

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**.
Use of other draft paper may lead to the disqualification of your exam.

Note: At the end of the exam booklet there is draft paper for your use. Do not add any other pages.

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. שימוש בטייטה אחרת עלול לגרום לפסילת הבחינה.

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

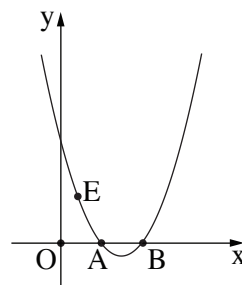
1. The parabola $y = x^2 - 6x + 8$ intersects the x-axis at Points A and B, as shown in the figure on the right.

- א. Find the coordinates of Points A and B.
- ב. Give the positive intervals [תחומי החיוביות] of the parabola.

Point E is located on the parabola. The x-coordinate of Point E is 1.

- ג. Find the y-coordinate of Point E.
- ד. Calculate the area of Triangle AOE.

(O is the origin.)



2. The smallest three-digit number divisible by 7 with no remainder [בלי שארית] is 105.
The largest three-digit number divisible by 7 with no remainder is 994.
How many three-digit numbers in total are divisible by 7 with no remainder?
3. In January **2014** the value of land in a certain area of Israel began to increase by a fixed percentage annually.
In January **2015** the price of land in this area was 200,000 shekels.
In January **2018** the price of land in this area was 240,000 shekels.
 - א. By what percentage does the price of land in this area increase annually?
 - ב. What was the price of land in this area in January **2014**?

Trigonometry

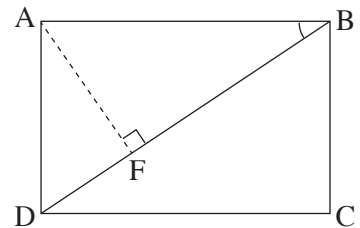
4. The figure on the right shows Rectangle ABCD.

Given: $AD = 8$, $DB = 17$

- א. Find the length of Side AB.
- ב. Find the size of Angle ABD.

Point F is located on Diagonal BD, such that AF is perpendicular to BD.

- ג. Find the length of Segment AF.
- ד. Calculate the area of Triangle AFB.



Probability and Statistics

5. A bag contains balls of three colors: black, red, and green.

The probability of taking out a black ball is 0.25, and the probability of taking out a red ball is 0.3.

- א. What is the probability of taking out a green ball?
- ב. Yoav removes a ball from the bag at random. He returns it and then again removes a ball from the bag at random.

What is the probability that Yoav will take out a red ball both times?

- ג. We know that the bag contains 60 balls.

How many balls of each color does the bag contain?

6. The ages of the workers at a certain factory have a normal distribution.

The average age of the workers at the factory is 42 years old, and the standard deviation is 4 years.

Once a year the factory carries out routine medical tests for all workers aged 40 and above.

א. What percentage of workers undergo these routine medical tests carried out by the factory?

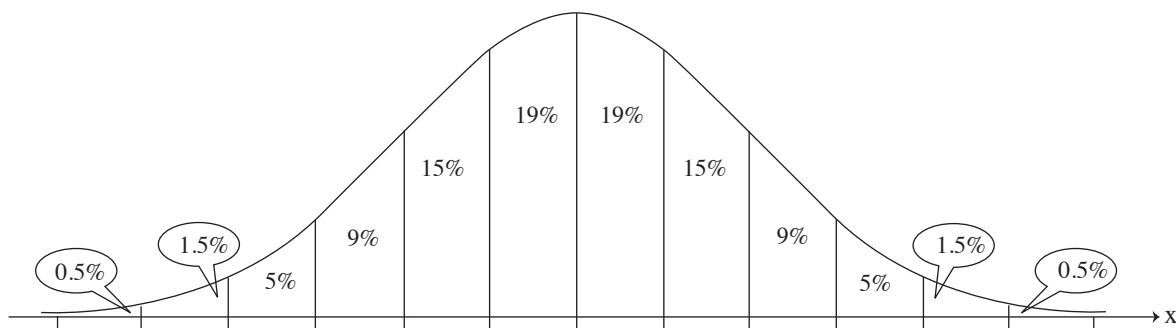
In addition to the routine medical tests, the factory carries out in-depth medical tests for workers aged 50 and above.

ב. What percentage of workers undergo these in-depth medical tests carried out by the factory?

ג. (1) What percentage of workers undergo only routine medical tests?

(2) We know that the factory employs 6,800 workers. According to the normal distribution graph, how many workers undergo only routine medical tests?

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