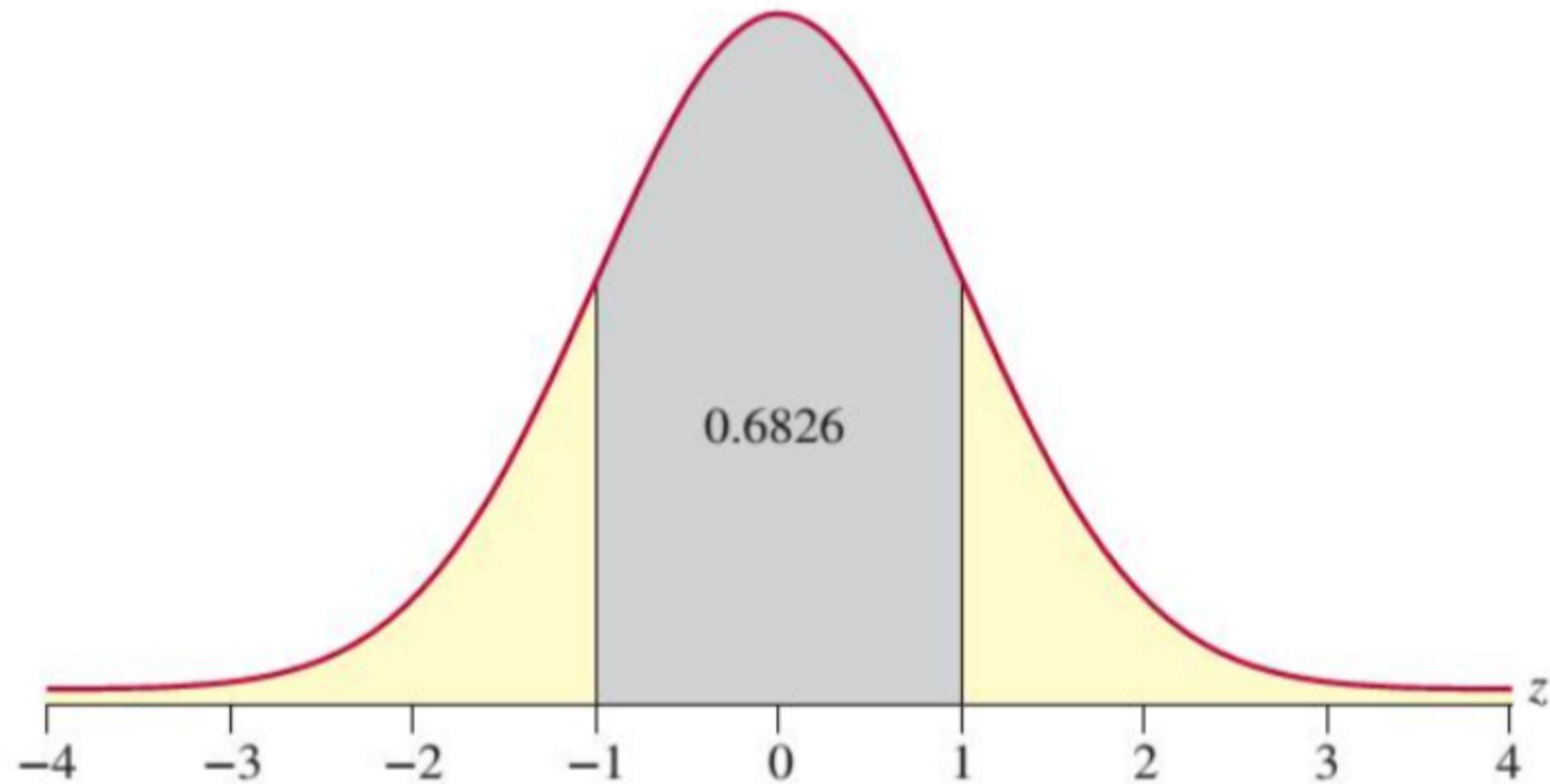
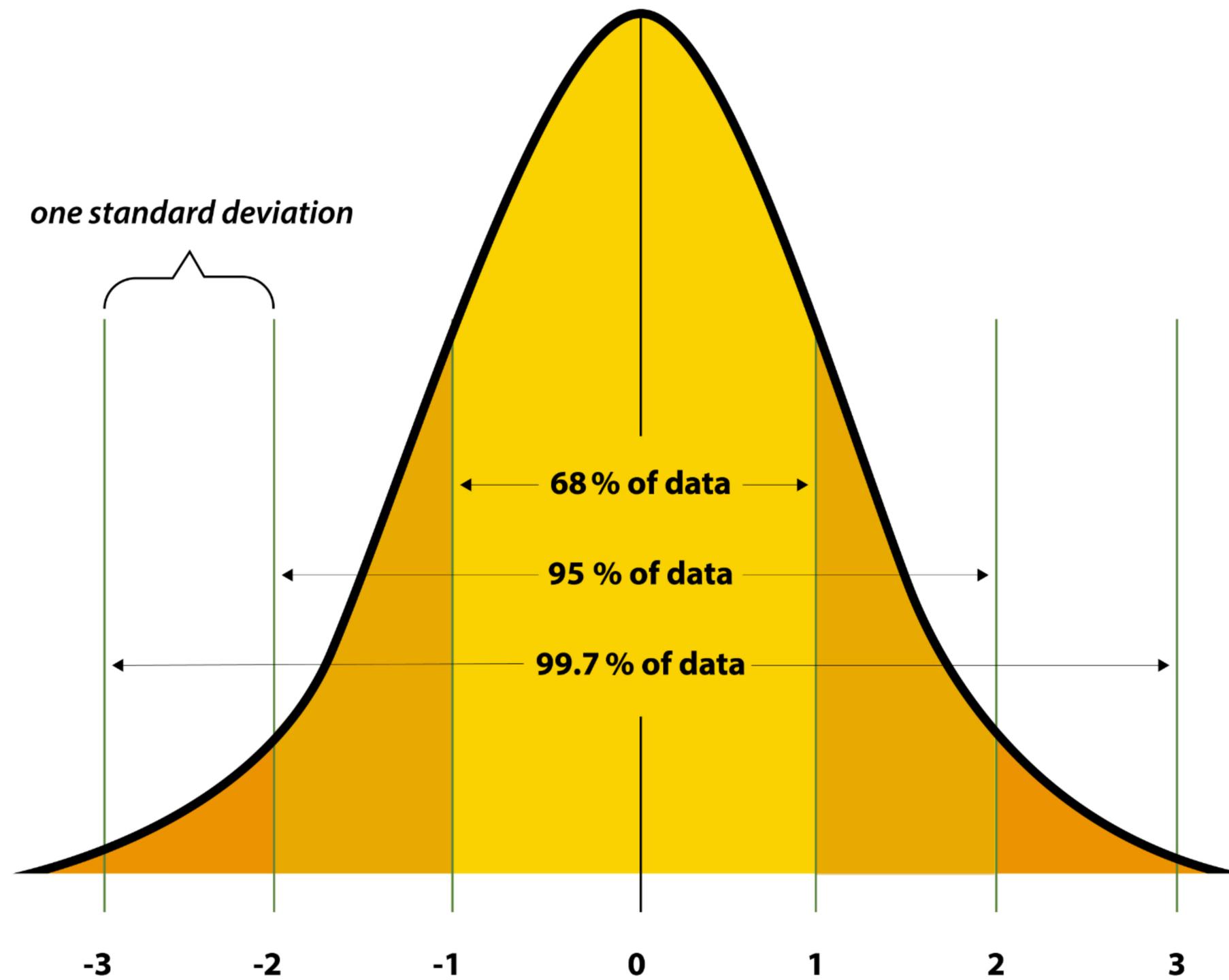
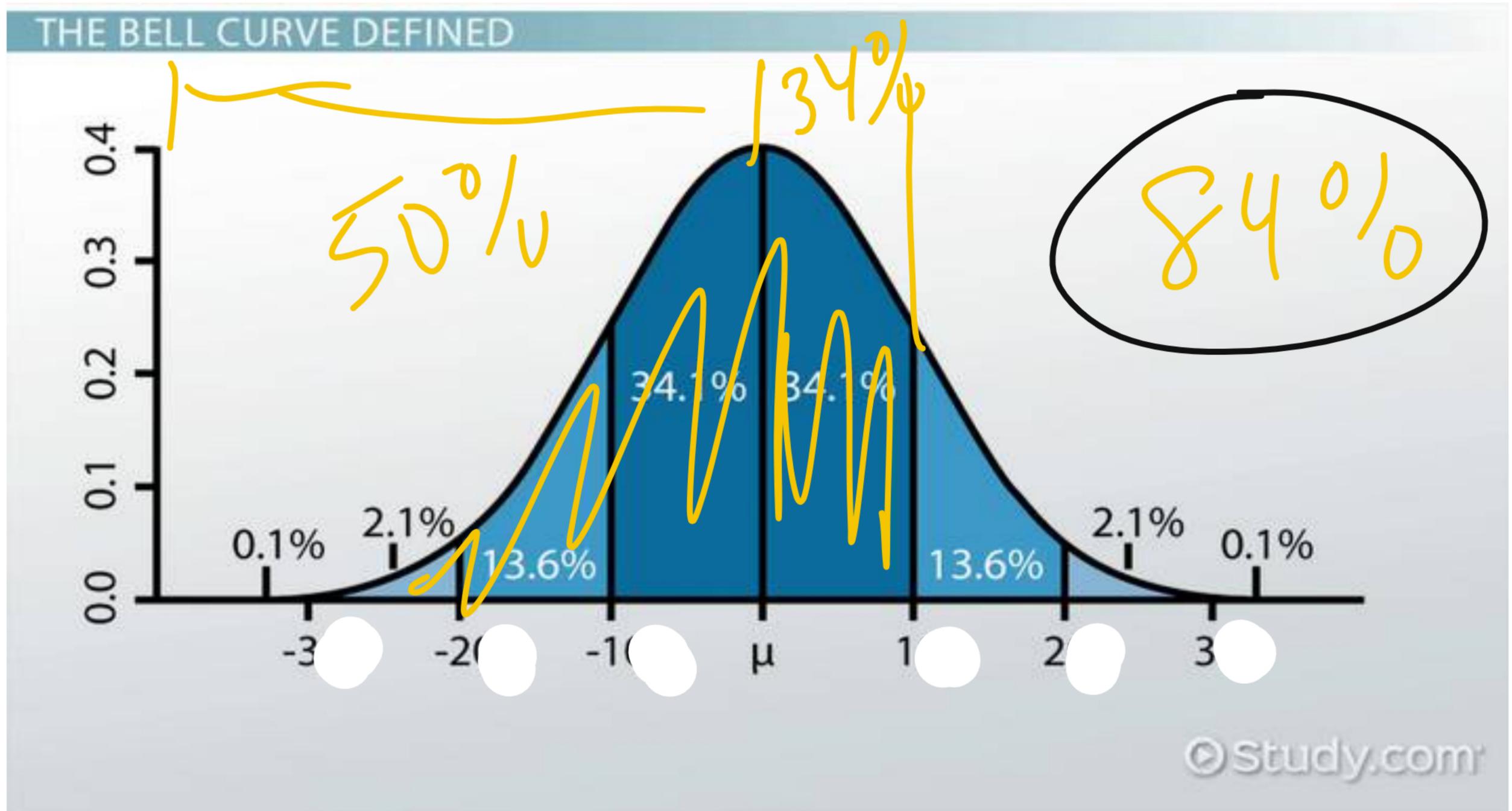


8.2 The Normal Distribution







Z-score

$$z = \frac{x - \mu}{\sigma}$$

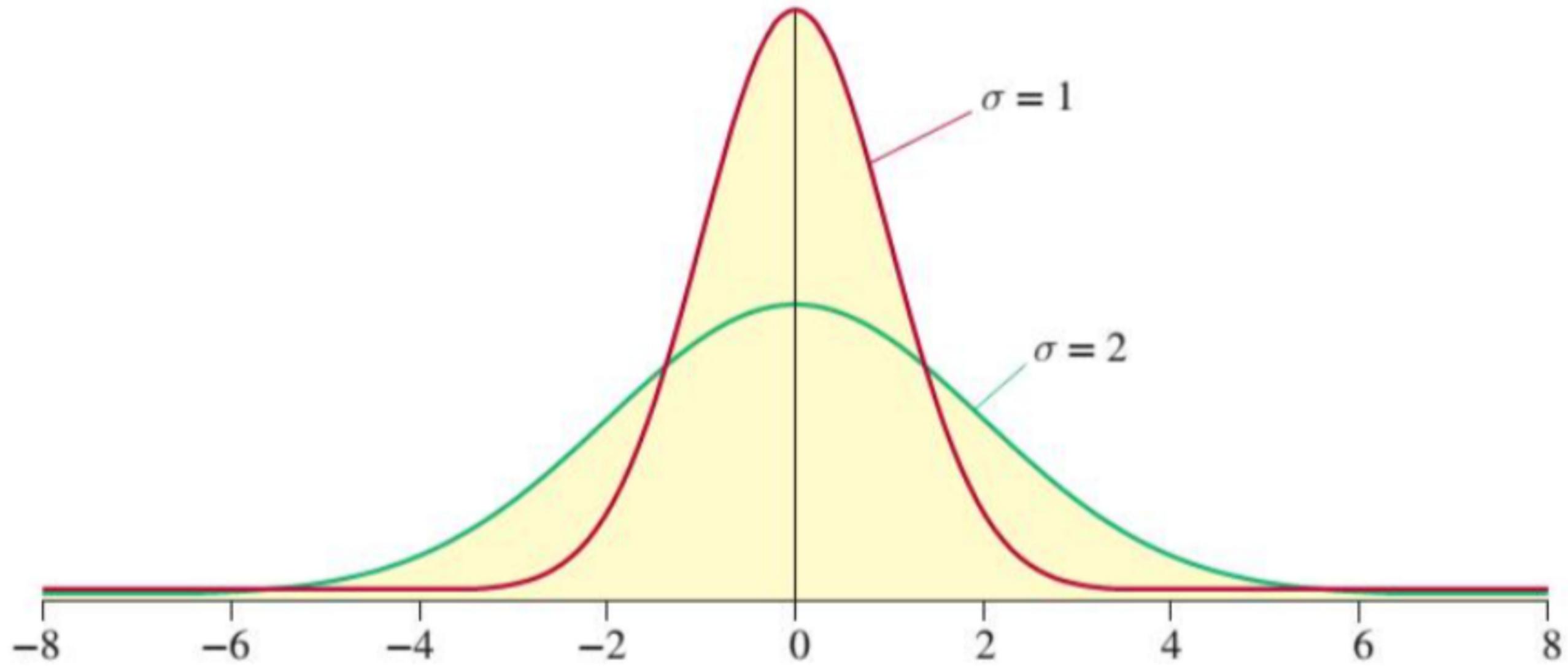
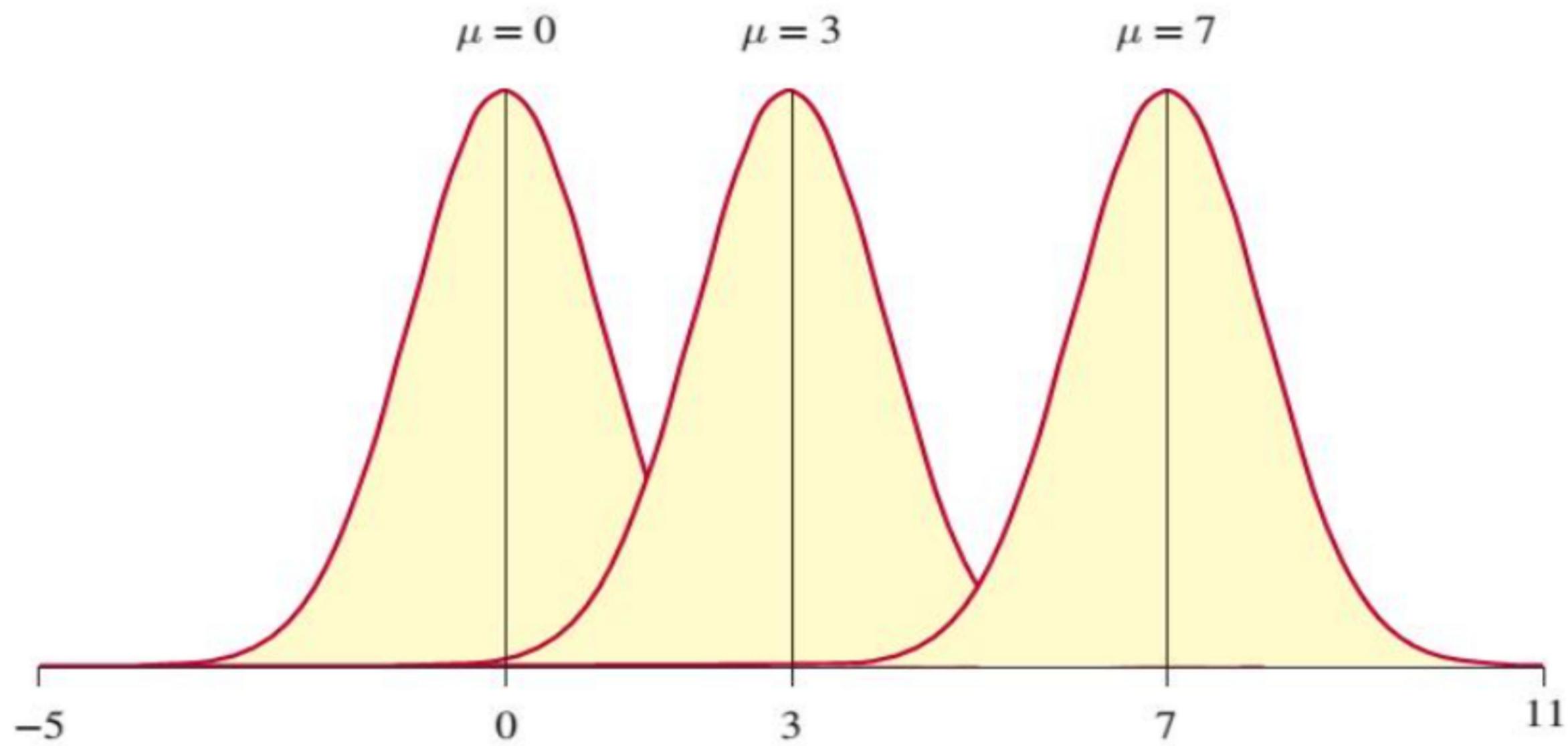
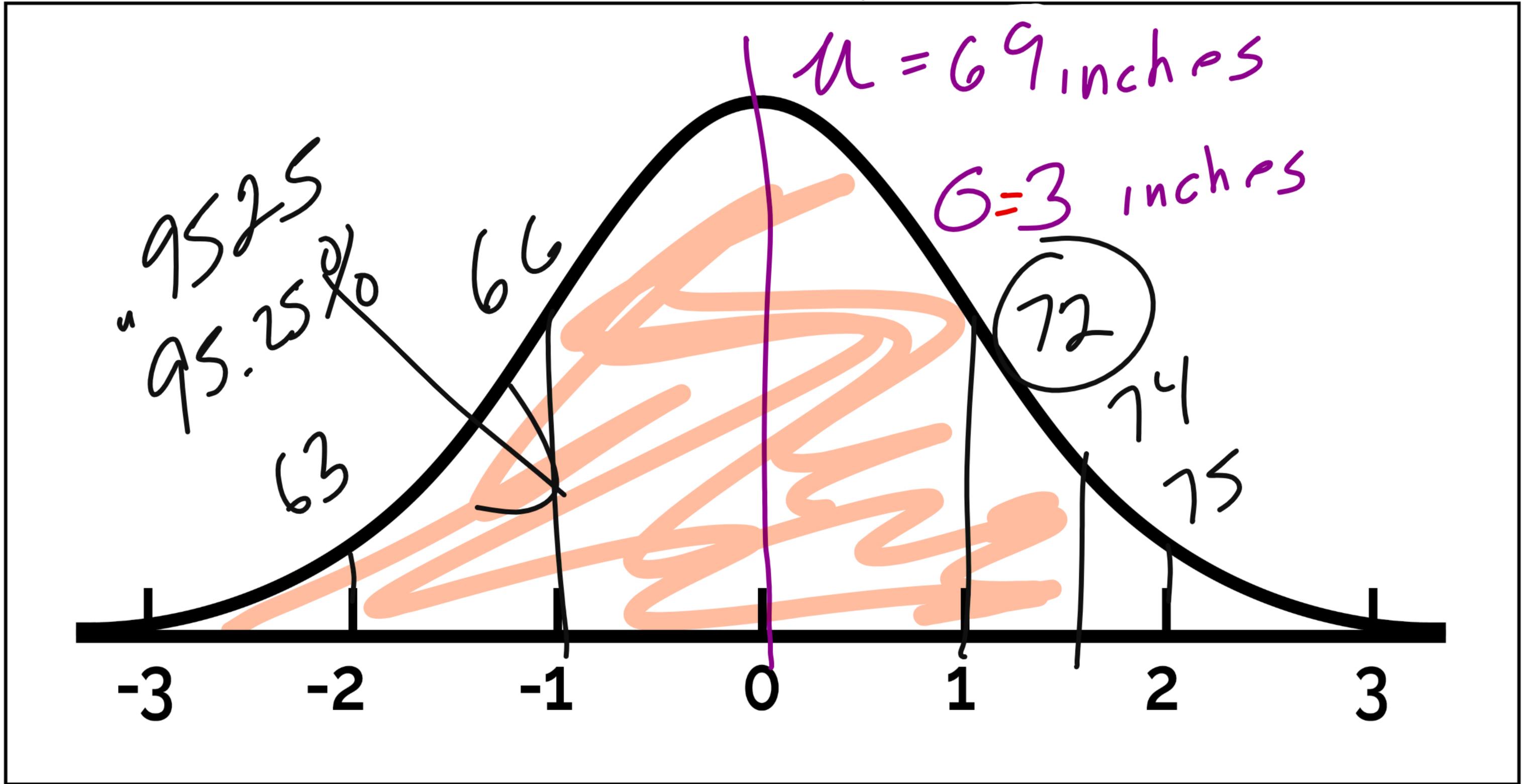


Figure 8.2.5





$$z\text{-score} = \frac{x - \mu}{\sigma}$$

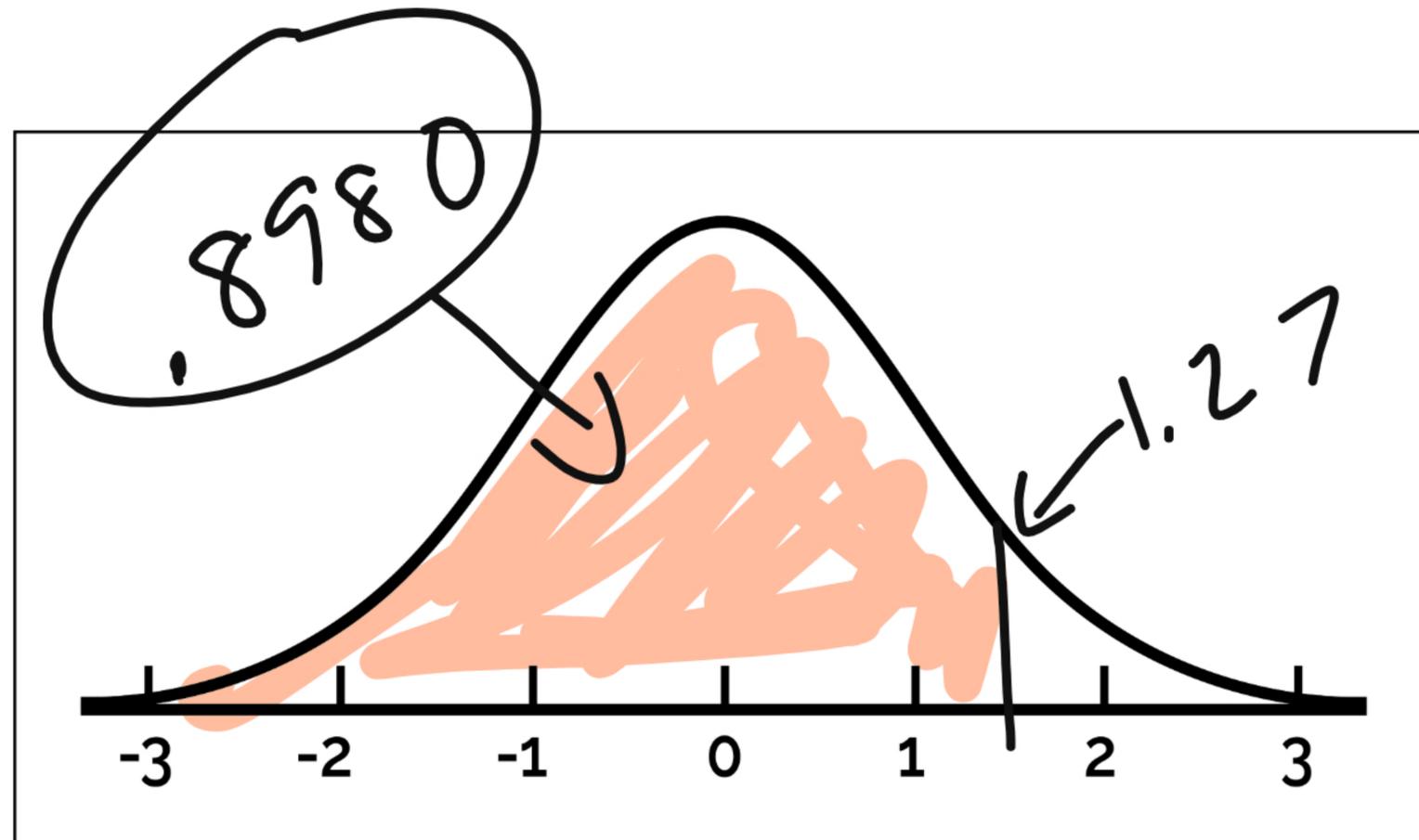
$$x = 74 \text{ inches}$$

$$\mu = 69 \text{ inches}$$

$$\sigma = 3 \text{ inches}$$

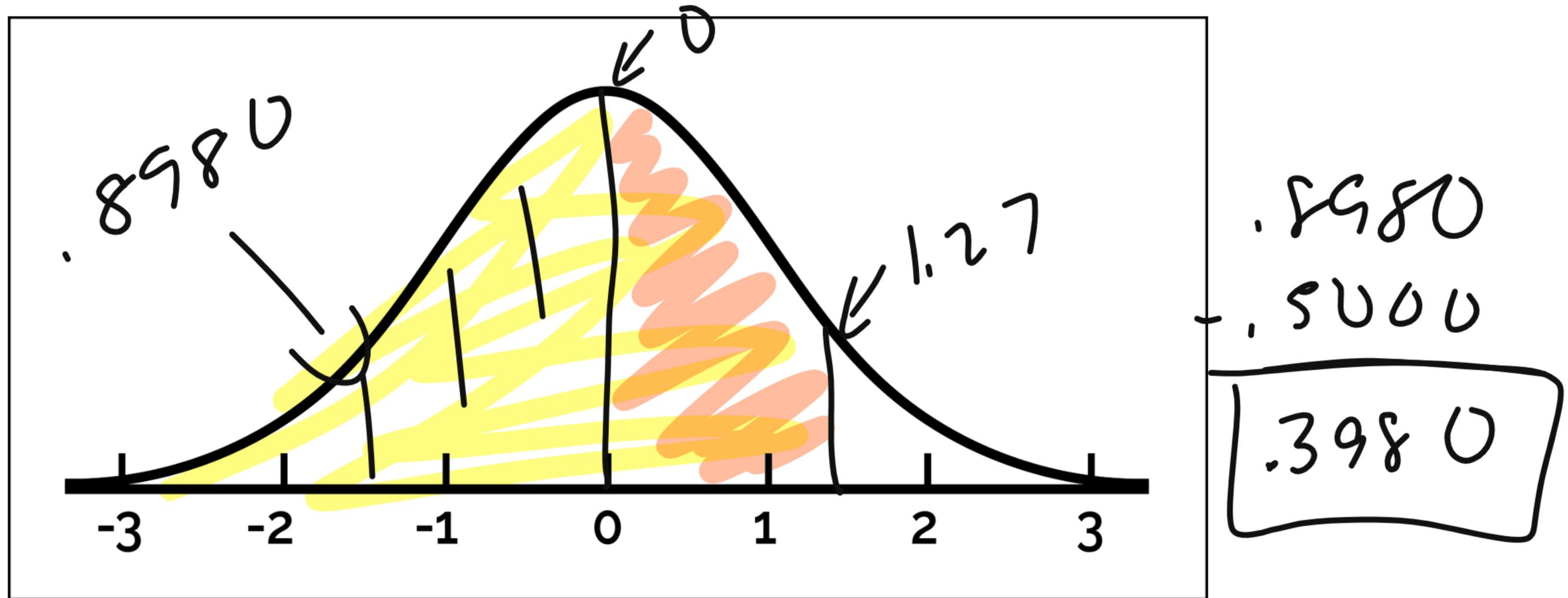
$$z = \frac{74 - 69}{3} = \frac{5}{3} = 1.67$$

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

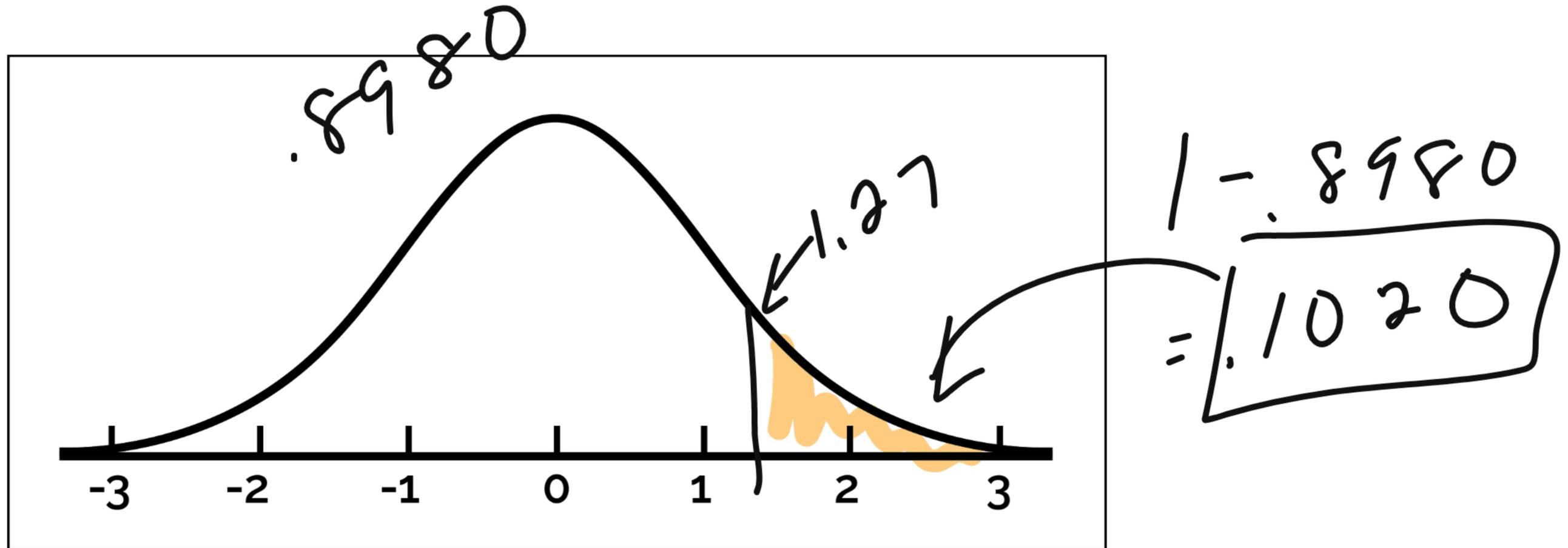


z-score

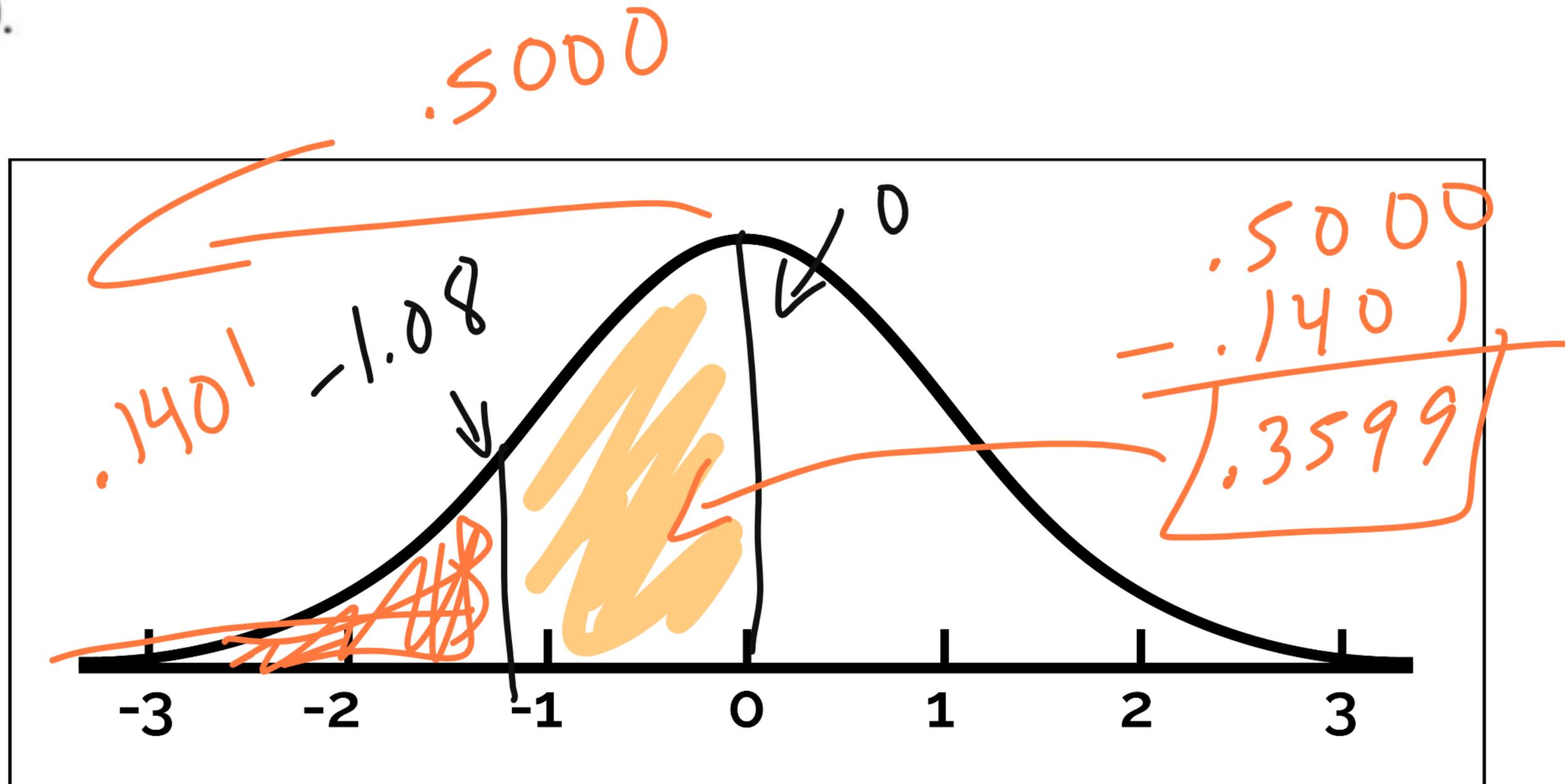
Compute the probability that a standard normal random variable is between 0 and 1.27.



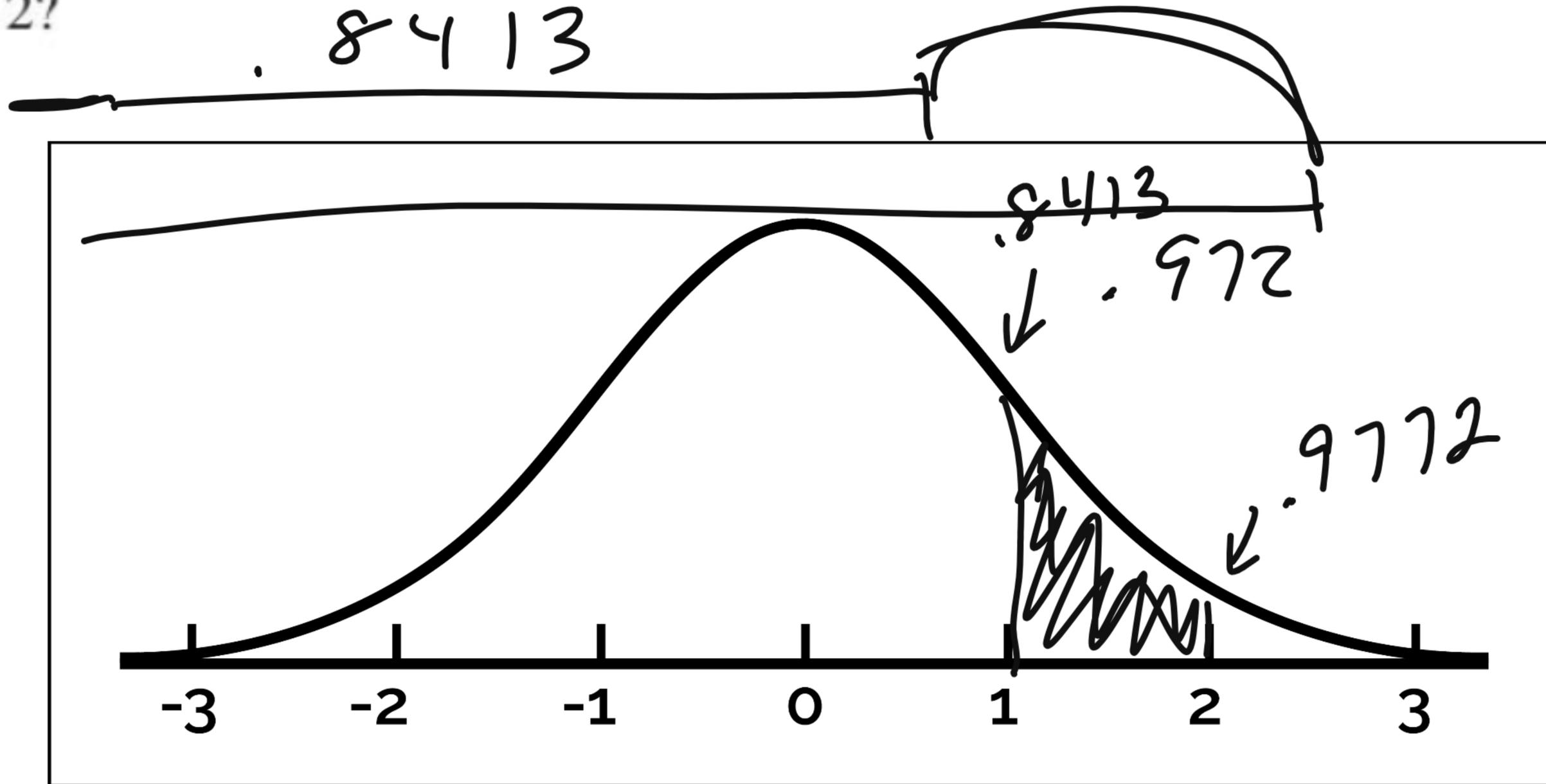
Determine the probability that a standard normal random variable is greater than 1.27.



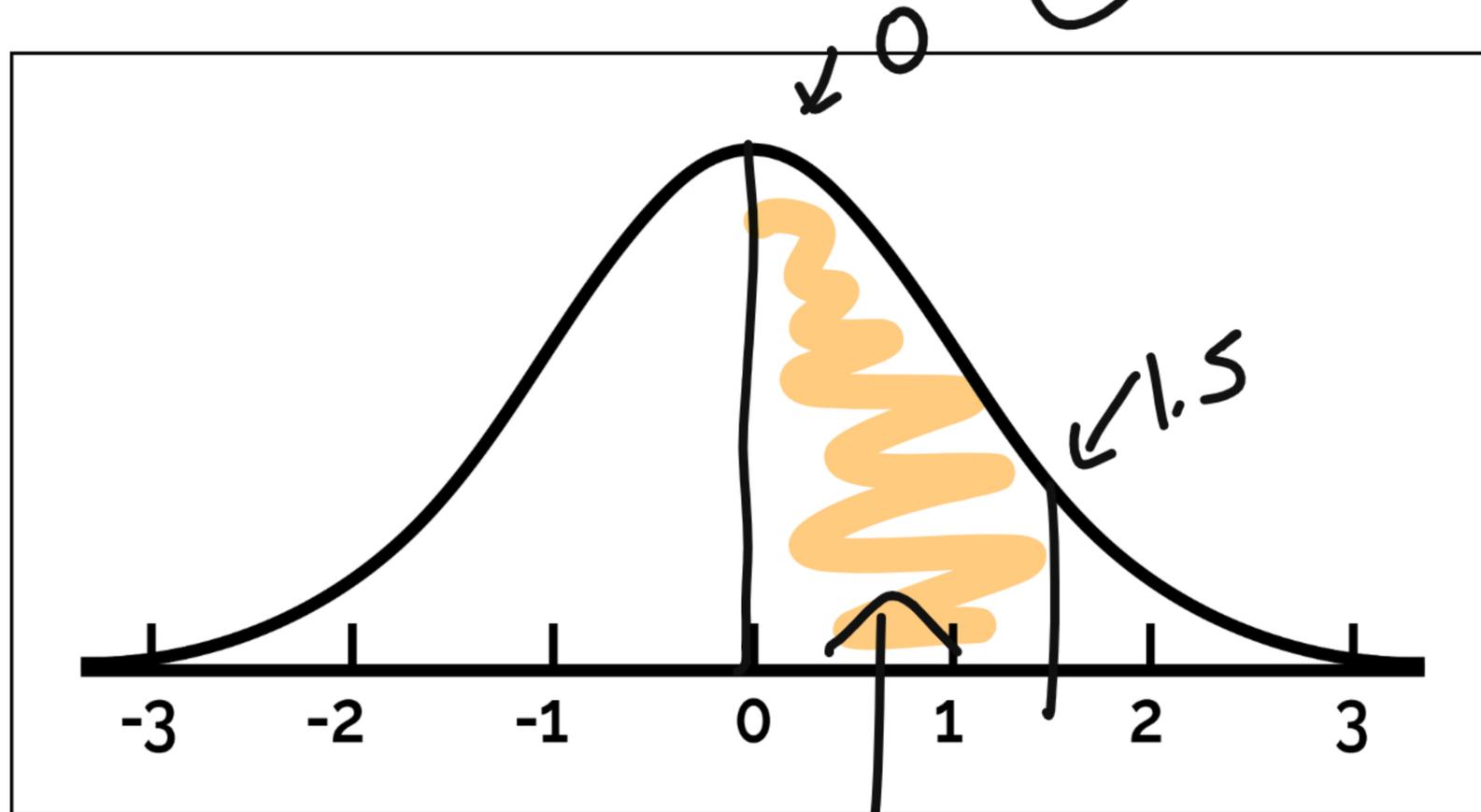
Determine the probability that a standard normal random variable is between -1.08 and 0 .



What is the probability that a standard normal random variable will be between 1 and 2?



Find the probability that a normal random variable with a mean of 10 and a standard deviation of 20 will lie between 10 and 40.



.4332

$$\mu = 10$$

$$\sigma = 20$$

$$X = 10$$

$$X = 40$$

$$z = \frac{10 - 10}{20}$$

$$z = \frac{40 - 10}{20} = \frac{30}{20}$$

$$z = 0$$

$$z = 1.5$$

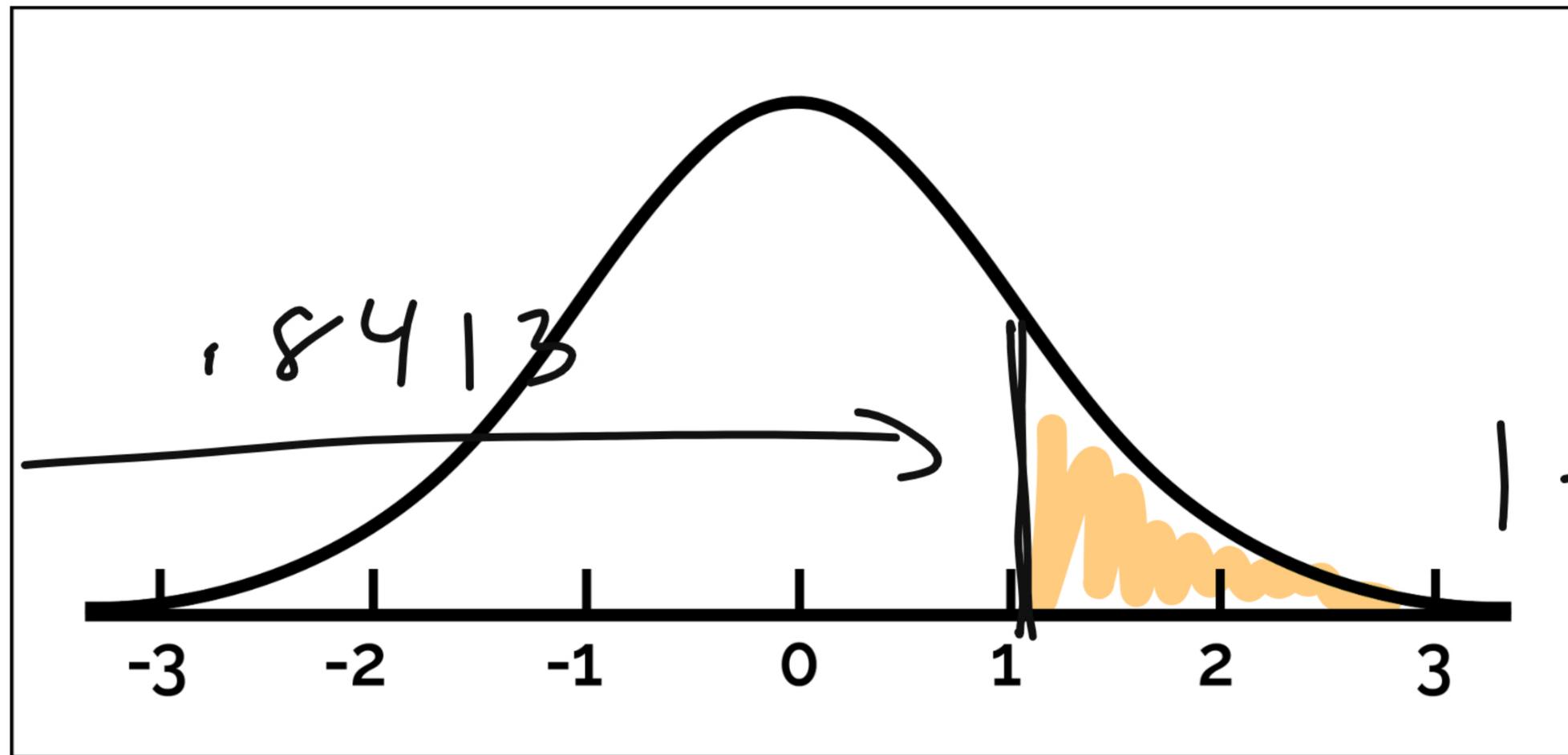
$$.5000$$

$$.9332$$

$$- .5000$$

.4332

Find the probability that a normal random variable with a mean of 10 and standard deviation of 20 will be greater than 30.

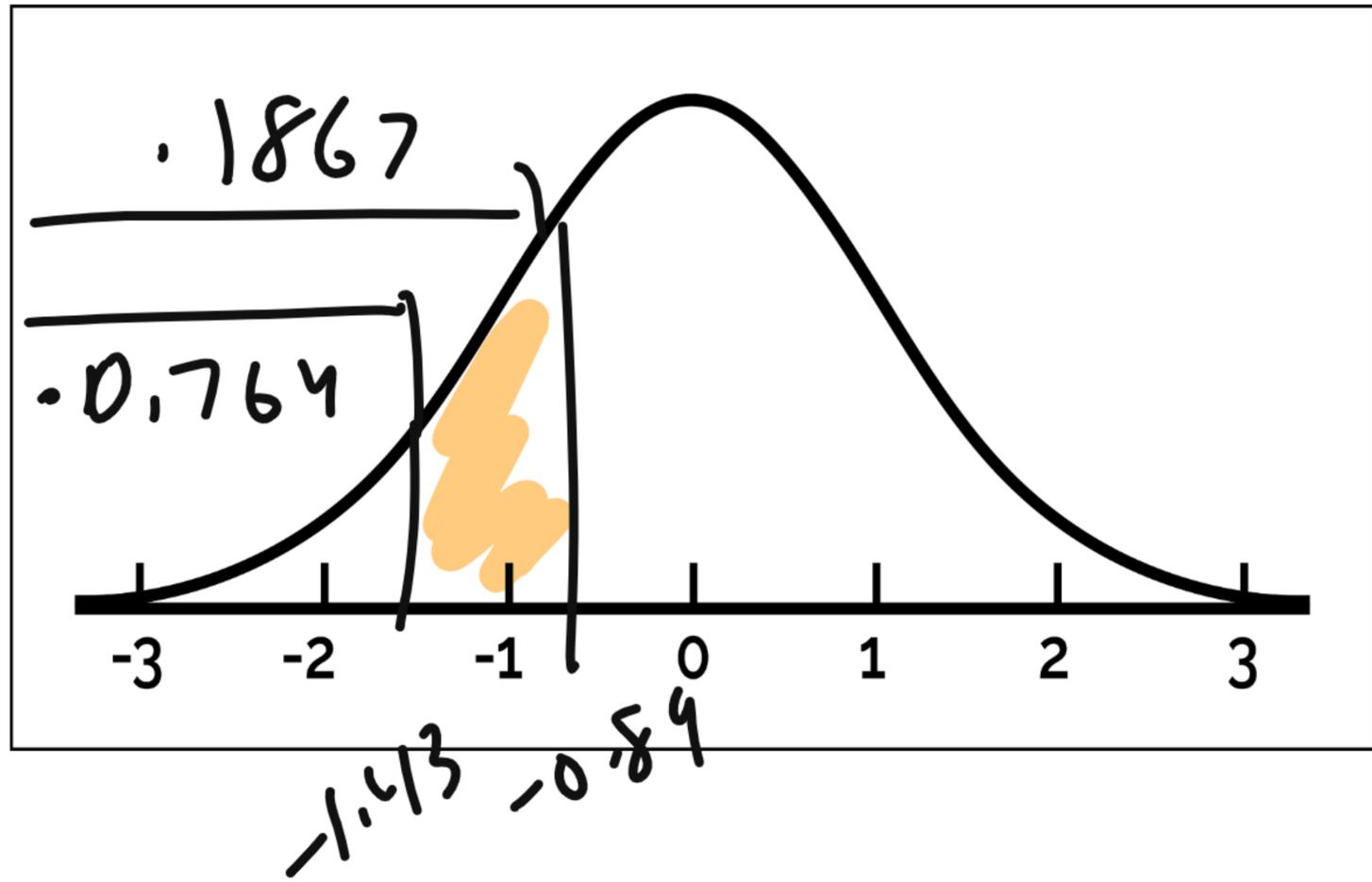


$$z = \frac{X - \mu}{\sigma}$$

$$z = \frac{30 - 10}{20} = 1$$

$$.8413 = .1587$$

Suppose that for 152 shoppers making a purchase at a clothing store, the total each shopper will spend follows a normal distribution with a mean of \$234 and a standard deviation of \$94. What is the probability that the next purchase total will be between \$100 and \$150?



$$\begin{aligned} \mu &= 234 & \sigma &= 94 \\ X &= 100 & X &= 150 \\ z &= \frac{100 - 234}{94} & z &= \frac{150 - 234}{94} \\ z &= -1.43 & z &= -0.89 \\ &0.0764 & &0.1867 \\ && & \boxed{0.1103} \end{aligned}$$

