returns the area of a circle given the radius.

Use the constant `Math.PI` from the `Math` class.

```
let radiusInput= +prompt('Write the radius you want to give!')

let areaCircleInput=Math.PI*radiusInput**2;

console.log('The area of a circle with a radius of ' + radiusInput + " cm is " + areaCircleInput + " cm squared.");
```

Exercise : Square a Double Type

Write a program that computes the square of the number 1221.

```
let input=1221;
answer= input**2;
console.log("The value of your number squared is "+answer);
```

Input Exercise : Square a Double Type

Write a program that computes the square of the number entered by a user.

```
//Input Exercise : Square a Double Type
let input=+prompt("What value would you like to square?");
answer= input**2;
console.log("The value of your number squared is "+answer);
```

Exercise : Cube of a Number

Write a program that computes the cube of the number 1221.

```
let cubeNumber=1221;
cubeNumber**=3;
console.log('The cube of the number 1221 is ' + cubeNumber + '.');
```

Input Exercise : Cube of a Number

Write a program that computes the cube of the number provided by the user.

```
//Input Exercise : Cube of a Number
input=+prompt("What value would you like to cube?");
answer= input**3;
```

```
console.log("The value of your number cubed is "+answer);
```

Exercise : Weight of a Car Carrier Trailer

Write a program that displays how much the weight is on a car carrier trailer given the average weight of a car is 1220 kg and number of cars on the trailer is 101.

```
let avgWeight=1220;

let numOfCars=101;

let totalWeight=avgWeight*numOfCars;

console.log('The amount of weight on the car carrier trailer is ' + totalWeight + ' kg.');
```

Input Exercise : Weight of a Car Carrier Trailer

Write a method that returns how much the weight is on a car carrier trailer given the average weight of a car and number of cars on the trailer.

```
//Input Exercise : Weight of a Car Carrier Trailer

input=+prompt("What is the average weight of a car on this trailer");

answer= input*101;

console.log("The weight of the car carrier trailer would be "+answer);
```

Exercise : Purchase Calculator

Create a simple calculator that calculates the the pre-tax amount of purchased items at a store that cost $4.99, $7.99, $3.99 and $11.95.

```
number1=4.99;

number2=7.99;

number3=3.99;

number4=11.95;
```

```
answer= number1+number2+number3+number4;

console.log("The sum of all 4 numbers is "+answer);
```

Input Exercise : Purchase Calculator

Create a simple calculator that combines four numbers to determine the pre-tax amount of 4 purchased items at a store.

```
//Input Exercise : Purchase Calculator

number1=+prompt("please input 1st number");

number2=+prompt("please input 2nd number");

number3=+prompt("please input 3rd number");

number4=+prompt("please input 4th number");

answer= number1+number2+number3+number4;

console.log("The sum of all 4 numbers is "+answer);
```

Exercise : Address Number Combinations

Write a method that displays an int value of the total number of address combinations there are for a randomly created street address, which could include a combination of numbers and maybe letters.

The total number of addresses are based on how many digit or letter “slots” can be in an address (generally 1-6) and the number of values possible in each slot. Not all combinations are possible, so to estimate the number of combinations that will actually work, you should multiply the number of slots times the number of values.

For example, an address may have 3 slots and 10 possible digits and 4 possible letters (N, S, E, or W for the cardinal directions) that could fill each slot. So the total number of combinations for the addresses in this area would be 3 times (4 + 10) which is 42. Display the number of combinations of addresses if there are 7 slots with 8 possible digits and 5 possible letters.

```
let TotalAddresses = 0;
```

```
let Slots = 7;

let Digits = 8;

let Letters = 5;

TotalAddresses = Slots * (Digits + Letters);

console.log(TotalAddresses);
```

Input Exercise : Address Number Combinations

Write a method that displays an int value of the total number of address combinations there are for a randomly created street address, which could include a combination of numbers and maybe letters.

The total number of addresses are based on how many digit or letter “slots” can be in an address (generally 1-6) and the number of values possible in each slot. Not all combinations are possible, so to estimate the number of combinations that will actually work, you should multiply the number of slots times the number of values.

For example, an address may have 3 slots and 10 possible digits and 4 possible letters (N, S, E, or W for the cardinal directions) that could fill each slot. So the total number of combinations for the addresses in this area would be 3 times (4 + 10) which is 42. Ask for the number of slots, digits and letters.

```
let TotalAddresses = 0;

let Slots = +prompt("How many slots would you like?",3);

let Digits = +prompt("How many possible digits would you like for each slot to have?",10);

let Letters = +prompt("How many possible letters would you like each digit to have?",4);

TotalAddresses = Slots * (Digits + Letters);

console.log(TotalAddresses);
```

Exercise : Product

Write a function that displays the product of 102 and 2155.

```
let productNum1=102;

let productNum2=2155;

let productOfBoth=productNum1*productNum2;

console.log('The product of ' + productNum1 + ' and ' + productNum2 + ' is ' +
productOfBoth + '.');
```

Input Exercise : Product

Write a function that displays the product of two numbers entered by a user.

```
//Input Exercise : Product

let input1=+prompt("What is your first value?");

let input2=+prompt("What is your second value?");

answer= input1*input2;

console.log("The product of your two numbers is "+answer);
```

Exercise : Cubed

Write a program that displays the cube of 42.

```
let numberToCube=42;

numberToCube=Math.pow(42, 3);

//.pow stands for power and what this function does is it takes the given x value (42) and applies
the y value (3) as the power.

console.log('The cube of 42 is ' + numberToCube + '.');
```

Input Exercise : Cubed

Write a program that displays the cube of any number provided by the user.

```
//Input Exercise : Cubed
input=+prompt("What value would you like to cube?");
answer= input**3;
console.log("The value of your number cubed is "+answer);
```

Exercise : Average

Write a program that displays the average of 11,22,33 and 44.

```
let eleven=11;
let twentyTwo=22;
let thirtyThree=33;
let fourtyFour=44;
let amountOfNums=4;
averageOfNums=(eleven+twentyTwo+thirtyThree+fourtyFour)/amountOfNums;
console.log('The average of 11, 22, 33, 44 is ' + averageOfNums + '.');
```

Input Exercise : Average

Write a program that displays the average of 4 given numbers!

```
//Input Exercise : Average
number1=+prompt("please input 1st number");
number2=+prompt("please input 2nd number");
number3=+prompt("please input 3rd number");
number4=+prompt("please input 4th number");
answer= (number1+number2+number3+number4)/4;
console.log("The average of all 4 numbers is "+answer);
```

Exercise : Circumference of Circle

Write a program that displays the circumference of a circle given the radius of 98.7 m! Assume pi is 3.14.

Note: the equation for circumference is `2pi*radius`.

```
radius=98.7;
const pi=3.14;
answer=2*pi*radius;
console.log("The circumference of the circle with given radius is "+answer);
```

Input Exercise : Circumference of Circle

Write a function that returns the circumference of a circle given the radius! Assume pi is 3.14.

Note: the equation for circumference is `2pi*radius`.

```
//Input Exercise : Circumference of Circle
radius=+prompt("what is the radius of your circle?");
const pi=3.14;
answer=2*pi*radius;
console.log("The circumference of the circle with given radius is "+answer);
```

Exercise : Volume of Sphere

Write a program that displays the volume of a sphere given the radius of 1100 cm. Assume pi is 3.14.

Note: The equation for a sphere's volume is (4/3)pi * radius3

```
radius=1100;
answer=(4/3)*pi*radius**3;
console.log("The volume of your sphere given radius is "+answer);
```

Input Exercise : Volume of Sphere

Write a function that returns the volume of a sphere given the radius. Assume pi is 3.14.

Note: The equation for a sphere's volume is (4/3)pi * radius^3

```
//Input Exercise : Volume of Sphere
radius=+prompt("what is the radius of your sphere?");
answer=(4/3)*pi*radius**3;
console.log("The volume of your sphere given radius is "+answer);
```

Exercise : Pythagorean

Write a program that displays the length of the hypotenuse by using the Pythagorean theorem assuming the lengths of sides a and b are 10 cm and 12 cm..

The Pythagorean Theorem is a2 + b2 = c2.

```
input1=10;
input2=12;
answer=Math.sqrt(input1**2+input2**2);
console.log("The length of the hypotenuse of this triangle is "+answer);
```

Input Exercise : Pythagorean

Write a function that takes in two numbers that represent the legs of a triangle and returns the length of the hypotenuse by using the Pythagorean theorem.

The Pythagorean Theorem is a2 + b2 = c2.

```
//Input Exercise : Pythagorean
input1=+prompt("What is the length of the first leg?");
input2=+prompt("What is the length of the second leg?");
answer=Math.sqrt(input1**2+input2**2);
console.log("The length of the hypotenuse of this triangle is "+answer);
```