

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 exam 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 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). 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 figure to the right shows the parabola whose equation is $y = -x^2 + 6x$, and the line whose equation is $y = 5$.

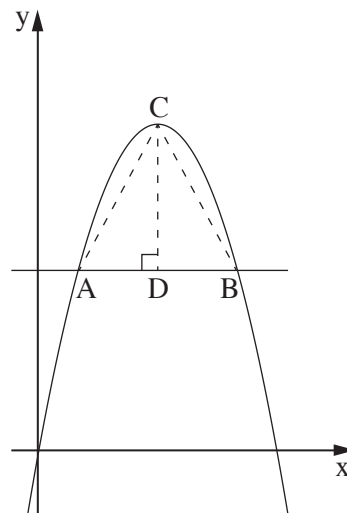
א. Find the coordinates of the vertex of the parabola, C.

Points A and B are the points at which the parabola and the line intersect, as shown in the figure.

ב. Find the coordinates of Points A and B.

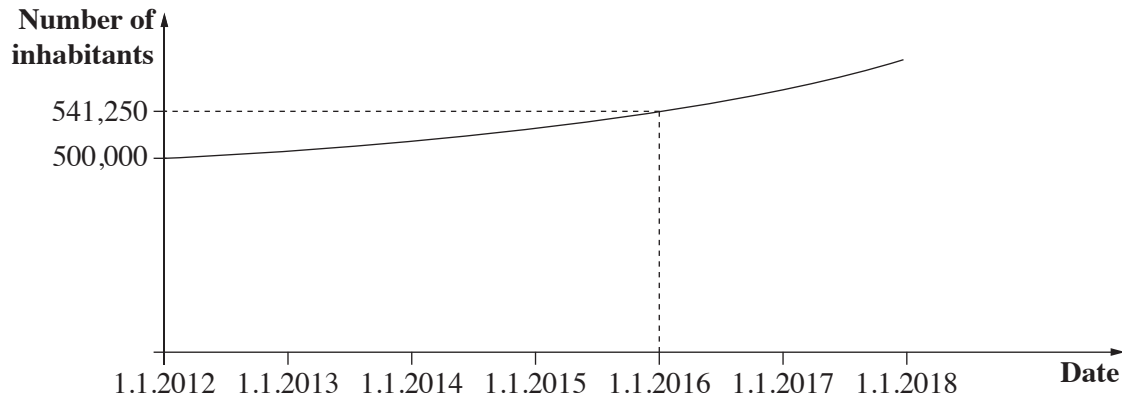
CD is a height in Triangle ABC (see figure).

- ג. (1) What is the length of the height CD?
(2) Calculate the area of Triangle ABC.



2. The population of a certain city grows exponentially every year.

The graph below describes the population growth from 1.1.2012 until 1.1.2018.



- א. (1) How many inhabitants did the city have on 1.1.2012?
 (2) How many inhabitants did the city have on 1.1.2016?
- ב. (1) By how many times does the number of inhabitants in the city increase in one year?
 Your answer should be accurate to two decimal places.
 (2) By what percentage does the number of inhabitants increase in one year?
- ג. How many inhabitants did the city have on 1.1.2018?

3. Danny's salary rose by a fixed amount every month.

He received a salary of 7,000 shekels for his first month of work.

He received a salary of 7,246 shekels for his fourth month of work.

א. By how many shekels did Danny's salary rise each month?

Danny worked for 12 months.

- ב. (1) What was Danny's salary for the 12th month?
 (2) What was Danny's total salary for the 12 months that he worked?

Trigonometry

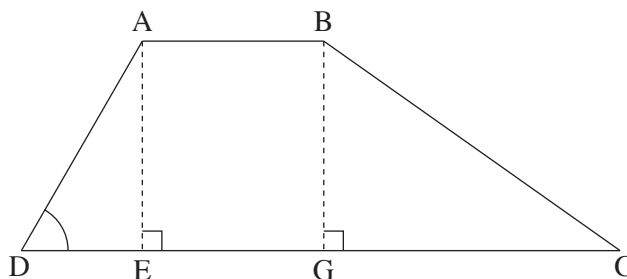
4. ABCD is a trapezoid ($AB \parallel DC$).

AE and BG are heights in the trapezoid

(see figure).

Given: $AB = 3$ cm, $AD = 4$ cm,

$GC = 5$ cm, $\angle ADC = 60^\circ$.



- א. Find the length of the height of the trapezoid.
- ב. Find the size of the angle BCG.
- ג. (1) Calculate the length of Side BC.
(2) Calculate the perimeter of Trapezoid ABCD.

Probability and Statistics

5. Two fair dice [קוביות משחק הוגנות] are rolled.

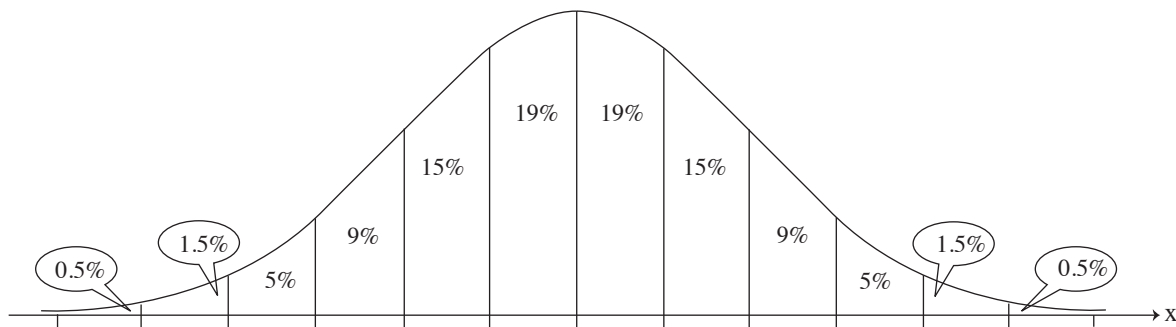
- א. What is the probability that both dice will show the same number? Explain.
- ב. What is the probability that the sum of the numbers that the dice show will be 7? Explain.
- ג. What is the probability that the product [מכפלה] of the numbers that the dice show will be 6? Explain.

6. The daily milk yield of cows on a certain dairy farm has a normal distribution with a standard deviation of 6 liters.

We know that 7% of the cows yield more than 41 liters daily.

- א. Find the average daily milk yield of the cows on this farm.
- ב. What percentage of the cows on the farm yield less than 20 liters daily?
- ג. What percentage of the cows on the farm yield more than 20 liters daily and less than 29 liters daily?
- ד. The farm has 400 cows. According to the normal distribution graph, how many cows yield more than 41 liters daily?

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



Good Luck!

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בהצלחה!

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