

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. Do 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 exam booklet**.
If you use other draft paper your exam may be disqualified.

Note: At the back of the Hebrew exam booklet there is draft paper for you to use. Do not add any other paper to the exam booklet.

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. שימוש בטייטה אחרת עלול לגרום לפסילת הבחינה.

שים לב: בסוף הבחינה מצורפים דפי טייטה לשימושך. אין להוסיף דפים אחרים למחברת הבחינה.

Good Luck!

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 figure to the right describes a parabola whose equation is $y = -x^2 - 2x + 3$.

The parabola intersects the x-axis at Points A and B,
as shown in the figure.

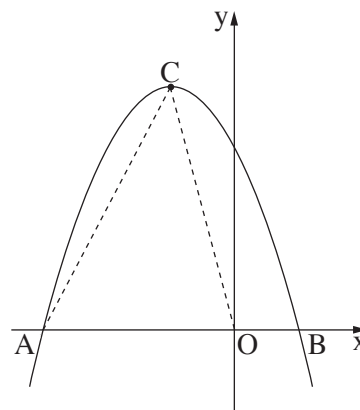
- א. Find the coordinates of Points A and B.
- ב. Find the negative intervals of the parabola.

Point C is the vertex of the parabola.

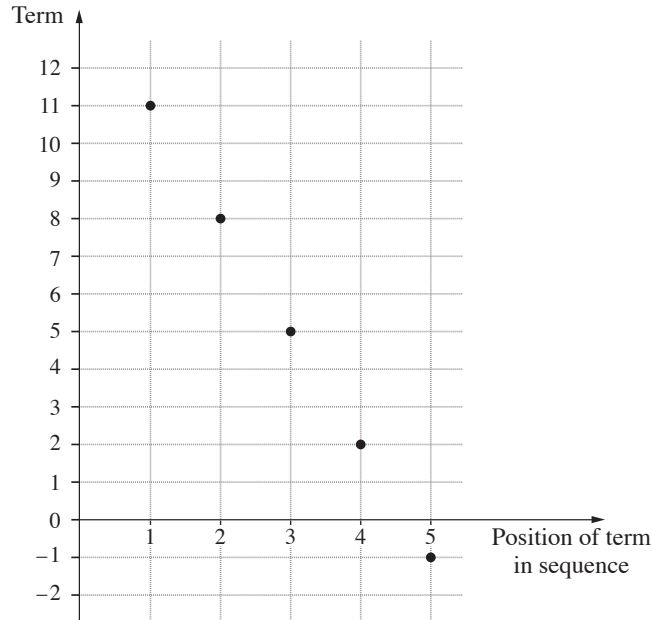
- ג. Find the coordinates of Point C.

Point O is the origin.

- ד. Calculate the area of Triangle ACO.



2. The graph below shows the first five terms of an arithmetic sequence.



א. (1) Based on the graph, find the first three terms of the sequence.

(2) Find the common difference of the sequence.

ב. - 13 (minus 13) is a term in the sequence.

Find the position of this term in the sequence.

ג. How many of the first terms of the sequence, when added together, total a sum of - 66 (minus 66)?

3. On 1/1/2019 an agreement was signed with the employees of a certain factory, according to which the salary of each employee would increase each year by a fixed percentage (a different percentage for each employee).

On that date Yael's monthly salary was 8,000 shekels.

Yael's salary increases by 3% each year.

א. (1) What will Yael's monthly salary be after two years (on 1/1/2021)?

(2) In what year will Yael's monthly salary be more than 9,000 shekels for the first time?

On 1/1/2019 Elad's monthly salary was 6,000 shekels.

After two years (on 1/1/2021) Elad's monthly salary will be 6,615 shekels.

ב. By what percentage does Elad's salary increase each year?

/Continued on page 4/

Trigonometry

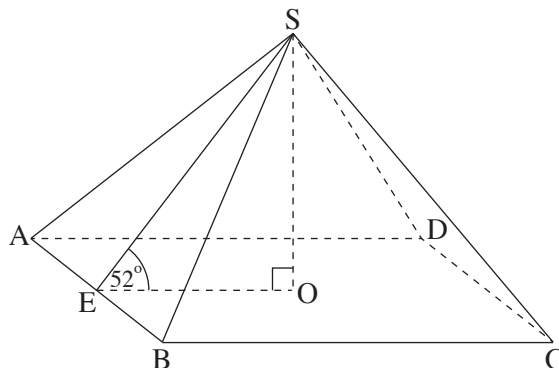
4. SABCD is a right quadrilateral pyramid whose base, ABCD, is a rectangle (see figure).

Given: $AB = 6 \text{ cm}$, $BC = 14 \text{ cm}$.

Point E is the midpoint of Side AB.

The size of the angle between Segment SE and the base of the pyramid is 52° .

- א. Calculate the height of the pyramid, SO.
- ב. Calculate the height to Side AB on Face SAB.
- ג. Calculate the area of Face SAB.



Probability and Statistics

5. 16 eleventh grade students took a math test.

3 students received a score of 60,

8 students received a score of 70,

and 5 students received a score of 80.

- א. Calculate the average of these scores.

- ב. What is the median of these scores?

6 other students from the same class missed this test, and so they were tested on another day.

All 6 students received a score of 80.

The teacher added these scores to those of the 16 students who had already been tested.

- ג. Is the new average score greater, smaller, or the same as before? Explain.

6. The scores on the university entrance exams in a certain year have a normal distribution.

The average score received by examinees is 74, and the standard deviation is 6.

א. What percentage of examinees received a score lower than 68 on the university entrance exams that year?

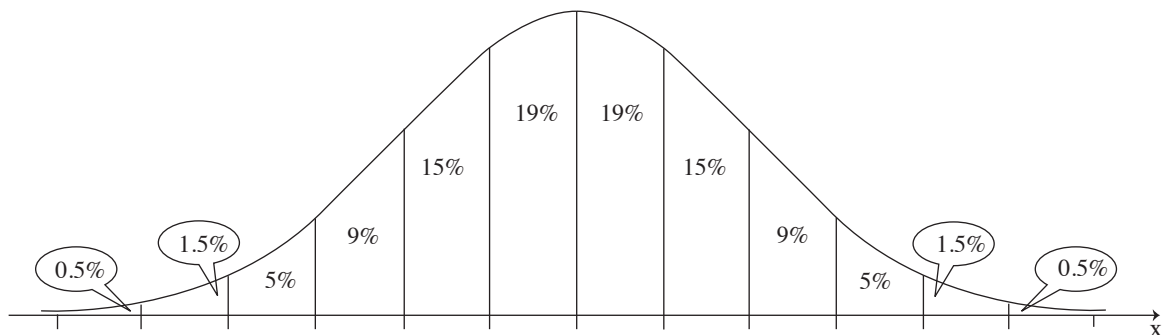
Examinees with a score higher than 86 were awarded a scholarship.

ב. What percentage of examinees were awarded a scholarship?

That year 420 of those who took the university entrance exams received a score lower than 65.

ג. According to the normal distribution curve, how many people took the university entrance exams that year?

Below is the normal distribution curve (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