

Mathematics

3 Points — Second Questionnaire

Instructions for examinees

א. Duration of the exam: One and a half hours

ב. Exam structure and breakdown of points:

This exam has six questions.

Each question is worth 25 points.

You may answer as many questions as you like,
but the maximum number of points you can earn
is 100.

ג. Material that may be used during the exam:

(1) A non-graphing calculator. You may not use
the programming options of a programmable
calculator. Use of a graphing calculator
or programming options may lead to the
disqualification of the exam.

(2) Formula sheets (attached).

(3) A Hebrew-foreign language / foreign
language-Hebrew dictionary.

ד. Special instructions:

(1) **Write all of your calculations and answers
in the Hebrew exam booklet.**

Do not write in the shaded margins.

(2) Explain all of your work, including
calculations, in detail and in a clear and
organized fashion.

Lack of detail may lower your score or
lead to the disqualification of the exam.

(3) For draft paper, use pages in the **Hebrew
exam booklet** (including those at the end
of the booklet) or paper you receive from the
proctors. Use of other draft paper may lead
to the disqualification of the exam.

Good Luck!

מ ת מ ט י ק ה

3 יחידות לימוד - שאלון שני

הוראות לנבחן

א. משך הבחינה: שעה וחצי.

ב. מבנה השאלון ומפתח ההערכה:

בשאלון זה שש שאלות.

לכל שאלה — 25 נקודות.

מוותר לך לענות על מספר שאלות כרצונך,
אך סך הנקודות שתוכל לצבור לא יעלה על 100.

ג. חומר עזר מותר בשימוש:

- (1) מחשבון לא גרפי. אין להשתמש באפשרויות
התכנות במחשבון הניתן לתכנות.
שימוש במחשבון גרפי או באפשרויות התכנות
במחשבון עלול לגרום לפסילת הבחינה.
(2) דפי נוסחאות (מצורפים).
(3) מילון עברי-לועזי/לועזי-עברי.

ד. הוראות מיוחדות:

(1) **כתוב את כל החישובים והתשובות ב**נוסח
העברי** של השאלון.**

אסור לכתוב על הפסים שבשוליים.

(2) הסבר את כל פעולותיך, כולל חישובים,
בפירוט ובצורה ברורה ומסודרת.
חוסר פירוט עלול לגרום לפגיעה בציון או
לפסילת הבחינה.

(3) לטייטה יש להשתמש בדפים שב**נוסח העברי
של השאלון** (כולל הדפים שבסופו) או בדפים
שקיבלת מהמשגיחים. שימוש בטייטה אחרת
עלול לגרום לפסילת הבחינה.

בהצלחה!

Questions

This exam has six questions. A complete answer is worth 25 points.

You may answer as many questions as you like, completely or partially, but the maximum number of points that you can earn is 100.

Write all of your calculations and answers in the Hebrew exam booklet.

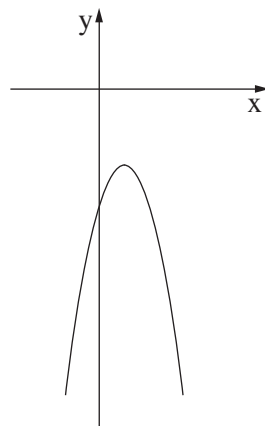
Note! Explain all of your work, including calculations, clearly and in detail. Lack of detail may lower your score or lead to the disqualification of the exam.

Algebra

1. The figure to the right shows the parabola

$$y = -2x^2 + 4x - 6.$$

- א. Find the coordinates of the point at which the parabola intersects the y-axis.
- ב. Find the coordinates of the vertex [קדקוד] of the parabola.
- ג. For which values of x does the parabola increase [עולה]?
- ד. Does the line $y = -2$ intersect the parabola? Explain.



2. A bank offers two savings schemes, Scheme I and Scheme II.

Scheme I: At the end of 4 years, a person who deposited 2000 shekels will receive a sum of money that is 40% greater than the sum he originally deposited.

Scheme II: At the end of 5 years, a person who deposited 2000 shekels will receive a sum of money that is 50% greater than the sum he originally deposited.

In each of the schemes, the amount deposited in the account grows by a fixed percentage annually.

- א. (1) In Scheme I, how much money will the person receive at the end of 4 years?
 (2) In Scheme II, how much money will the person receive at the end of 5 years?
- ב. Which scheme, I or II, has the higher annual rate (percentage) of growth? Explain.

Trigonometry

3. The figure to the right shows the square ABCD.

The length of a side of the square is 10 cm.

N is a point on the side AD.

Given: $AN = 4$ cm.

א. Calculate the size of the angle NCD.

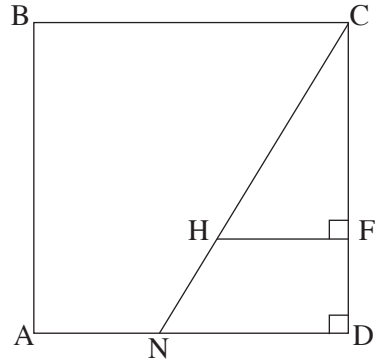
F is a point on the side CD.

H is a point on CN.

Given: $HF \perp CD$, $CF = 7$ cm.

ב. Calculate the length of the segment CH.

ג. Calculate the length of the segment NH.



4. The figure to the right shows the cuboid [תיבה] ABCDA'B'C'D'.

Given: $AB = 12$ cm

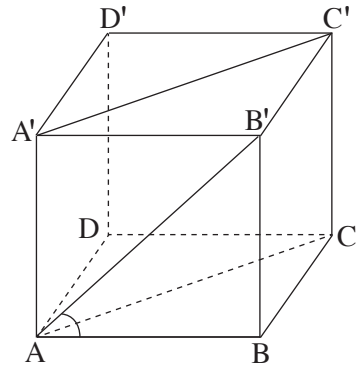
$BC = 10$ cm.

The angle between the diagonal AB' and the base ABCD is 42° .

א. Calculate the height BB' of the cuboid.

ב. Calculate the length of the diagonal AC.

ג. Calculate the area of the quadrilateral ACC'A'.



Probability and Statistics

5. A jar contains 4 white balls and 6 black balls.

One ball is randomly chosen and removed from the jar. The ball is left outside the jar.

The balls remaining in the jar are mixed and a second ball is randomly chosen and removed from the jar.

א. What is the probability that the first ball to be removed is white and the second ball will be black?

ב. What is the probability that both of the balls removed are black?

ג. What is the probability that both of the balls removed are the same color?

6. There is a list of the scores obtained by students on a nationwide test.
The scores on the list are normally distributed; the standard deviation is 8
and the average score is 72.

Answer the following items with the help of the normal distribution curve
shown below.

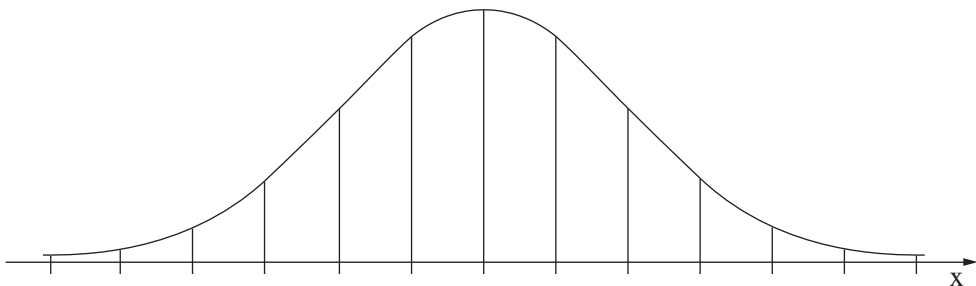
- א. One of the scores on the list is randomly chosen.

What is the probability that this score is lower than 56?

- ב. What percentage of students earned a score between 56 and 80?

- ג. 41,500 students took the test.

How many students earned a score between 56 and 80, according to the
normal distribution curve?



Good Luck!

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בהצלחה!

זכות היוצרים שמורה למדינת ישראל
אין להעתיק או לפרסם אלא ברשות משרד החינוך