

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 test 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 test 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.

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

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 test 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

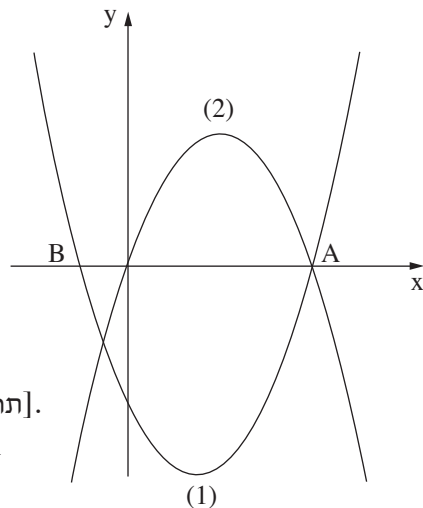
1. The figure below shows the graphs, (1) and (2), of two functions:

$$f(x) = -x^2 + 4x$$

$$g(x) = x^2 - 3x - 4$$

Graph (1) intersects the x-axis at Points A and B.

- א. Match each graph, (1) and (2), with the function it represents. Explain.
- ב. Find the coordinates of Point A and the coordinates of Point B.
- ג. Find the intervals on which Graph (1) is positive [תחומי החיוביות].
- ד. Find the coordinates of the vertex of the graph (2).



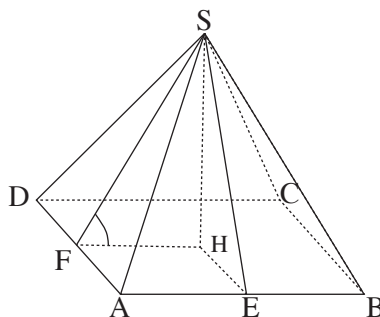
2. The salaries of 10 employees, arranged in ascending order (from the lowest salary to the highest salary), form an arithmetic sequence. The lowest salary is 5000 shekels, and the fourth salary in the sequence is 8300 shekels.
- א. Calculate the common difference of the arithmetic sequence [הפרש הסדרה החשבונית].
 - ב. Calculate the total sum of the 10 salaries.
 - ג. Calculate the average of the 10 salaries.
3. 20 years ago, there were 40,000 tons of wood in a plot of forest land. Today, the plot contains 50,000 tons of wood. The quantity of wood increases exponentially [באופן מעריכי] each year.
- א. By what percentage does the quantity of wood increase each year?
Your answer should be accurate to two decimal places.
 - ב. How much wood will the forest contain 20 years from now?
 - ג. How much wood did the forest contain 5 years ago?

Trigonometry

4. The base ABCD of a right pyramid SABCD is a rectangle (see figure).

Given: $AD = 20$ cm, $AB = 30$ cm.

The height to the side AB on the face SAB is $SE = 15$ cm.



- א. Calculate the height of the pyramid.
- ב. Calculate the height SF to the side DA on the face SDA.
- ג. Calculate the size of the angle between the height SF and the base of the pyramid.

Statistics and Probability

5. In a certain factory, there are two salary levels, high and low.
34 workers receive the low salary
and 66 workers receive the high salary.
The hourly wage for a high-salary worker is 15 shekels higher than the
hourly wage of a low-salary worker.
The average salary in the factory is 49.9 shekels per hour.
- א. Calculate the hourly wage at each of the two salary levels.
 - ב. What is the modal [שכיח] hourly wage?
 - ג. What is the median [חציון] hourly wage in this factory? Explain.

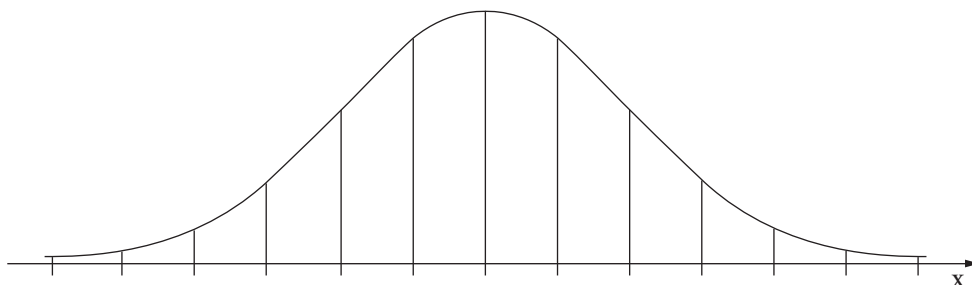
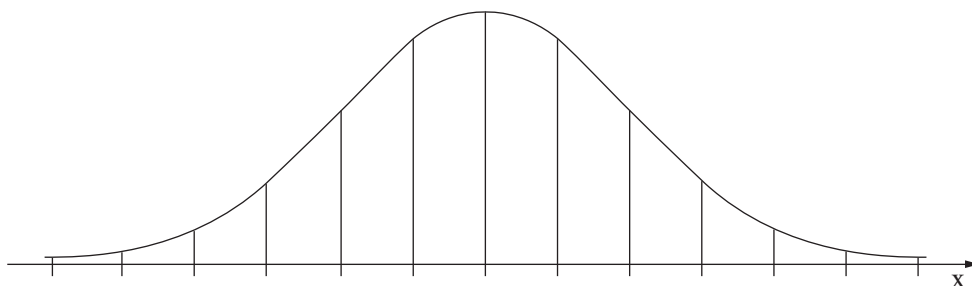
6. A certain university department held entrance exams in English and math. The scores obtained by the examinees were distributed normally. Danny took both exams.

The table below shows the average scores and the standard deviation of the scores on these exams, as well as Danny's score on each of the exams.

Danny's score	Standard deviation	Average	Exam
80	5	70	English
80	8	76	Math

Answer Items א and ב with the help of the normal distribution curves below.

- א. Find what percentage of students earned a score higher than 80:
(1) on the English exam
(2) on the math exam.
- ב. On which of the two exams was Danny's score higher, relative to the rest of the examinees? Explain.



Good Luck!

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בהצלחה!

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