

Mathematics

3 Points — 2nd Exam

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 your 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 your exam.
- (3) For draft paper, use the pages in the **Hebrew test booklet** (including those at the end of the booklet). Use of other draft paper may lead to the disqualification of your exam.

Good Luck!

מתמטיקה

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.
מותר 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 בנוסח 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 שבנוסח העברי של השאלון (כולל הדפים שבסופו). שימוש בטייטה אחרת עלול לגרום לפסילת הבחינה.

בהצלחה!

Questions

This exam consists of 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 your exam.

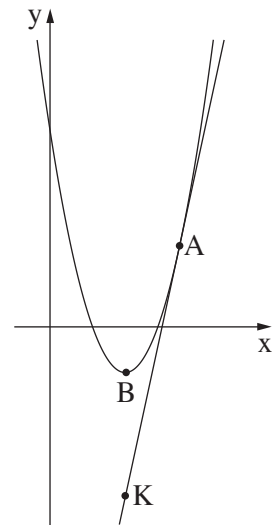
Algebra

1. The sketch to the right shows the parabola whose equation is $y = x^2 - 7x + 10$ and the line whose equation is $y = 5x - 26$.

- א. Find the coordinates of the vertex of the parabola (Point B in the figure).
- ב. What is the interval on which the parabola increases?
- ג. Find the coordinates of the point that is common to the parabola and the line (Point A in the figure).
- ד. K is a point on the line.

The x-coordinate of Point K is equal to the x-coordinate of the parabola's vertex.

Find the coordinates of Point K.



2. Yosef paid for a television he purchased in monthly installments that form an arithmetic sequence.

In the first month, Yosef paid 99.5 shekels.

In the fourth month, Yosef paid 248 shekels.

- א. How much did Yosef pay in the second month?

Yosef paid a total of 4,461 shekels for the television.

- ב. In how many installments did Yosef pay for the television?

Miriam bought a television for the same price, but paid for it in four equal installments.

- ג. How much was each of the installments that Miriam paid?

3. Yoav received a bank loan of 20,000 shekels, at an annual interest rate of 3%.

- א. Calculate Yoav's outstanding debt to the bank after one year.

- ב. Calculate Yoav's outstanding debt to the bank at the end of the first 8 years.

Your answer should be accurate to two decimal places.

8 years after Yoav received the bank loan, his grandmother gave him a gift of 30,000 shekels. He used some of the gift money to pay off his debt (which you calculated for Item ב).

- ג. How much money did Yoav have left after he paid off his bank loan?

After paying off his loan, Yoav invested the remaining money in a savings plan that gave a fixed annual interest rate. Two years later he had 4,758.36 shekels in his account.

- ד. What annual interest rate did this savings plan offer?

Trigonometry

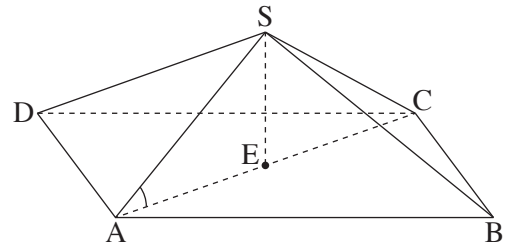
4. SABCD is a right quadrilateral pyramid whose base is rectangular, as shown in the figure.

SE is a height of the pyramid.

Given: $AD = 11$ cm, $AB = 20$ cm, $SE = 7$ cm.

- א. Calculate the length of the diagonal of the base of the pyramid.
- ב. Calculate the length of a side edge of the pyramid.
- ג. Calculate the size of the angle between a side edge of the pyramid and the pyramid's base.

Your answers should be correct to two decimal places.



Probability and Statistics

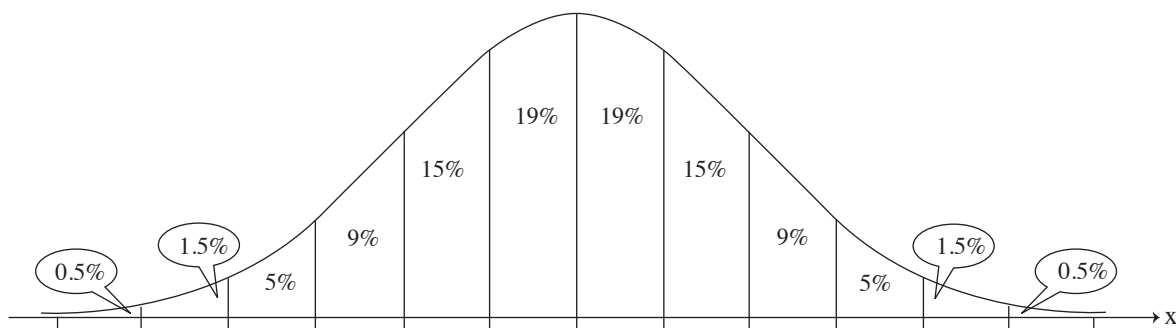
5. The average score of a student on 5 tests is 77.

The student took an additional test. He wants to obtain an average score of 80 on the 6 tests.

- א. In order to obtain an average score of 80 on the 6 tests, does the student's score on the sixth test have to be higher than, lower than, or equal to his average score on the first 5 tests?
- ב. What score must he obtain on the sixth test, in order to obtain an average score of 80 on the 6 tests? Explain.

6. In a school of 600 students, the heights of all the students were measured.
The heights of the students in that school were found to have a normal distribution.
The average height of the students in that school is 162 cm.
7% of the students have a height that is less than 156 cm.
- א. Find the standard deviation of the heights of the students in the school.
 - ב. What percentage of students have a height of between 166 cm and 172 cm?
 - ג. According to the normal distribution curve, how many students with a height of between 166 cm and 172 cm attend this school?

Below is the normal distribution graph from the formula sheet. Use it in your calculations.



Good Luck!

All rights reserved by the State of Israel.
Copying or publication without the consent of the
Ministry of Education is prohibited.

בהצלחה!

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