

Uniform Probability Density Function

The **uniform probability density function** is given by

height \times

$$f(x) = \begin{cases} \frac{1}{b-a} & \text{for } a \leq x \leq b \\ 0 & \text{otherwise.} \end{cases}$$

The mean and standard deviation are given by the following expressions.

$$\mu = \frac{a+b}{2} \quad \text{and} \quad \sigma = \frac{b-a}{\sqrt{12}}$$

mean St. Dev

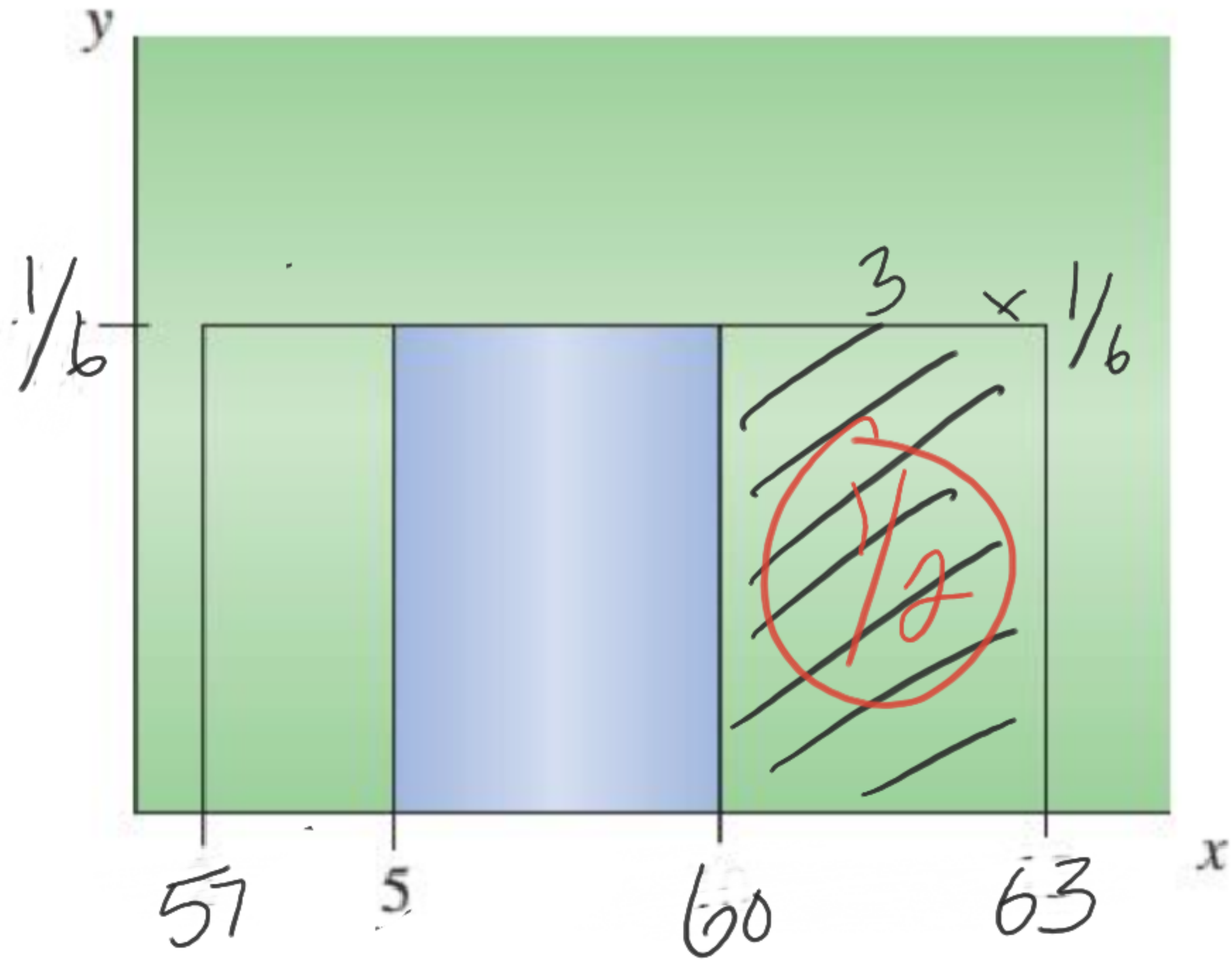
FORMULA

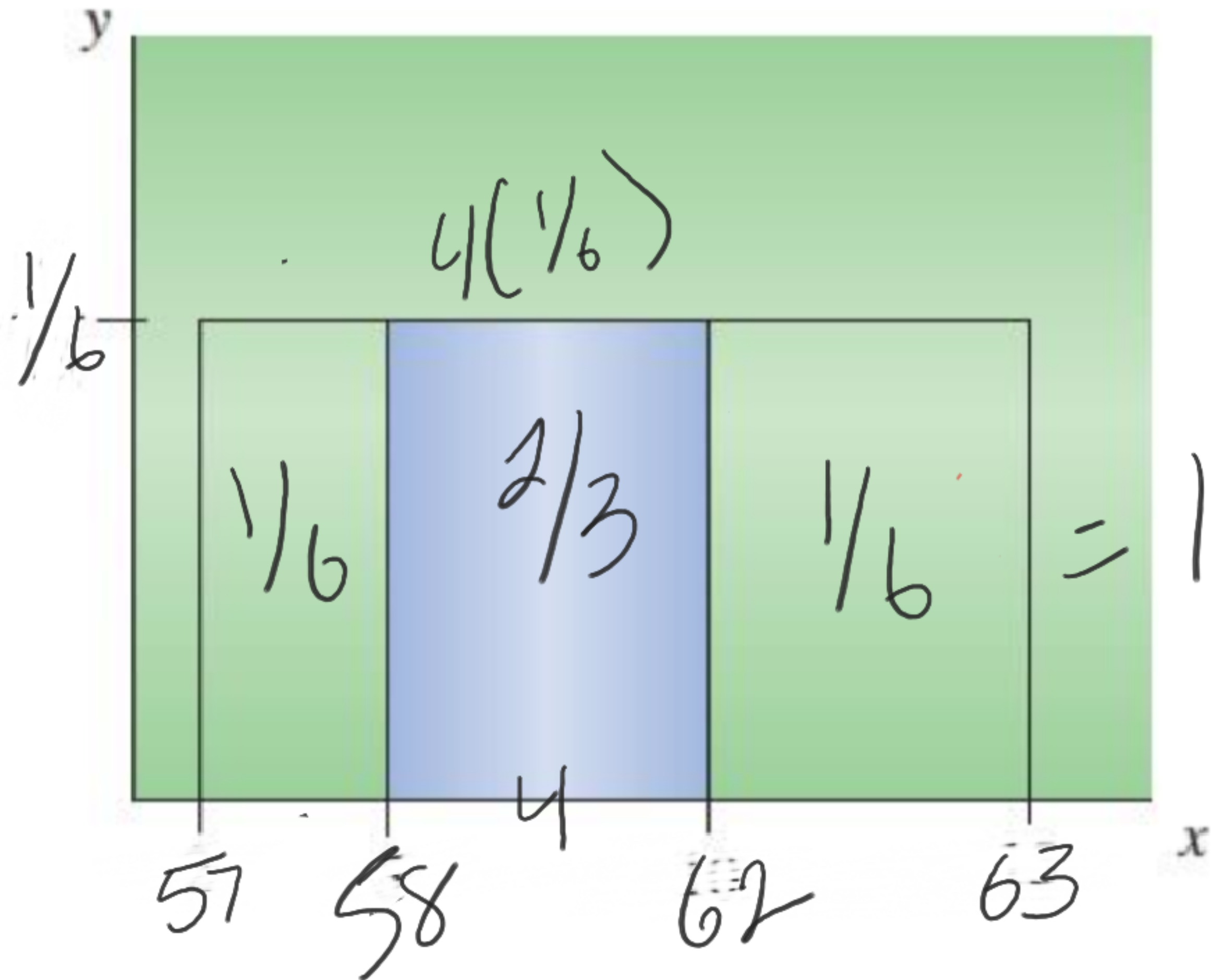
Polar Bear Frozen Foods manufactures frozen French fries for sale to grocery store chains. The final package weight is thought to be a uniformly distributed random variable. Assume X , the weight of French fries, has a uniform distribution between 57 ounces and 63 ounces.

- a. What is the mean weight for a package?
- b. What is the standard deviation for the weight of a package?
- c. What is the probability that a store will receive a package weighing less than 59 ounces?
- d. What is the probability that a package will contain between 60 and 63 ounces?
- e. What is the probability that a package will contain more than 62 ounces?
- f. Find the probability that a package will contain exactly 60 ounces.

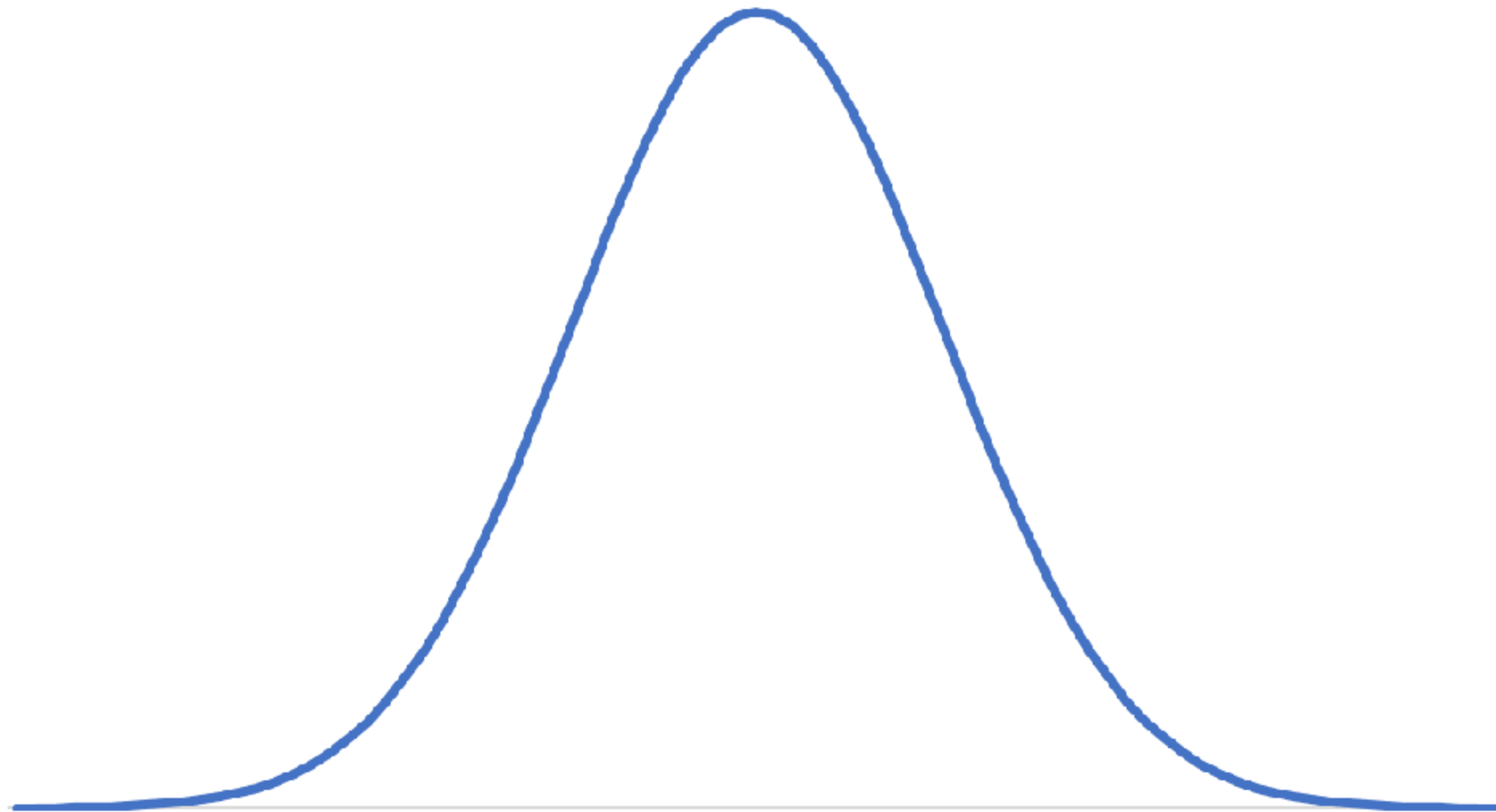
$$a) \frac{a+b}{2} = \frac{57+63}{2} = 60 = \mu$$

$$\begin{aligned} b) \sigma &= \frac{b-a}{\sqrt{12}} \\ &= \frac{63-57}{\sqrt{12}} \\ &= 1.73 \end{aligned}$$





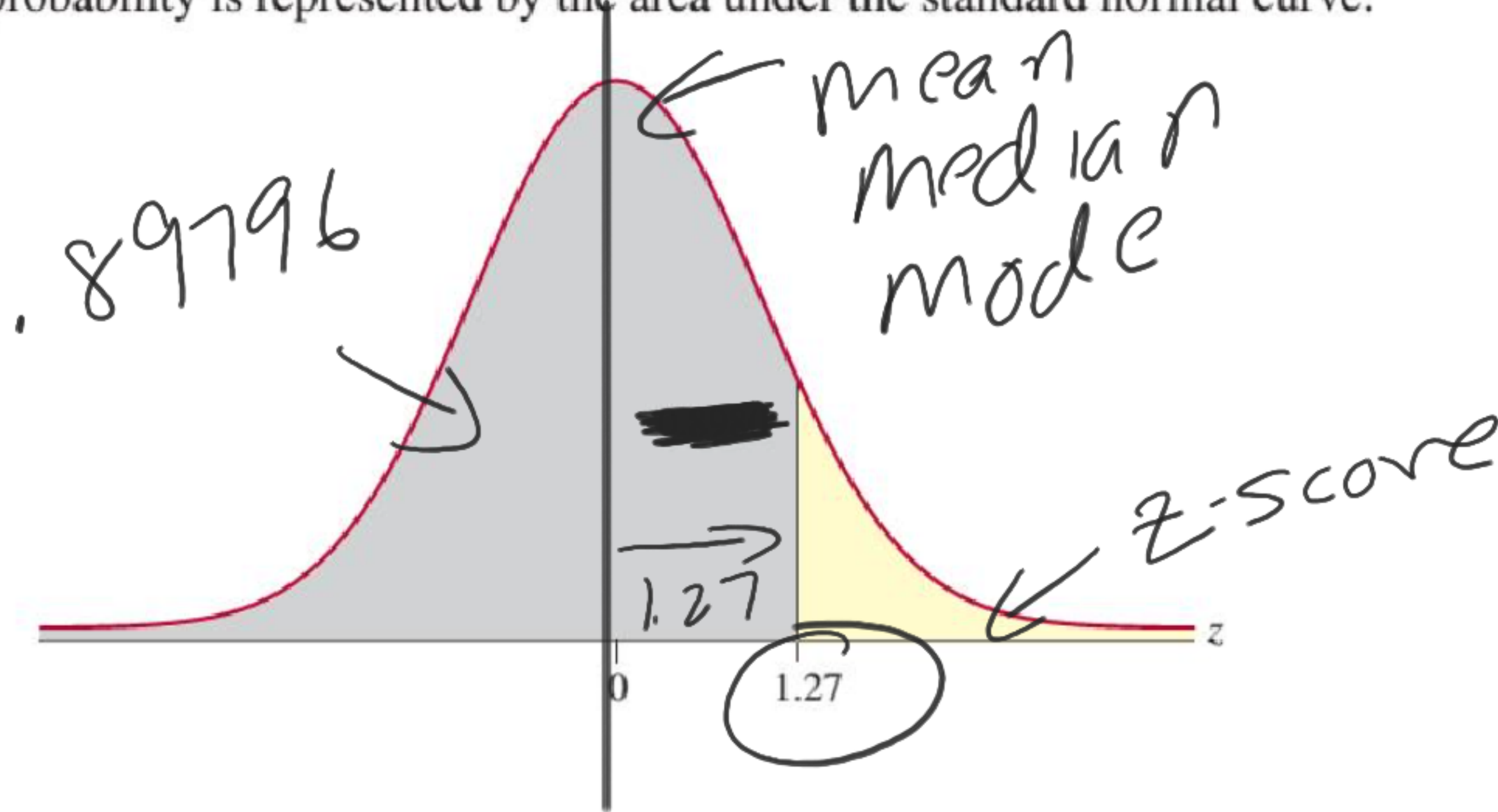
8.3 The Standard Normal Distribution



Compute the probability that a standard normal random variable is less than 1.27.

Solution

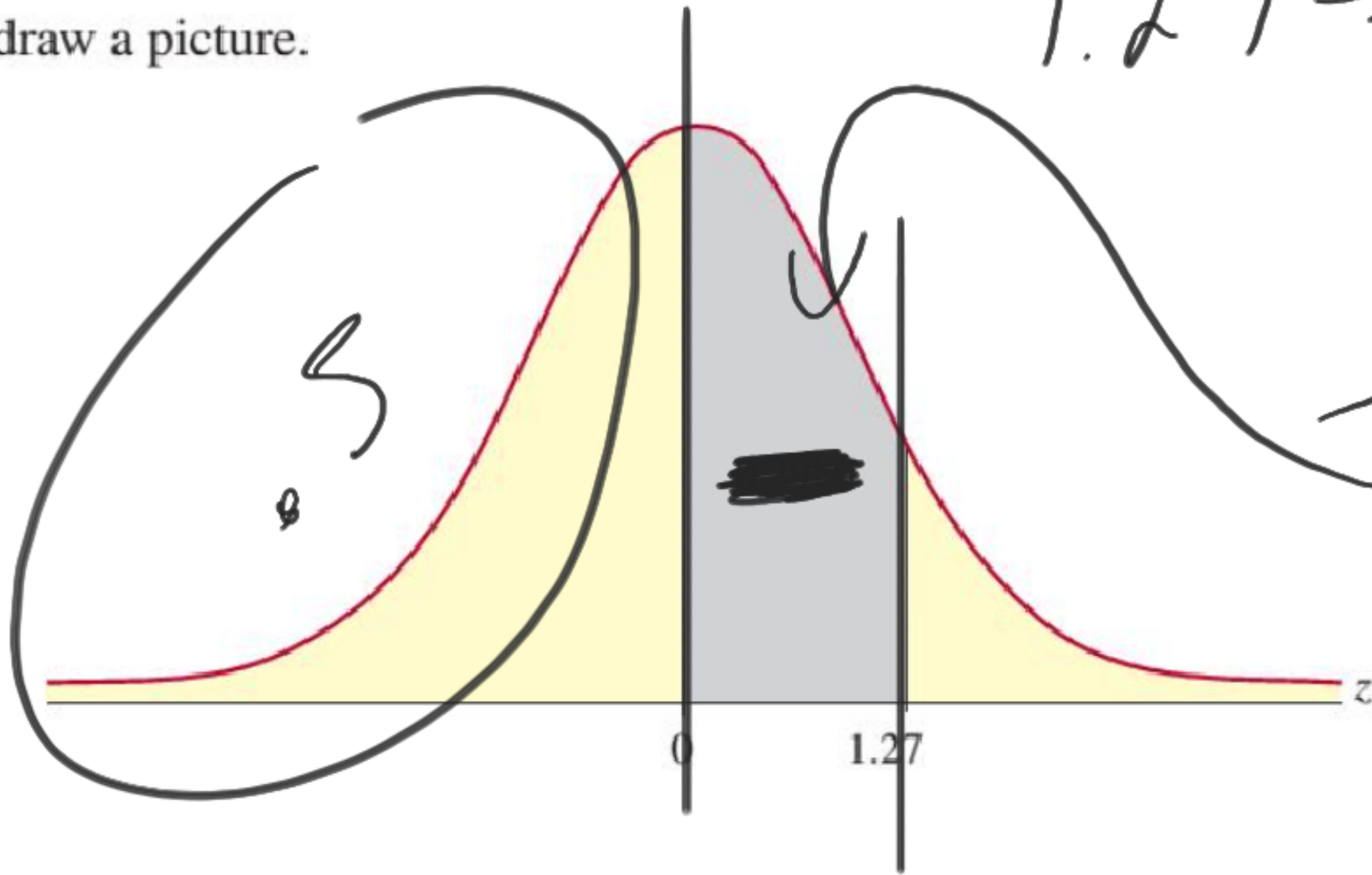
Drawing a picture, even when the problem is rather simple, is a good idea. Remember that the probability is represented by the area under the standard normal curve.



Compute the probability that a standard normal random variable is between 0 and 1.27.

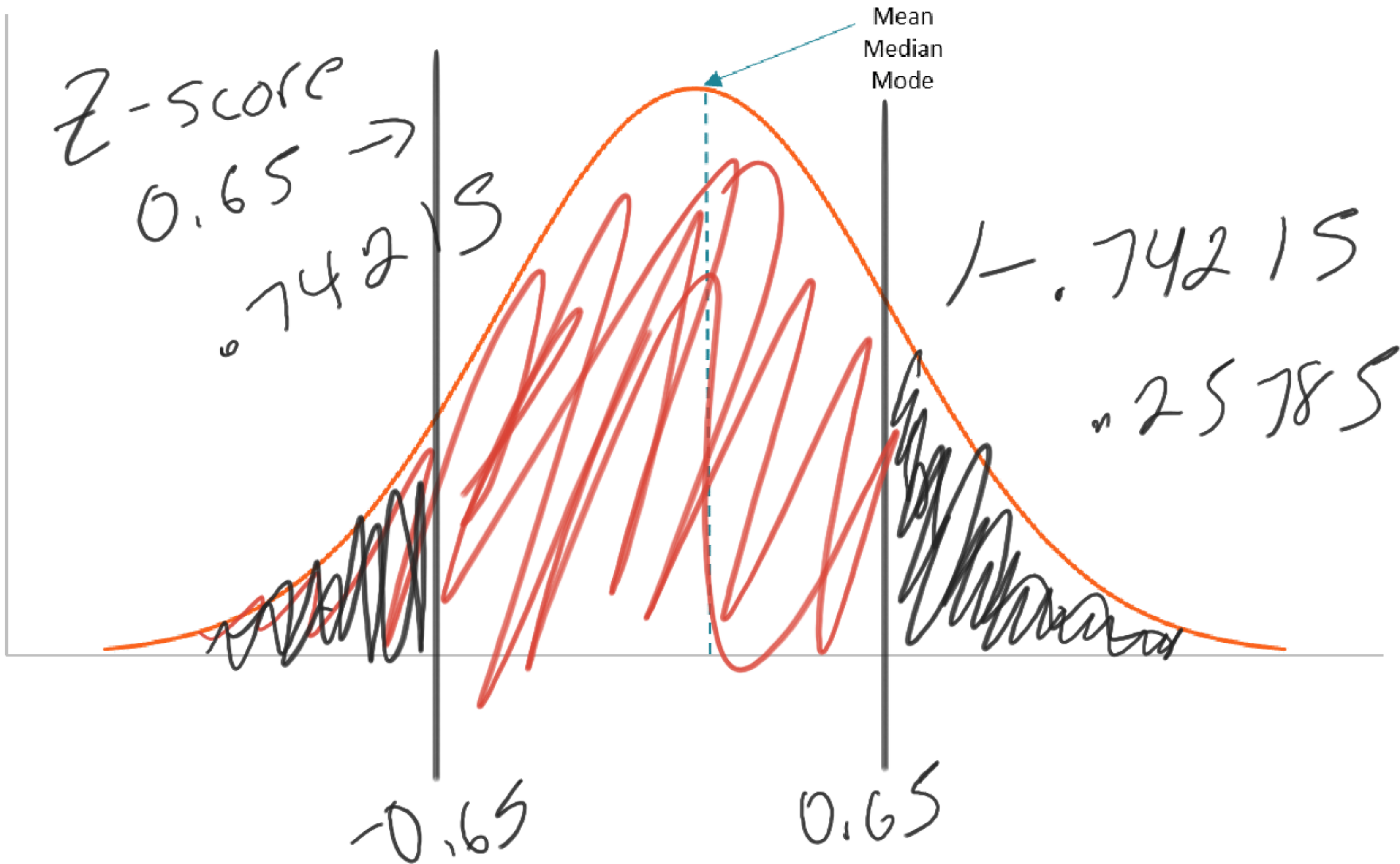
Solution

First, draw a picture.



$$1.27 \rightarrow \frac{.89796}{.9}$$

$$.39796$$



.97725 .02275

.99865 - .00135

= 0.9545

- 0.9973

Mean
Median
Mode

Z-score

1 → .84134

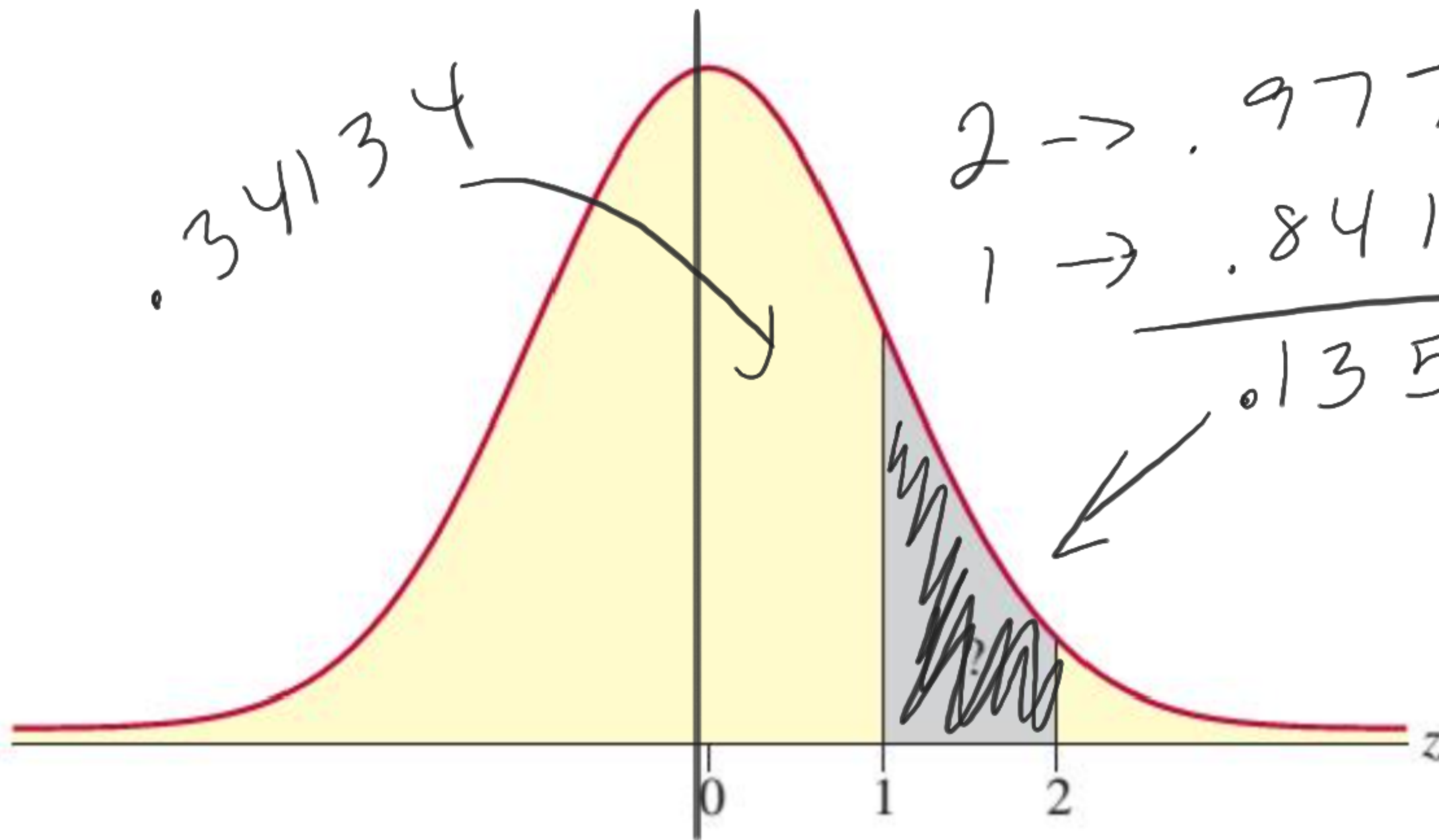
-1 → .15866

 .68268

-2 ↔ 2
.9545

 -3 ↔ 3
.9973





$.34134$

$2 \rightarrow .97725$

$1 \rightarrow .84134$

$.13591$

- a. The area to the left of z is 0.9147.
- b. The area between 0 and z is 0.3665.
- c. The area to the left of z is 0.1469.
- d. The area to the right of z is 0.7967.

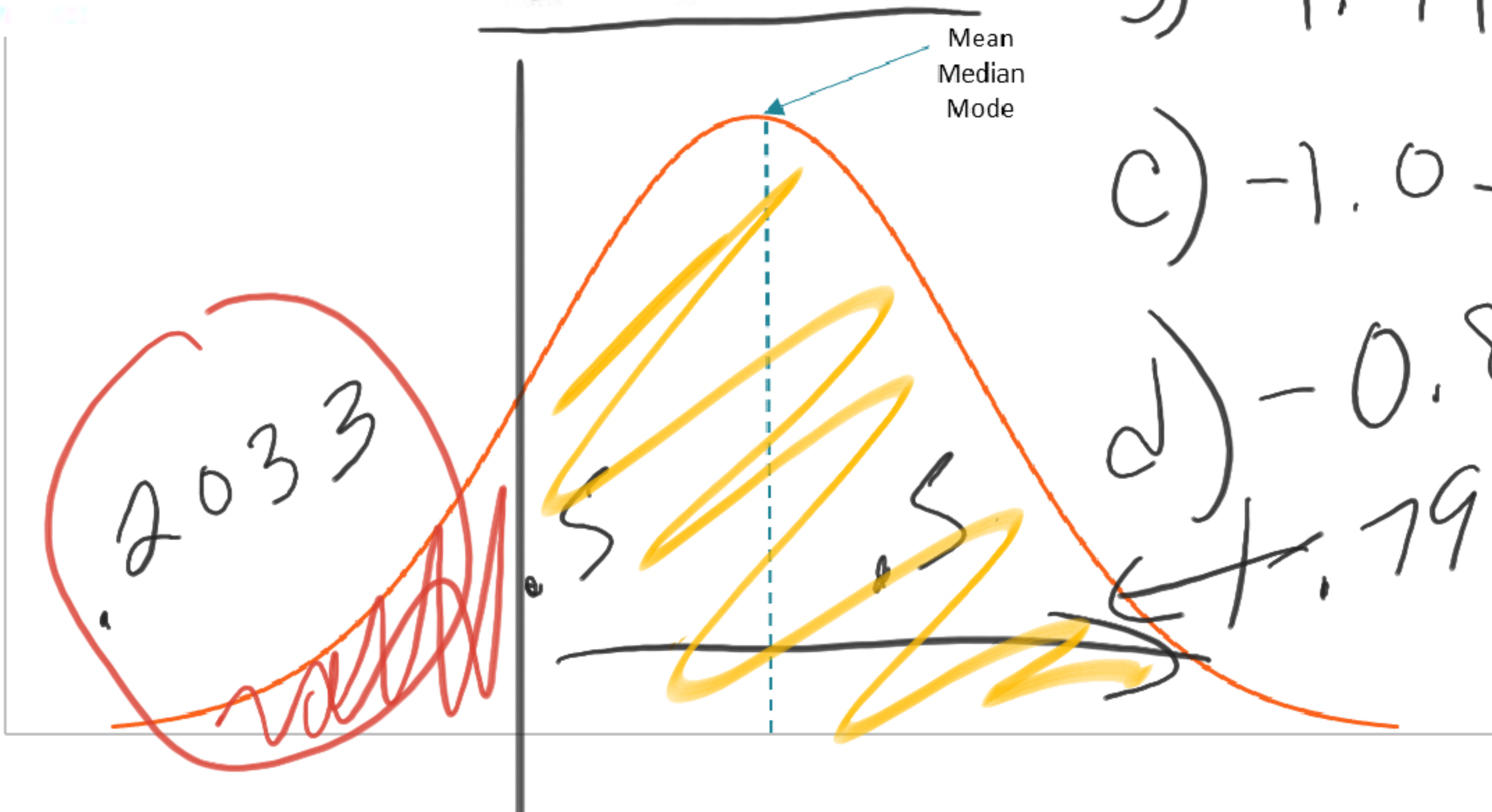
a) 1.37

b) 1.11

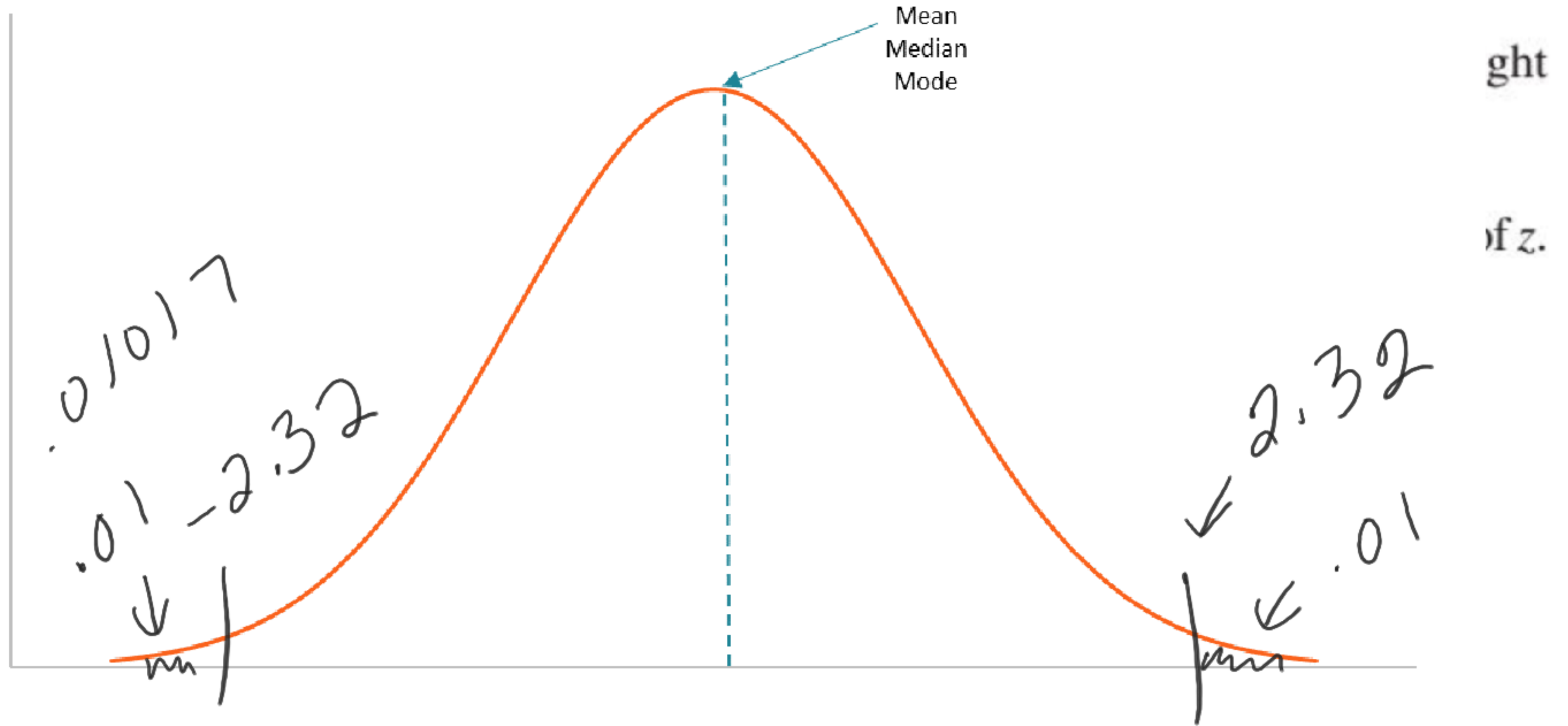
c) -1.05

d) -0.83

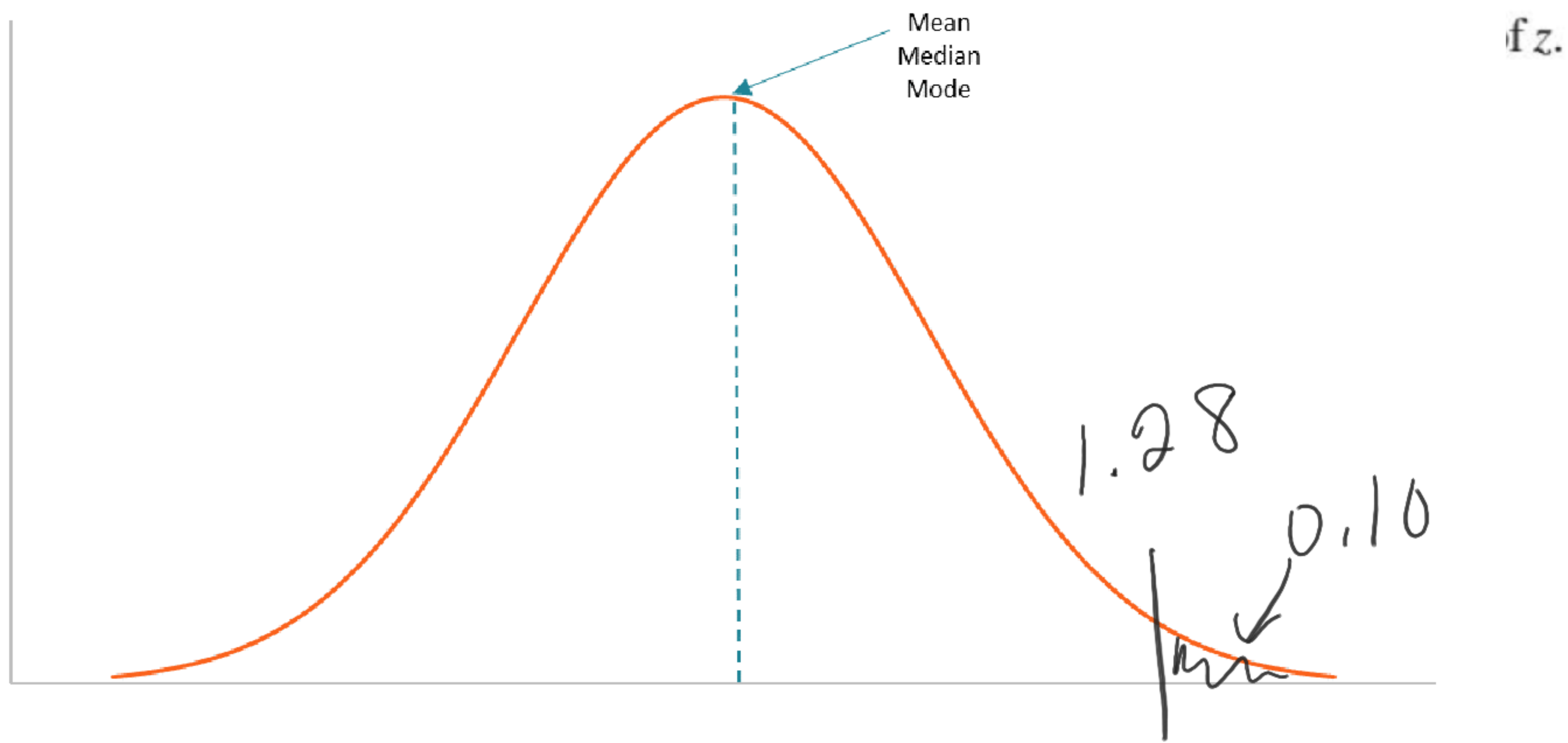
← 0.7967



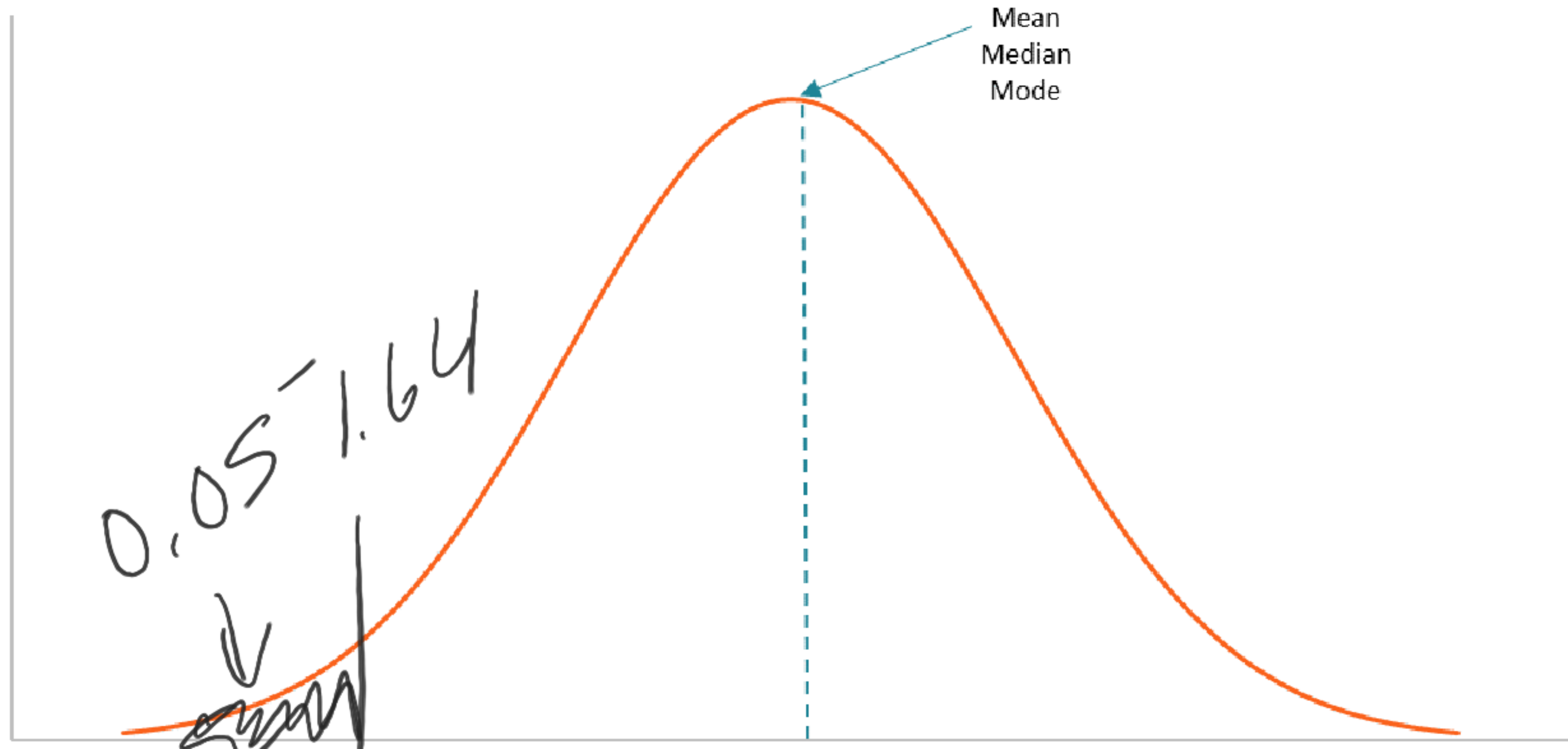
13. Find the value of z such that 0.01 of the area under the curve lies to the right of z .



14. Find the value of z such that 0.10 of the area under the curve lies to the right of z .



14. Find the value of z such that 0.10 of the area under the curve lies to the right of z .
15. Find the value of z such that 0.05 of the area under the curve lies to the left of z .



STANDARD NORMAL DISTRIBUTION: Table Values Represent AREA to the LEFT of the Z score.

Z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
-3.9	.00005	.00005	.00004	.00004	.00004	.00004	.00004	.00004	.00003	.00003
-3.8	.00007	.00007	.00007	.00006	.00006	.00006	.00006	.00005	.00005	.00005
-3.7	.00011	.00010	.00010	.00010	.00009	.00009	.00008	.00008	.00008	.00008
-3.6	.00016	.00015	.00015	.00014	.00014	.00013	.00013	.00012	.00012	.00011
-3.5	.00023	.00022	.00022	.00021	.00020	.00019	.00019	.00018	.00017	.00017
-3.4	.00034	.00032	.00031	.00030	.00029	.00028	.00027	.00026	.00025	.00024
-3.3	.00048	.00047	.00045	.00043	.00042	.00040	.00039	.00038	.00036	.00035
-3.2	.00069	.00066	.00064	.00062	.00060	.00058	.00056	.00054	.00052	.00050
-3.1	.00097	.00094	.00090	.00087	.00084	.00082	.00079	.00076	.00074	.00071
-3.0	.00135	.00131	.00126	.00122	.00118	.00114	.00111	.00107	.00104	.00100
-2.9	.00187	.00181	.00175	.00169	.00164	.00159	.00154	.00149	.00144	.00139
-2.8	.00256	.00248	.00240	.00233	.00226	.00219	.00212	.00205	.00199	.00193
-2.7	.00347	.00336	.00326	.00317	.00307	.00298	.00289	.00280	.00272	.00264
-2.6	.00466	.00453	.00440	.00427	.00415	.00402	.00391	.00379	.00368	.00357
-2.5	.00621	.00604	.00587	.00570	.00554	.00539	.00523	.00508	.00494	.00480
-2.4	.00820	.00798	.00776	.00755	.00734	.00714	.00695	.00676	.00657	.00639
-2.3	.01072	.01044	.01017	.00990	.00964	.00939	.00914	.00889	.00866	.00842
-2.2	.01390	.01355	.01321	.01287	.01255	.01222	.01191	.01160	.01130	.01101
-2.1	.01786	.01743	.01700	.01659	.01618	.01578	.01539	.01500	.01463	.01426
-2.0	.02275	.02232	.02169	.02118	.02068	.02018	.01970	.01923	.01876	.01831