```
load("Internet.mat")
```

```
MB = internet(:,1)
```

```
MB = 95×1
   163
   170
   169
   173
   160
   168
   163
   173
   168
   165
    ⋮
```

```
n = length(MB)
```

```
n = 95
```

```
%% Question 1
```

```
x = MB;
a = 0;
b = 1024;
y = a + b*x;
```

```
qvar_factor = n/(n-1);
qvar_x = var(x)*qvar_factor
```

```
qvar_x = 68.4047
```

```
qvar_y = var(y)*qvar_factor
```

```
qvar_y = 7.1728e+07
```

```
qstd_x = sqrt(qvar_x)
```

```
qstd_x = 8.2707
```

```
qstd_y = sqrt(qvar_y)
```

```
qstd_y = 8.4692e+03
```

```
checks1 = [mean(y) == a+b*mean(x), median(y) == a+b*median(x), ...
    qvar_y == power(b,2)*qvar_x, qstd_y == abs(b)*qstd_x]
```

```
checks1 = 1×4 logical array
   1   1   1   1
```

```
expressions1 = ["\bar{y} = a+b \bar{x}", "y_{med} = a+b x_{med}", ...
    "s_{y}^{2} = b^{2} \cdot s_{x}^{2}", "s_{y} = \left| b \right| \cdot s_{x}"];
expressions1 = arrayfun(@(expr, val) sprintf("$%s : \\mathrm{%s}$", expr, val), ...
    expressions1, string(checks1), UniformOutput=false);

clf;
axis off;
for i = 1:numel(expressions1)
    text(0, 1-(i-1)/6, expressions1(i), Interpreter="latex", FontSize=14, ...
        Units="normalized", HorizontalAlignment="left", VerticalAlignment="top")
end
```

$$\bar{y} = a + b\bar{x} : \text{true}$$

$$y_{med} = a + bx_{med} : \text{true}$$

$$s_y^2 = b^2 \cdot s_x^2 : \text{true}$$

$$s_y = |b| \cdot s_x : \text{true}$$

```
%% Question 2
```

```
x = MB;
y = (x-mean(x))/std(x);
```

```
fprintf("mean = %.4f", mean(y))
```

```
mean = -0.0000
```

```
fprintf("s^2 = %.4f", var(y))
```

```
s^2 = 1.0000
```

```
fprintf("s = %.4f", std(y))
```

```
s = 1.0000
```

```
e = 1e-15; % Error to use when comparing floating point numbers
checks2 = [abs(mean(y)-0) < e, abs(var(y)-0) < e, abs(std(y)-0) < e];
```

```
expressions2 = ["\bar{x} = 0", "s^{2} = 1", "s = 1"];
expressions2 = arrayfun(@(expr, val) sprintf("$%s : \\mathrm{%s}$", expr, val), ...
    expressions2, string(checks2), UniformOutput=false);

clf;
axis off;
for i = 1:numel(expressions2)
    text(0, 1-(i-1)/6, expressions2(i), Interpreter="latex", FontSize=14, ...
        Units="normalized", HorizontalAlignment="left", VerticalAlignment="top")
end
```

$$\bar{x} = 0 : \mathrm{false}$$

$$s^2 = 1 : \mathrm{false}$$

$$s = 1 : \mathrm{false}$$