

1.Find a Mean, Median, Mode, and Range in Height Analysis in My classroom?(collect height of 20-30 students)

```
import matplotlib.pyplot as plt
from statistics import mean, median, mode
```

Matplotlib is building the font cache; this may take a moment.

```
heights = [145, 148, 150, 150, 152, 155, 155, 156, 158, 160, 160, 162,
164, 165, 165, 167, 170, 172, 175]
```

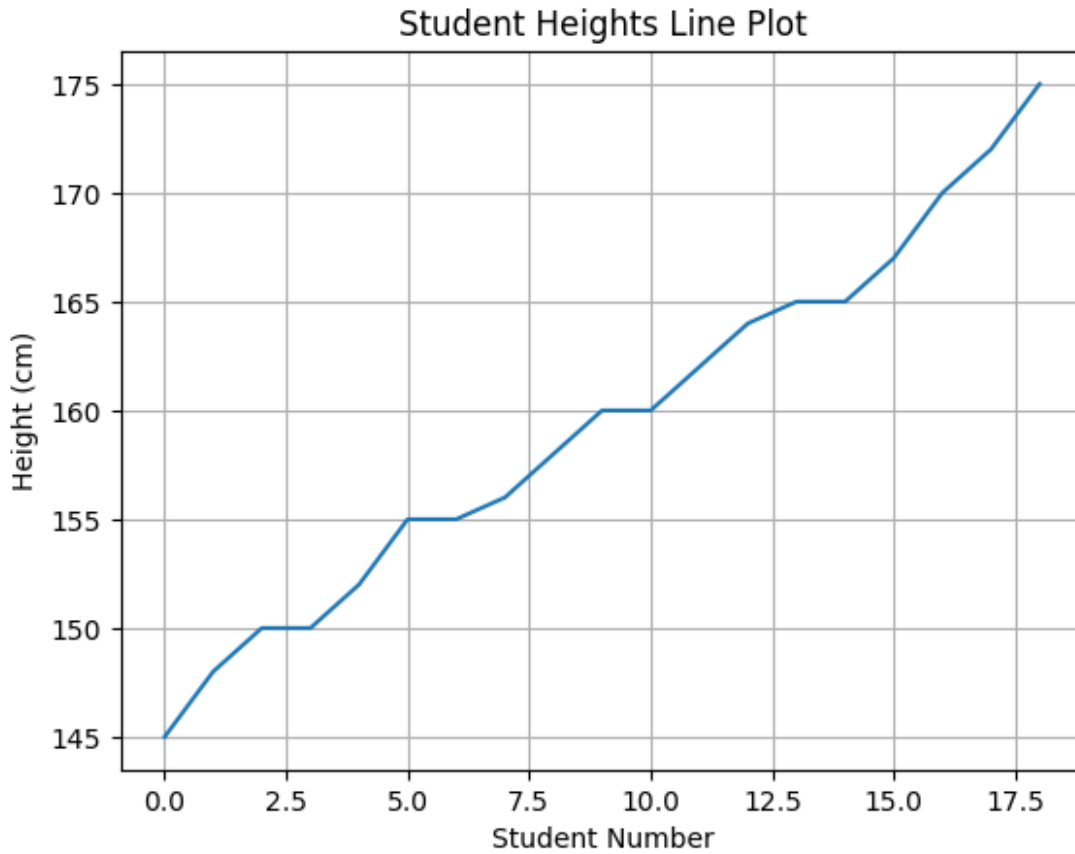
```
mean_value = mean(heights)           # Average
median_value = median(heights)        # Middle value
mode_value = mode(heights)            # Most common value
range_value = max(heights) - min(heights) # Difference between
highest & lowest
```

```
print("Mean =", mean_value)
print("Median =", median_value)
print("Mode =", mode_value)
print("Range =", range_value)
```

```
Mean = 159.42105263157896
Median = 160
Mode = 150
Range = 30
```

```
plt.plot(heights)
plt.title("Student Heights Line Plot")
plt.xlabel("Student Number")
plt.ylabel("Height (cm)")
plt.grid(True)

plt.show()
```



1. Calculate mean variance and standard deviation in School attendance analysis: collect 3 months attendance data

```
from statistics import mean, variance, stdev
import matplotlib.pyplot as plt

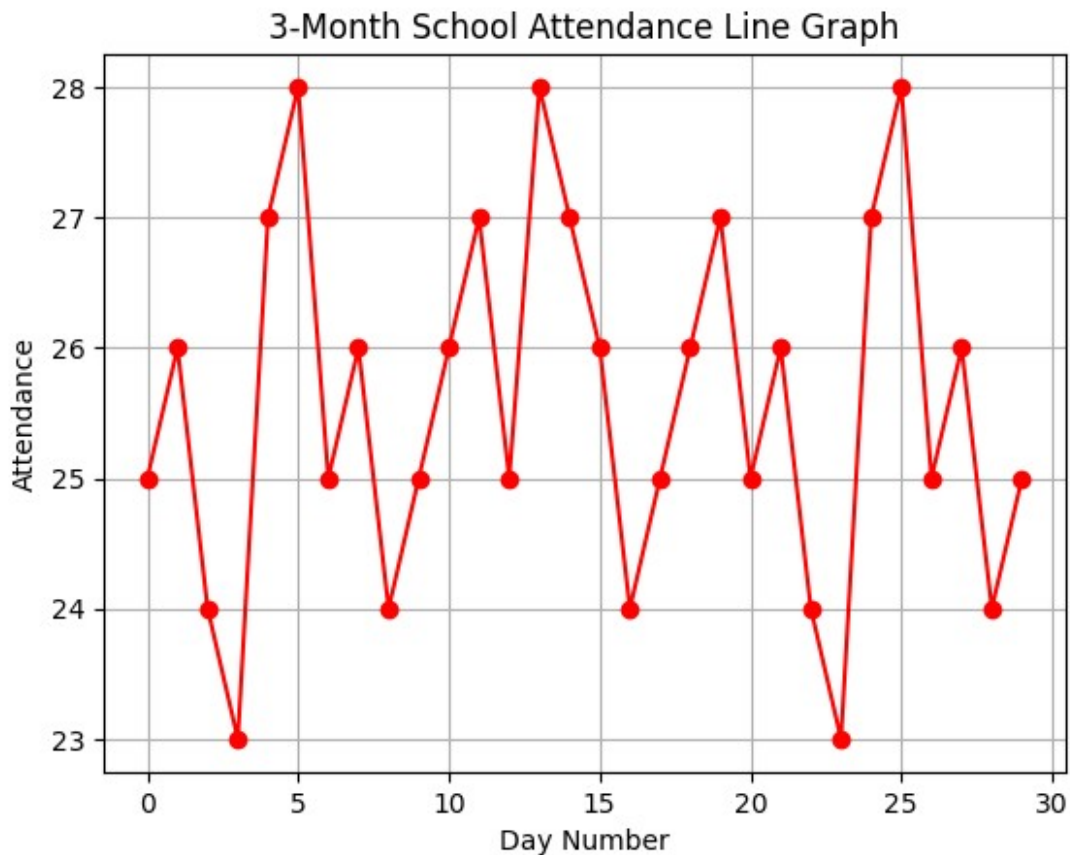
attendance = [
    25, 26, 24, 23, 27, 28, 25, 26, 24, 25, # Month 1
    26, 27, 25, 28, 27, 26, 24, 25, 26, 27, # Month 2
    25, 26, 24, 23, 27, 28, 25, 26, 24, 25 # Month 3
]

mean_value = mean(attendance)
variance_value = variance(attendance)
std_dev_value = stdev(attendance)

print("Mean Attendance =", mean_value)
print("Variance =", variance_value)
print("Standard Deviation =", std_dev_value)

Mean Attendance = 25.566666666666666
Variance = 1.9781609195402299
Standard Deviation = 1.4064710873459965
```

```
plt.plot(attendance, marker='o', linestyle='-', color='red')
plt.title("3-Month School Attendance Line Graph")
plt.xlabel("Day Number")
plt.ylabel("Attendance")
plt.grid(True)
plt.show()
```



1. find mean, median, mode data=12, 15, 18, 12, 10, 20, 12 ,height(cm): 150, 152, 155, 158, 160, 162,add one more height=200 check how median changes .

```
from statistics import mean, median, mode
import matplotlib.pyplot as plt

data = [12, 15, 18, 12, 10, 20, 12]

mean_value = mean(data)
median_value = median(data)
mode_value = mode(data)

print("MEAN =", mean_value)
print("MEDIAN =", median_value)
print("MODE =", mode_value)
```

```
MEAN = 14.142857142857142
MEDIAN = 12
MODE = 12
```

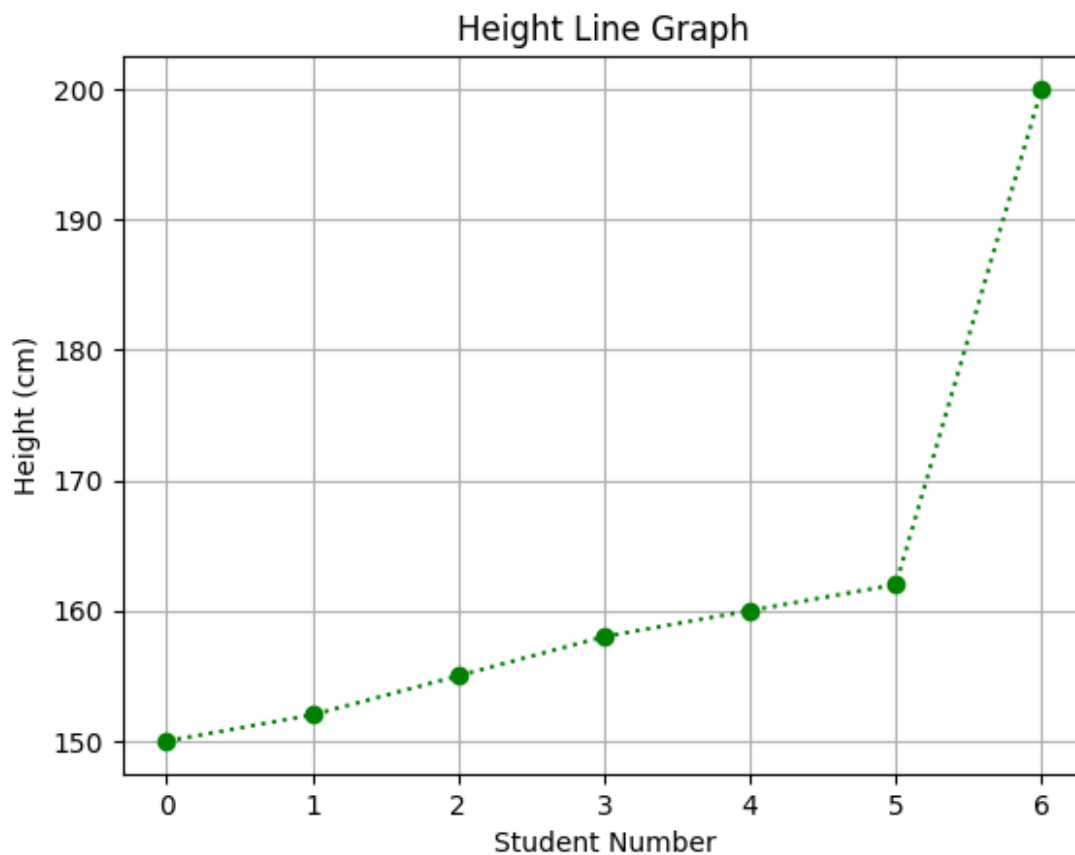
```
heights = [150, 152, 155, 158, 160, 162]
median_before = median(heights)
```

```
heights.append(200)
median_after = median(heights)
```

```
print("\nMedian Before Adding 200 =", median_before)
print("Median After Adding 200 =", median_after)
```

```
Median Before Adding 200 = 156.5
Median After Adding 200 = 158
```

```
plt.plot(heights, marker='o', linestyle='dotted', color='g')
plt.title("Height Line Graph")
plt.xlabel("Student Number")
plt.ylabel("Height (cm)")
plt.grid(True)
plt.show()
```



Variance and standard deviation marks 40,45, 50, 55,60 Find variance and sd (manual formula)
two datasets:A= 10,12,14,16, B= 18,10, 20,30 ,40 which has higher sd ?why?

```
import math
import matplotlib.pyplot as plt

marks = [40, 45, 50, 55, 60]

mean_marks = sum(marks) / len(marks)
variance_marks = sum((x - mean_marks) ** 2 for x in marks) / len(marks)
sd_marks = math.sqrt(variance_marks)

print("Marks =", marks)
print("Mean =", mean_marks)
print("Variance =", variance_marks)
print("Standard Deviation =", sd_marks)

Marks = [40, 45, 50, 55, 60]
Mean = 50.0
Variance = 50.0
Standard Deviation = 7.0710678118654755

A = [10, 12, 14, 16]
B = [18, 10, 20, 30, 40]

mean_A = sum(A) / len(A)
mean_B = sum(B) / len(B)

var_A = sum((x - mean_A) ** 2 for x in A) / len(A)
var_B = sum((x - mean_B) ** 2 for x in B) / len(B)

sd_A = math.sqrt(var_A)
sd_B = math.sqrt(var_B)

print("\nDataset A =", A)
print("Variance A =", var_A)
print("SD A =", sd_A)

print("\nDataset B =", B)
print("Variance B =", var_B)
print("SD B =", sd_B)

Dataset A = [10, 12, 14, 16]
Variance A = 5.0
SD A = 2.23606797749979

Dataset B = [18, 10, 20, 30, 40]
Variance B = 107.84
SD B = 10.384603988597735
```

```
plt.plot(marks, marker='o', linestyle=':', color='blue',  
label="Marks")  
plt.plot(A, marker='o', linestyle='-.', color='Cyan', label="Dataset  
A")  
plt.plot(B, marker='o', linestyle='-', color='red', label="Dataset B")  
  
plt.title("Line Graph for Marks, A, and B", color="magenta")  
plt.xlabel("Index (Position)")  
plt.ylabel("Values", color="green")  
plt.grid(True)  
plt.legend()  
  
plt.show()
```

