Statistic for Educational Research
MPU1034
Topic 6 : Introduction to Probability

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Probability In Inferential Statistics

• Probability deals with calculating the likelihood of a given event's occurrence

• Probability predicts the kind of samples of a population.

• In inferential statistics, probability is used to explain about sample which can be generalize to explain about population.
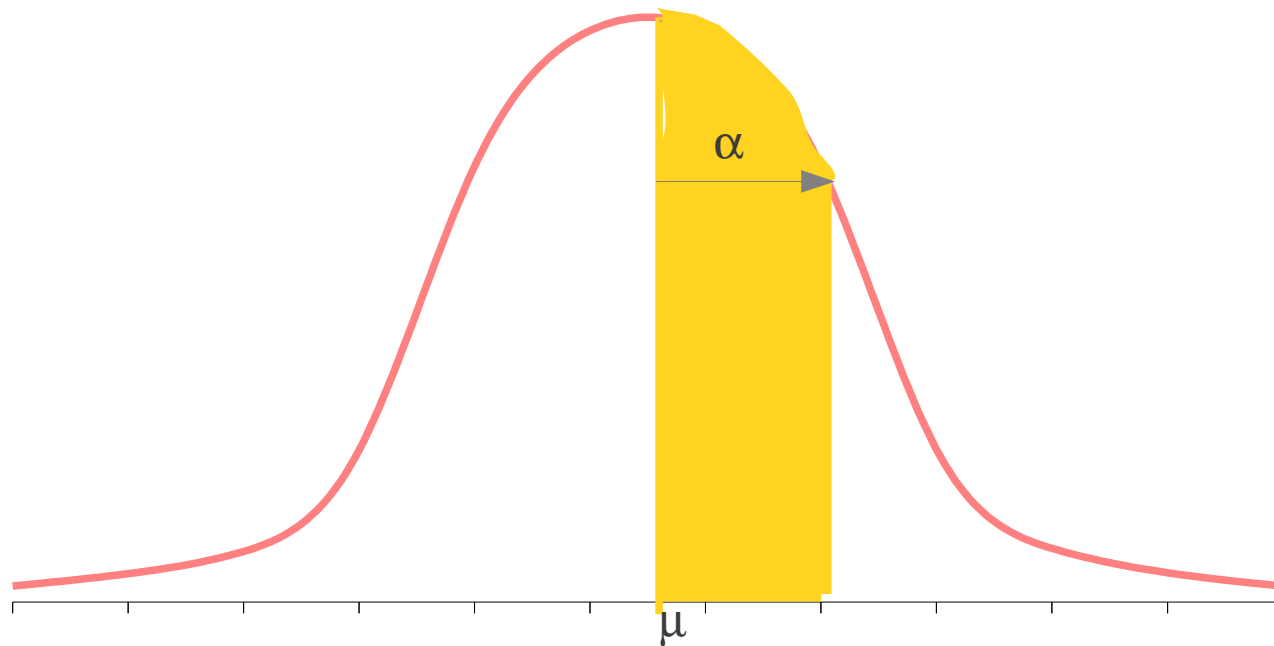
Probability and Frequency Distribution

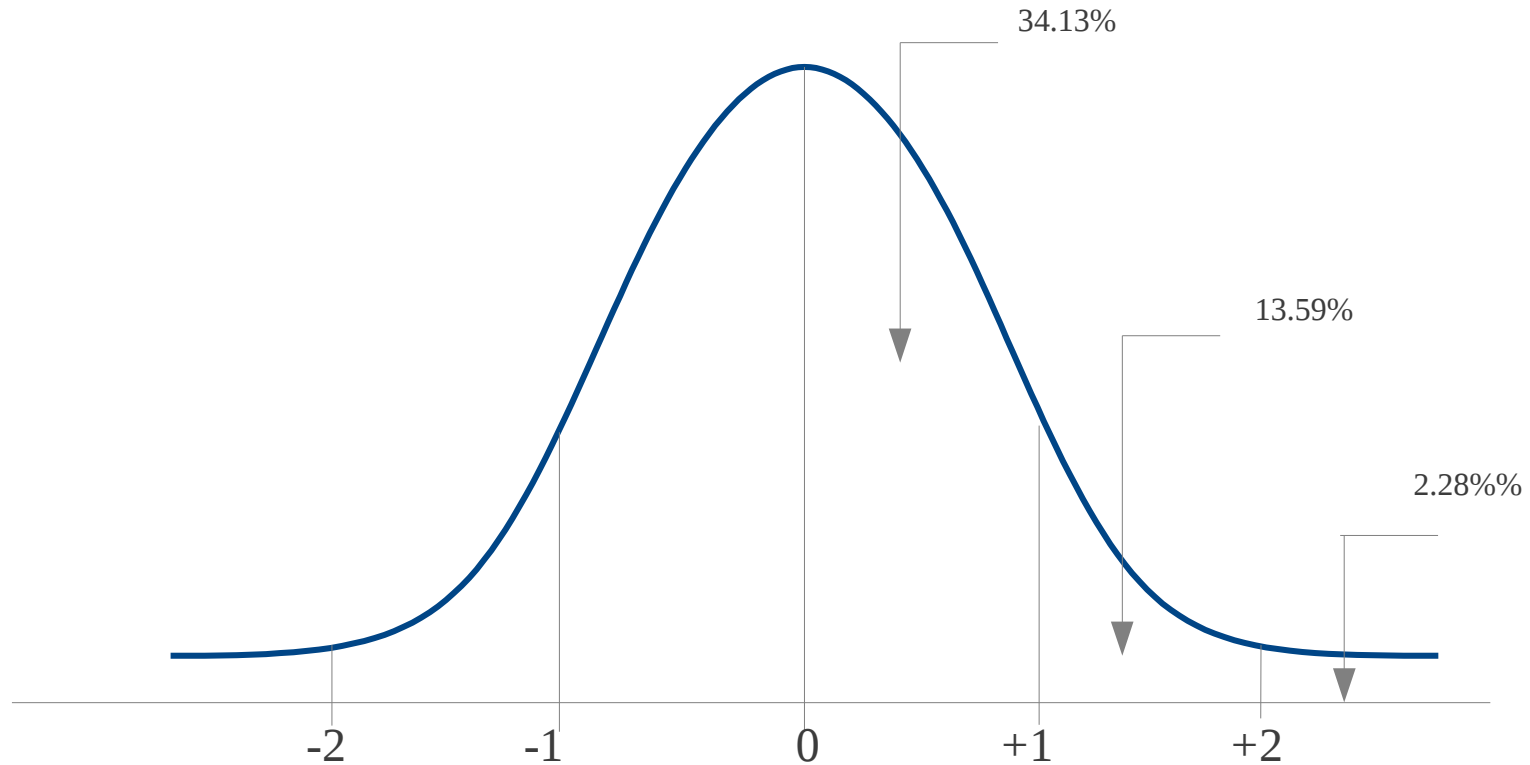| Score	Frequency
1	2
2	1
3	2
4	3
5	1
6	1

What is the probability to get a score greater than 5?
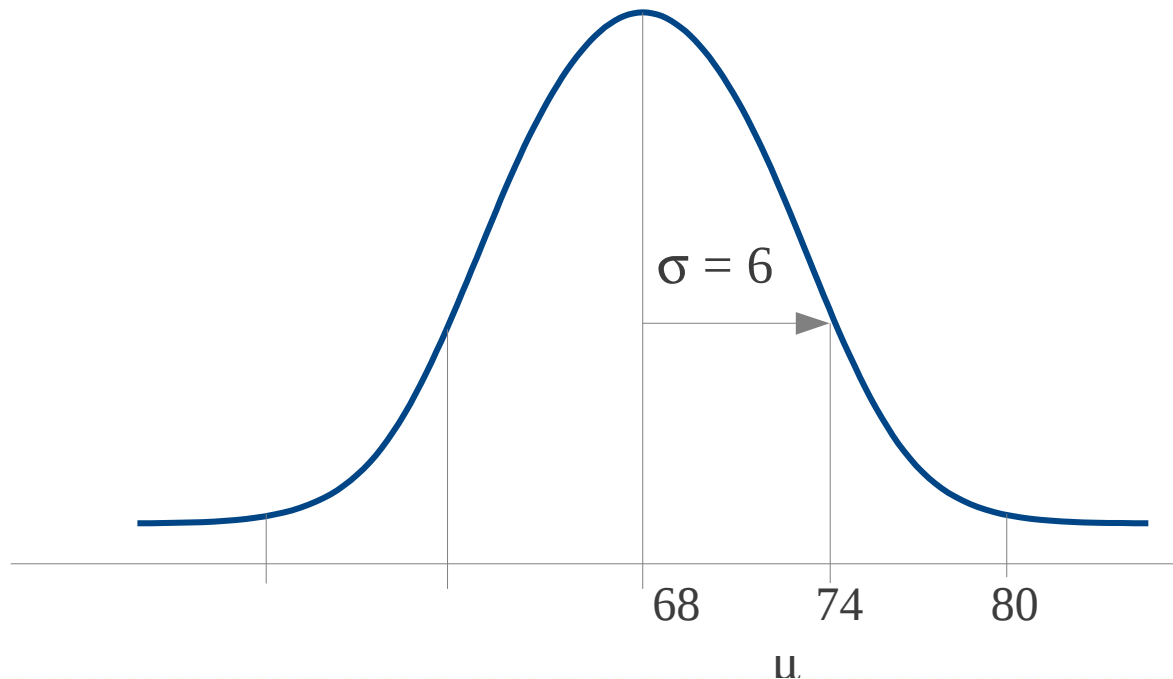
Probability and The Normal Distribution

The equation for normal distribution curve is :
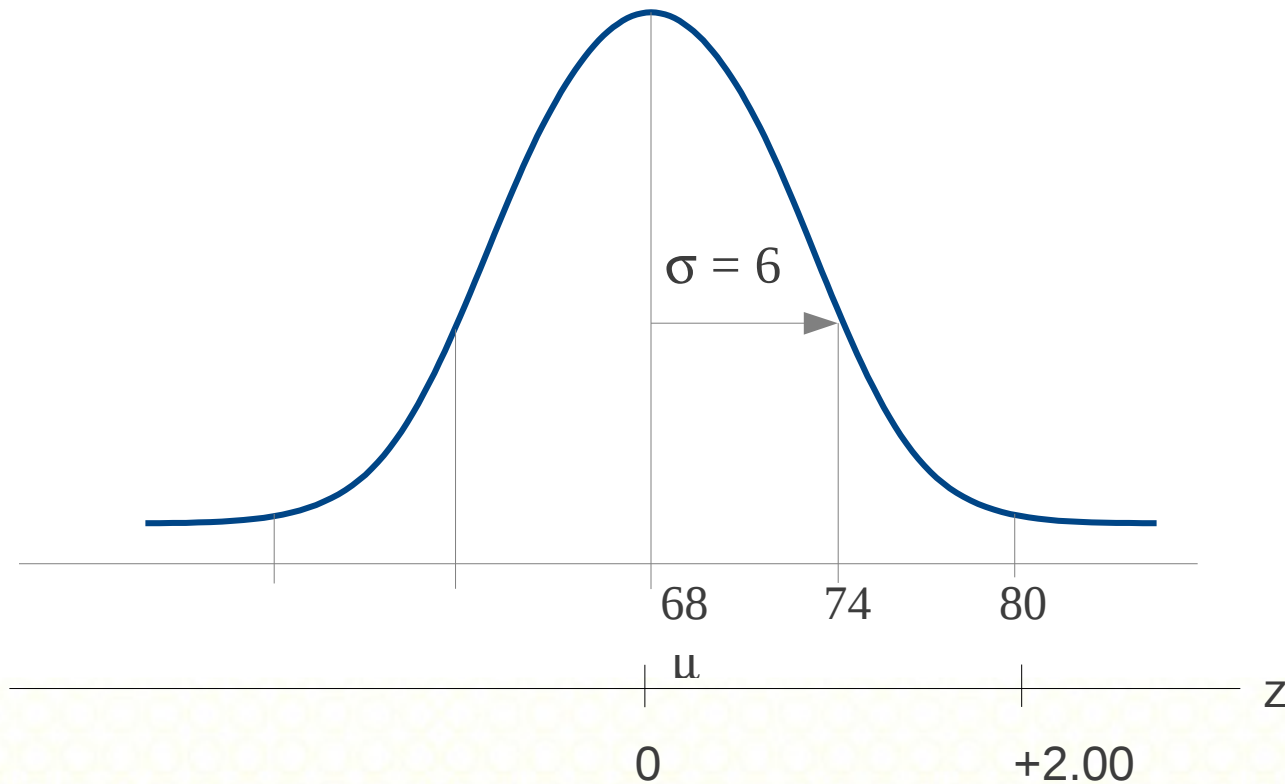
$$Y = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-(X-\mu)^2/2\sigma^2}$$
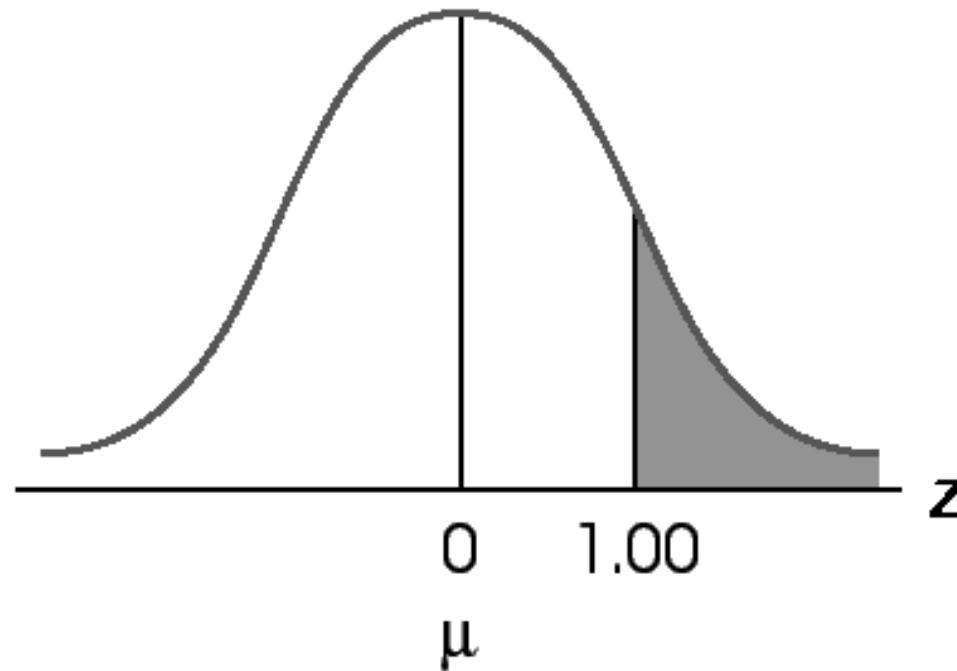
Percentage of score in selected interval

The population distribution of a mathematics exam is normal. The mean m=68 and standard deviation of selecting pupil who has a score greater than 80?

$\sigma = 6$

68   74   80

μ

What is the z-score when x = 80? Use table to fine the correspond p for the z value that has been   obtained.
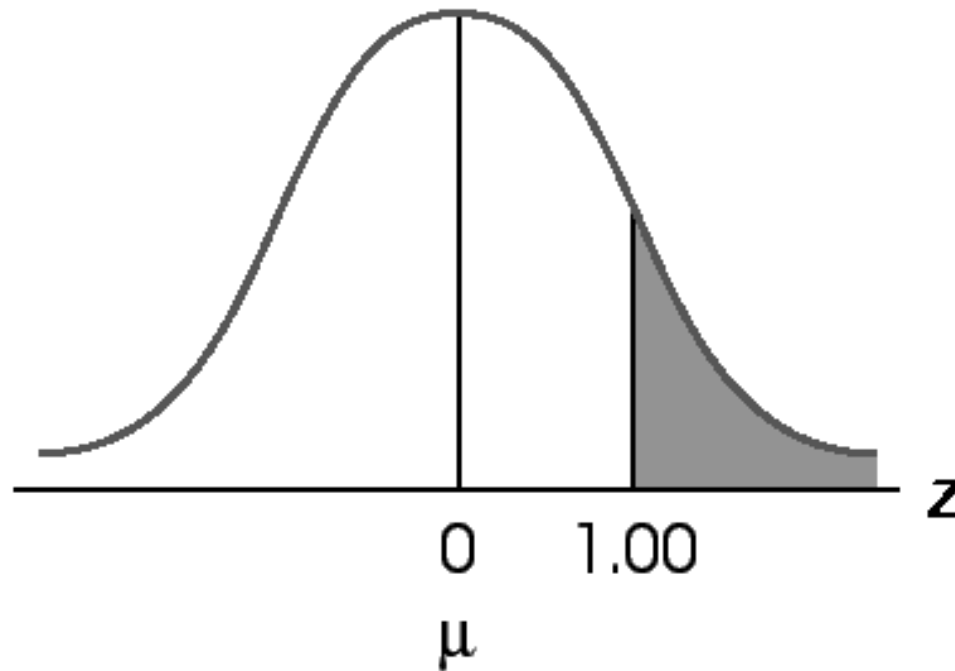

σ = 6

68   74   80
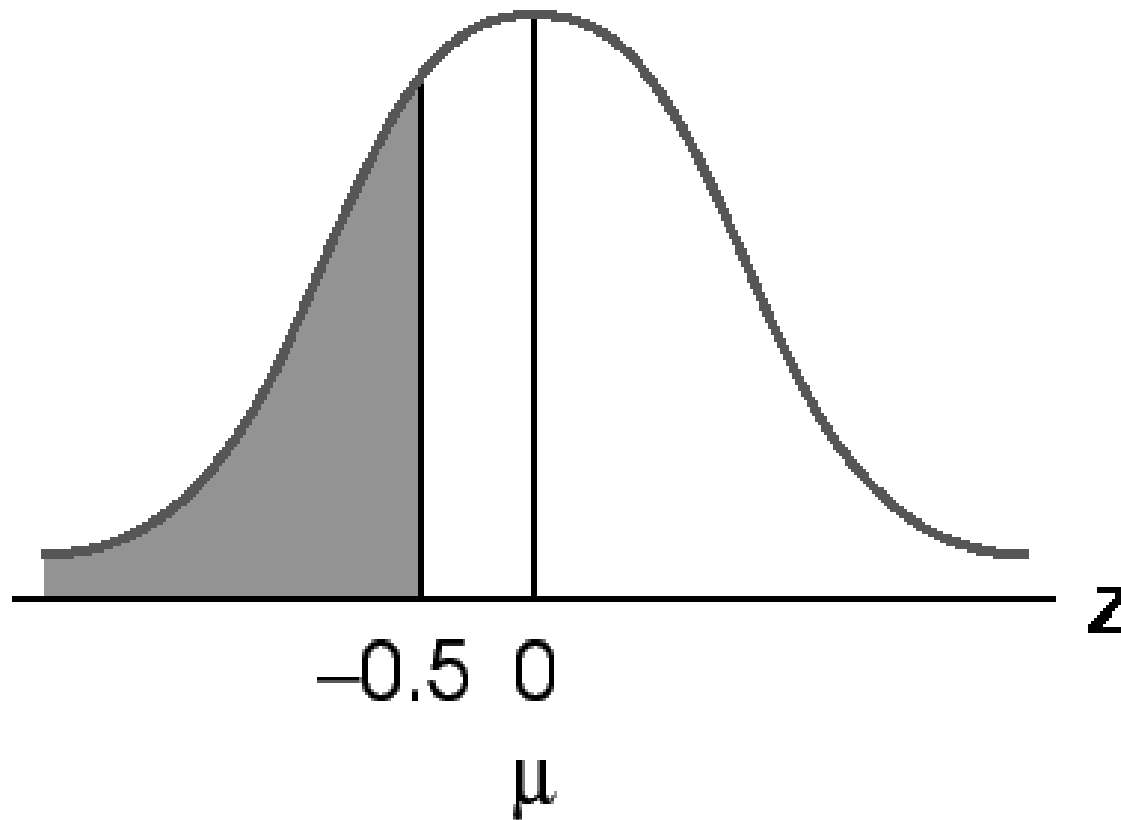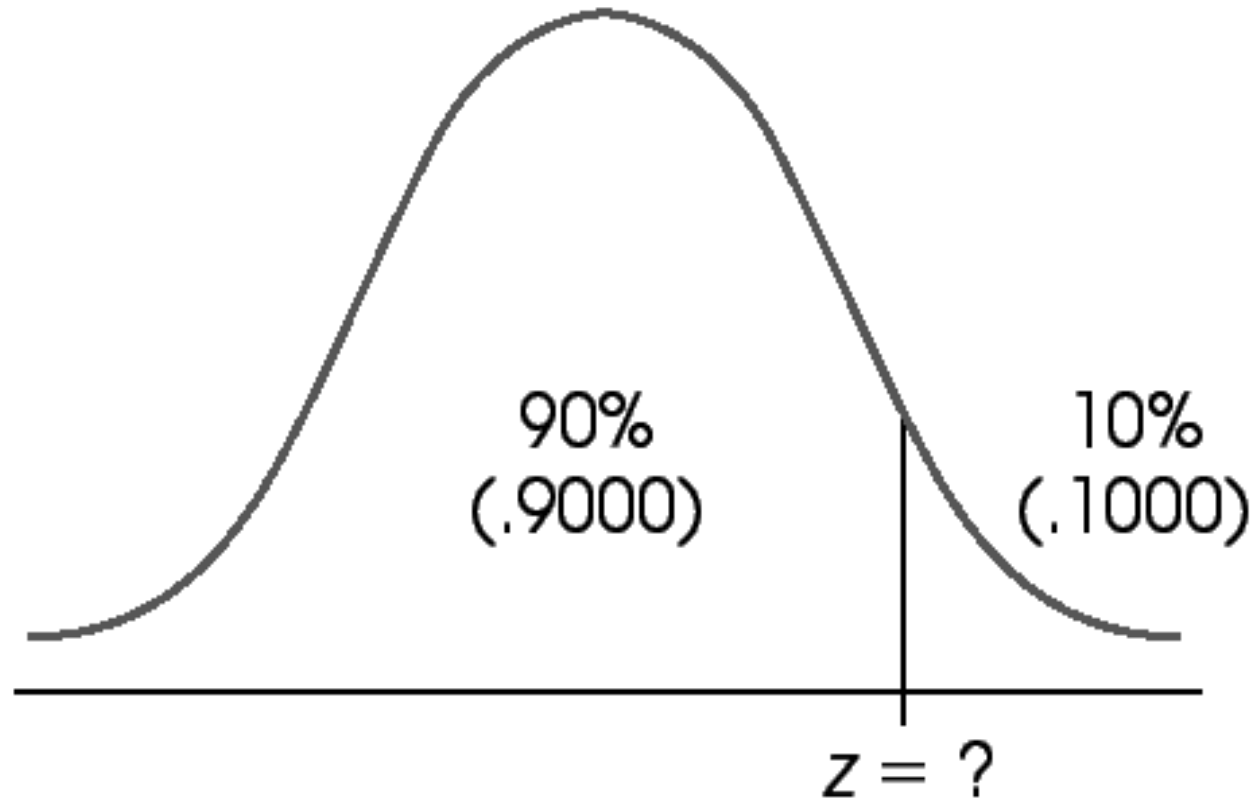
μ

0   +2.00

z

What is the probability z ≥1 ?

What is the probability z ≥1.5 ?

What is the probability z ≤−0.5 ?

What z score separate the top 10% from the rest?

90%
(.9000)

10%
(.1000)

$z = ?$

What z score contains the middle 60%?

60%
(.6000)
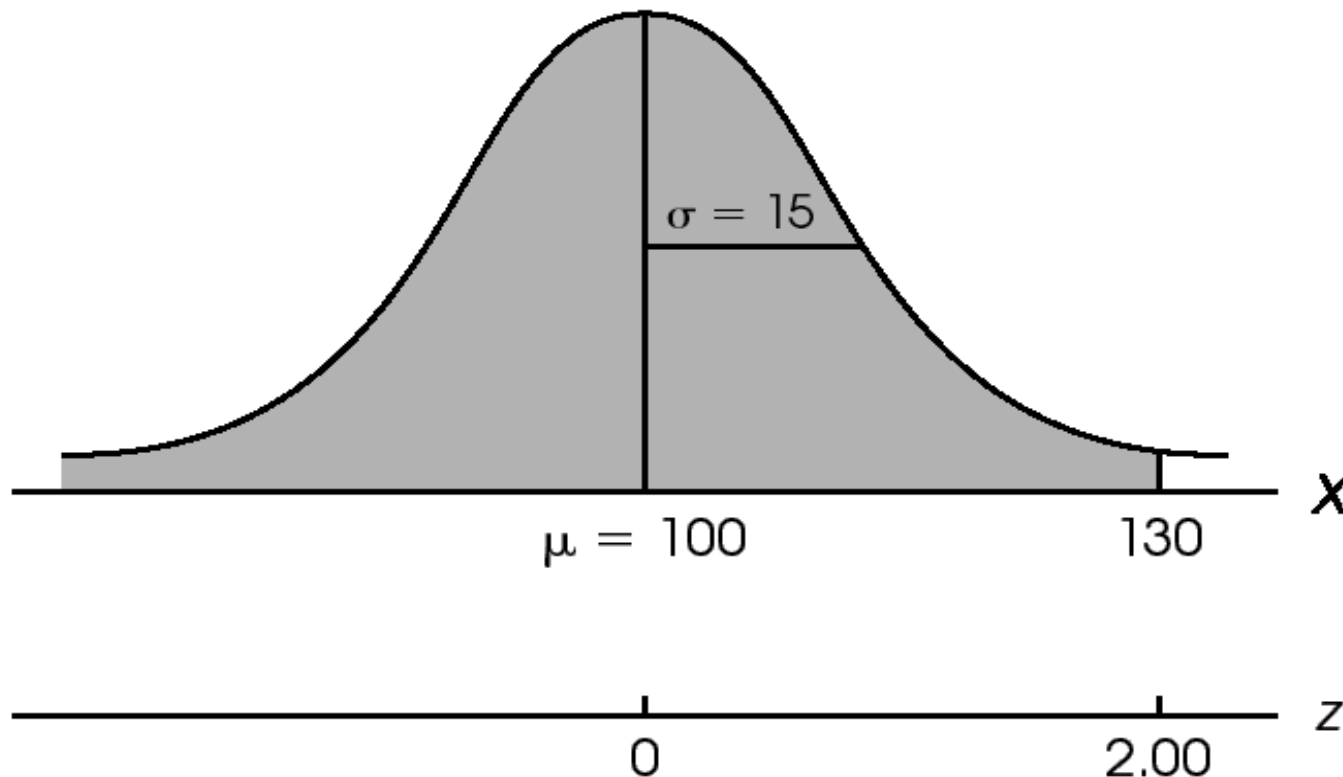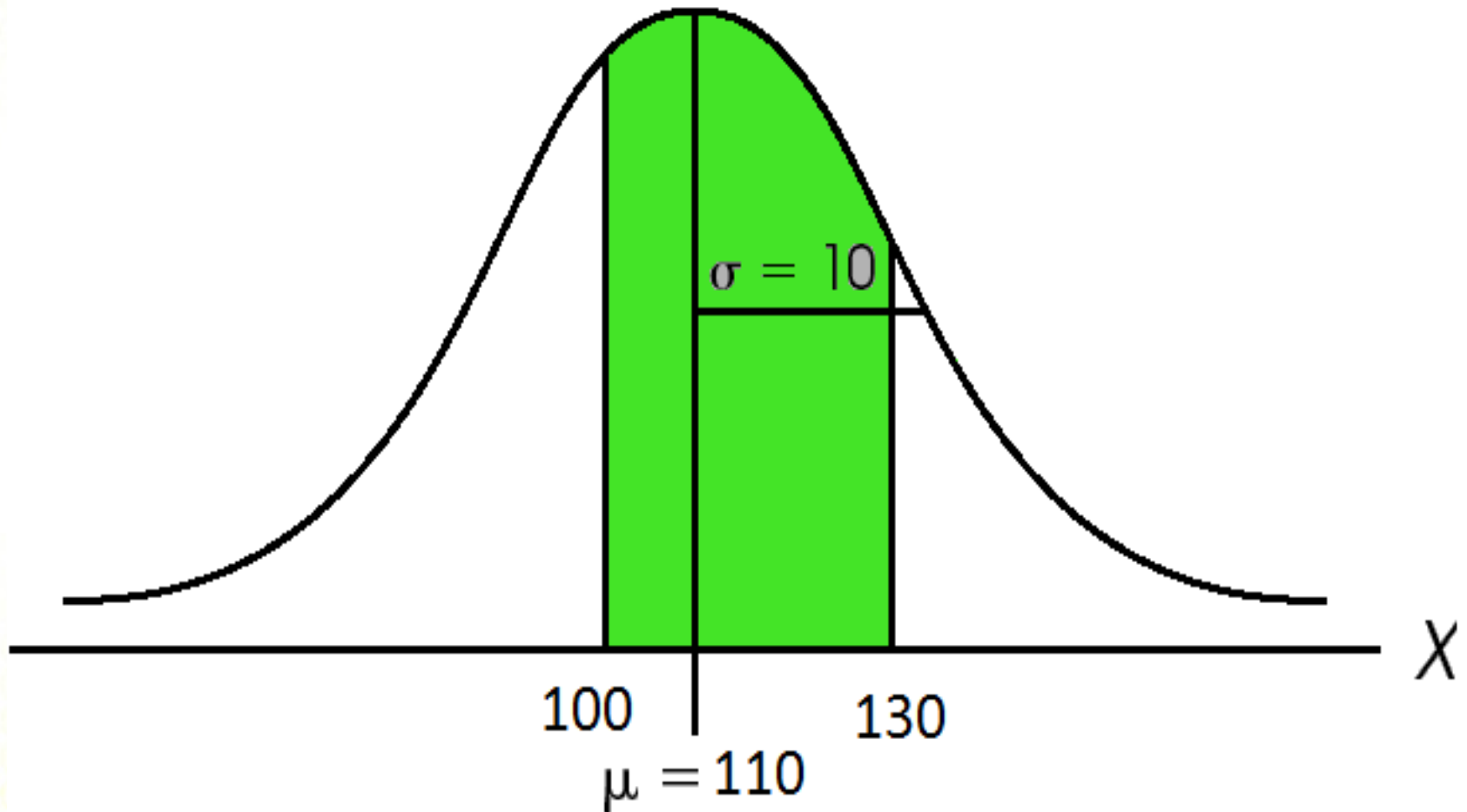
z = ?   z = ?
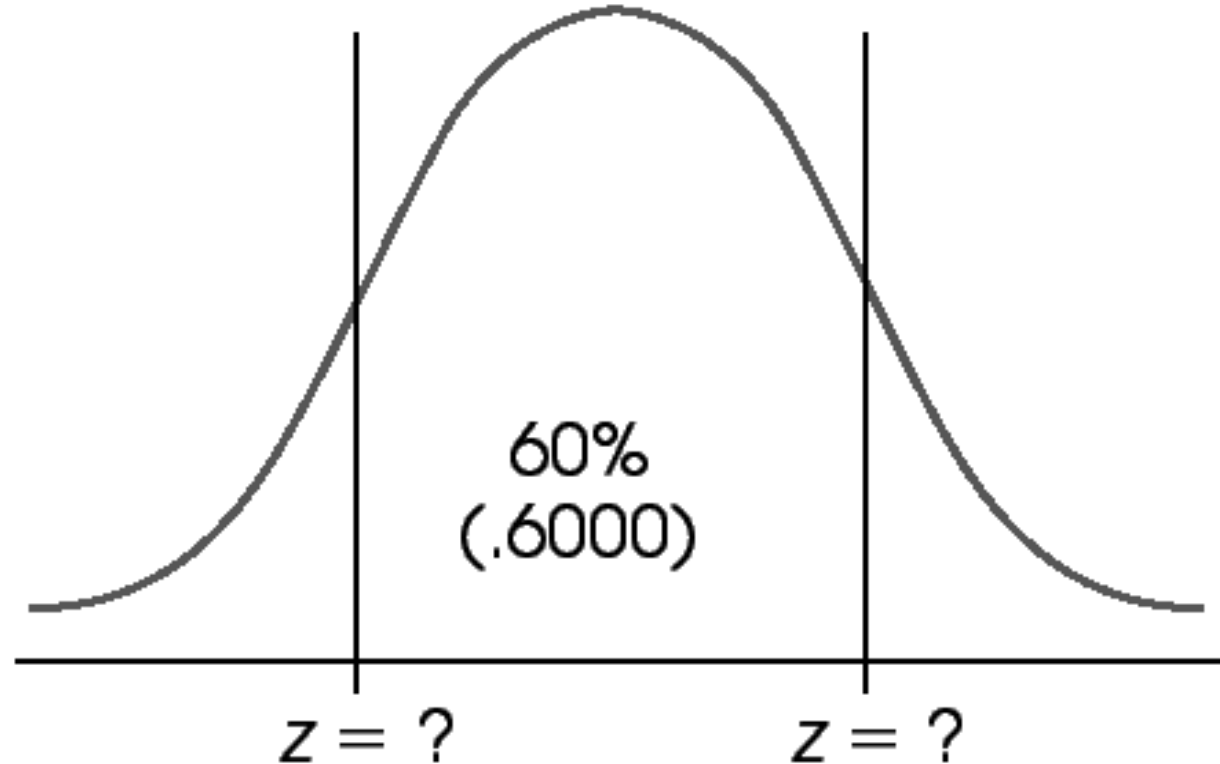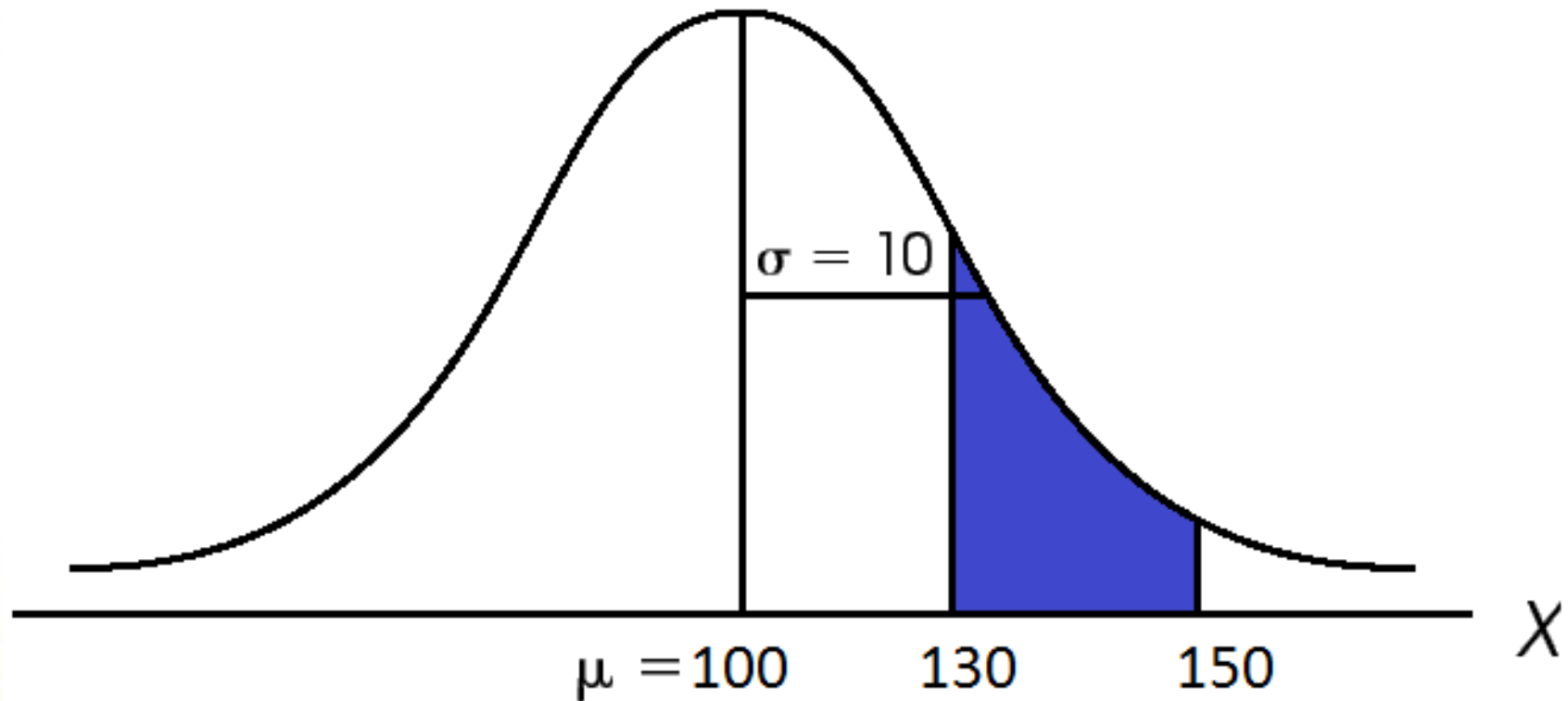
This is the IQ Score distribution.

What is the probability the IQ score is less than 130?

What is the probability that driver drive between 100km/h to 130 km/h?

What is the probability driver drives between 130km/h and 150km/h?

Binomial Distribution

- Binomial data involves scale with 2 categories, example :

    heads or tails as outcome in tossing 2 coins.

- When tossing 2 coins, the possible outcomes are :

    TT, HT,TH,HH

Binomial Distribution (2)

Outcome	Frequency	Probability
No head	1	1/4
1 head	2	2/4
2 heads	1	1/4

Binomial Distribution (3)

- Distribution for tossing 4 coins.

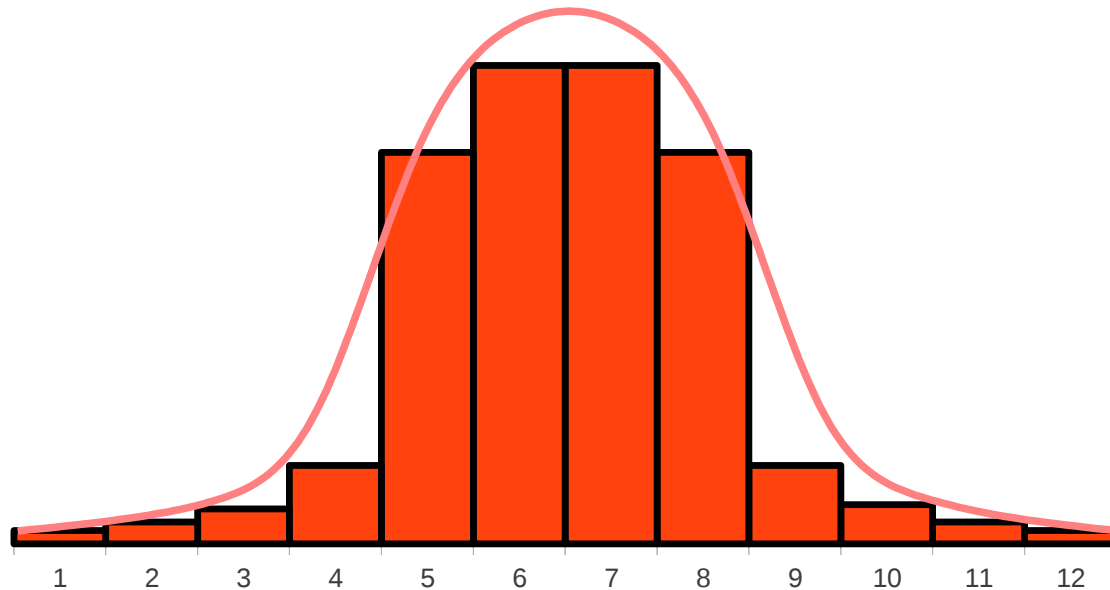| HHHH | HHTT | HTTH |
HHHT	HTTT	THHT
HHTH	TTHH	THTT
HTHH	TTTH	TTHT
THHH		TTTT

Binomial Distribution (3)

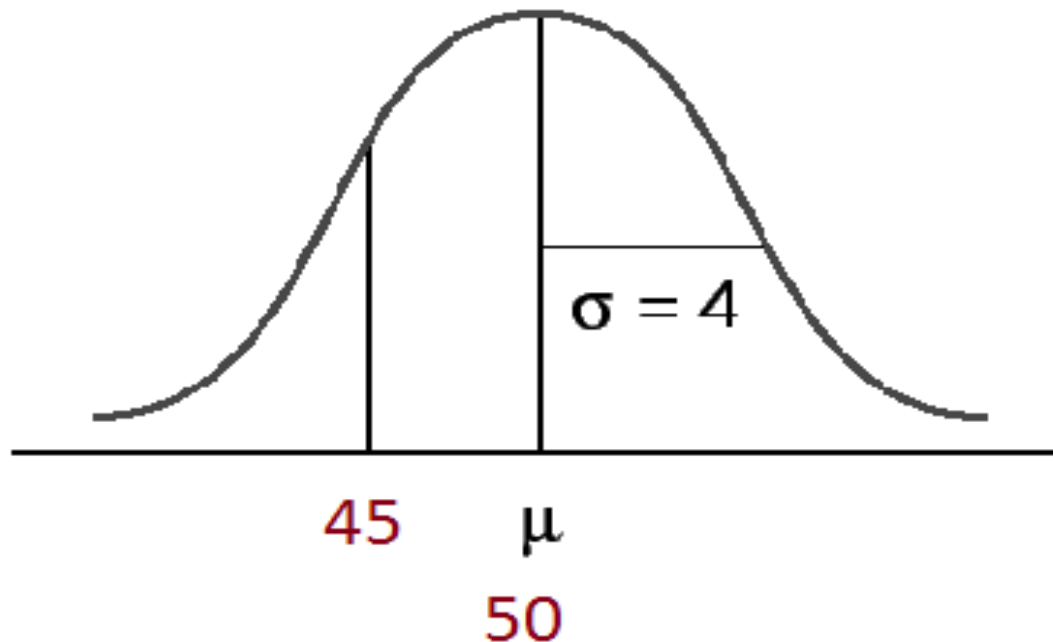The binomial distribution is a histogram while the normal distribution is the smooth curve

Binomial Distribution (4)

The is a normal approximation of a binomial distribution for a true-false test results. The X values stand for number of correct answers.

Middle 95%

(scores near μ = 100)
treatment has no effect

μ = 100

Extreme 5%

z = −1.96

z = +1.96
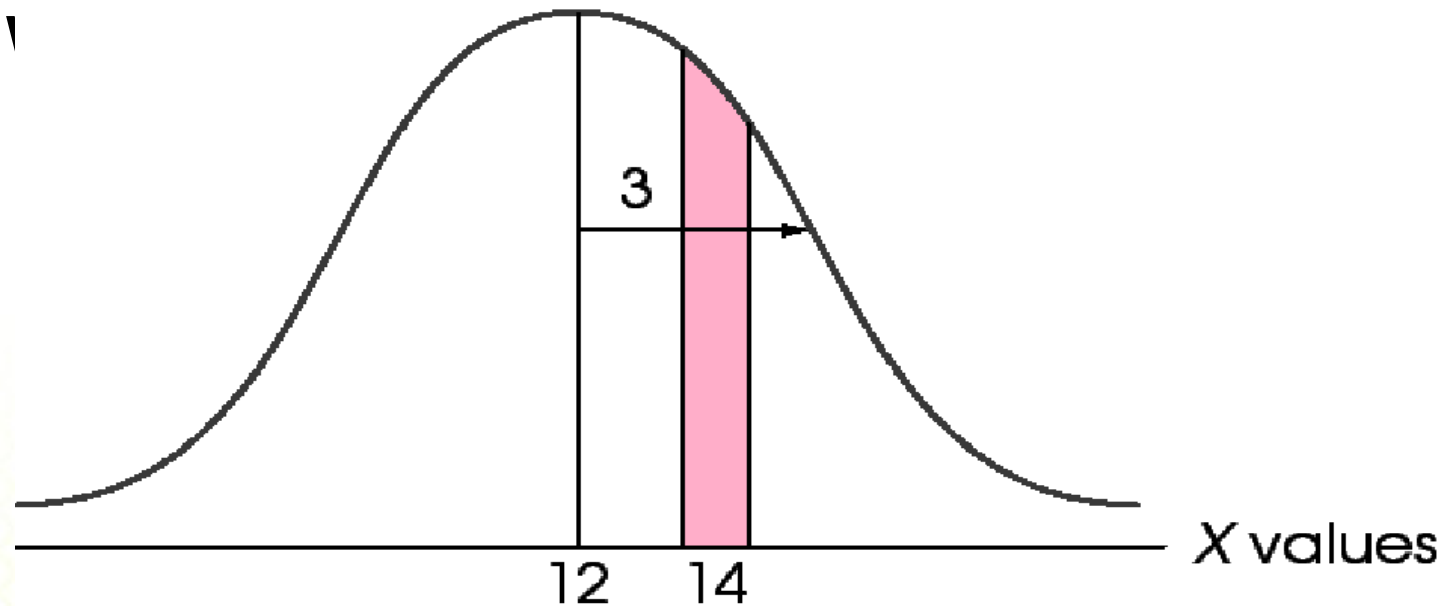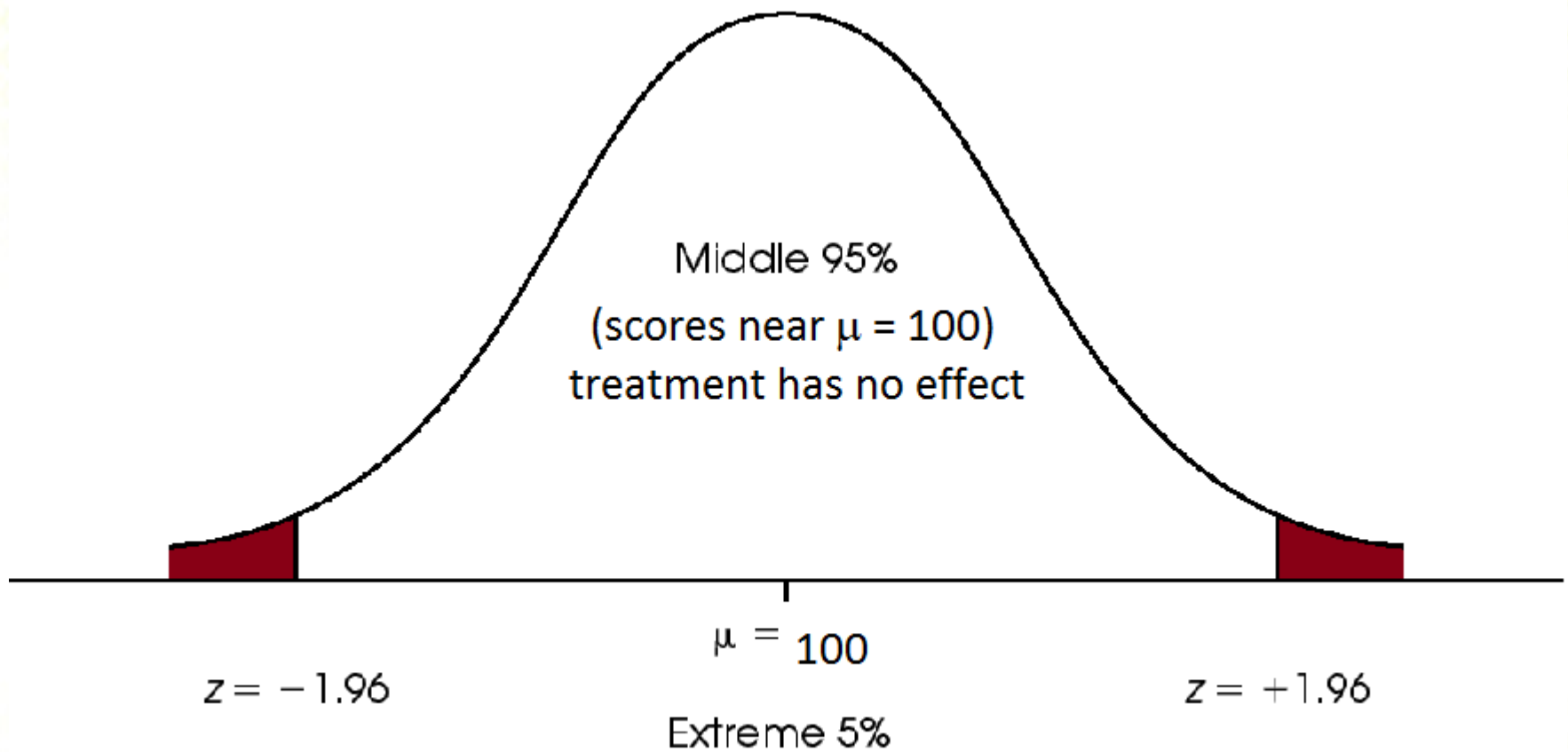
What is the probability of selecting at random for a score greater than 45?

For a binomial distribution,
$$\mu = 10 \quad \sigma = 2.$$

What is the probability of getting score greater than 15?