

Mathematics

3 Points — 2nd Exam

מתמטיקה

3 יחידות לימוד – שאלון שני

Instructions

א. Duration of the exam: One hour and forty-five minutes.

ב. Exam structure and breakdown of points:

This exam has six questions.

Each question is worth 30 points.

You may answer as many questions as you like, completely or partially, 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 your calculations and answers in the Hebrew exam booklet.**
Do not write in the 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) Use the pages in the **Hebrew exam booklet** for draft work. If you use other paper for draft work, your exam may be disqualified.

הוראות

א. משך הבחינה: שעה וארבעים וחמש דקות.

ב. מבנה השאלון ומפתח ההערכה:

בשאלון זה שש שאלות.

לכל שאלה 30 נקודות.

מוותר לענות, באופן מלא או חלקי, על מספר שאלות כרצונכם, אך סך הנקודות שתוכלו לצבור לא יעלה על 100.

ג. חומר עזר מותר בשימוש:

- (1) מחשבון לא גרפי.
אין להשתמש באפשרויות התכנות במחשבון שיש בו אפשרות תכנות.
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) **יש לכתוב את כל החישובים והתשובות בנוסח העברי של השאלון.**
אסור לכתוב על הפסים שבשוליים.
- (2) יש להסביר את כל הפעולות, 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.

שימו לב: בסוף הבחינה בעברית מצורפים דפי טייטה. אין להוסיף דפים אחרים למחברת הבחינה.

Note: There is draft paper at the end of the Hebrew exam booklet. Do not add any other paper to the exam booklet.

Good Luck!

בהצלחה!

Questions

This exam has six questions. A complete answer is worth 30 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 your calculations and answers in the Hebrew exam booklet.

Algebra

1. Consider the parabola $y = -x^2 + 3x + 10$.

Points A and B are the intersection points of the parabola with the x-axis, as shown in the figure to the right.

- א. Find the coordinates of Points A and B.

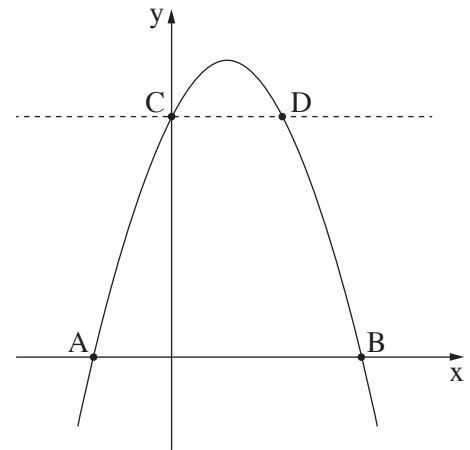
The graph of the parabola intersects the y-axis at Point C.

- ב. Find the coordinates of Point C.

A line parallel to the x-axis is drawn through Point C.

The line intersects the parabola at an additional point, D.

- ג. (1) Find the coordinates of Point D.
(2) Calculate the area of Trapezoid ACDB.



2. A factory manufactures spare parts for cars.

The numbers of spare parts manufactured at the factory each month form an arithmetic sequence.

In the first month the factory manufactured 1,250 spare parts.

In the fifth month the factory manufactured 1,810 spare parts.

- א. Find how many spare parts the factory manufactured in the second month.

The production line ran for 12 months.

- ב. Find how many spare parts in total the factory manufactured over these 12 months.

The factory's profit from the sale of each spare part is 34 shekels.

- ג. How much profit in total did the factory make from selling all the spare parts it had manufactured over these 12 months?

3. At the start of 2020 Nitsan deposited 28,500 shekels into a savings account.

The amount of money in the savings account grows by 4% every year.

א. Find how many shekels were in the savings account at the start of 2026 .

ב. Find at the start of which year there were 33,341 shekels in the savings account.

Nitsan wants to buy a car. The car's price decreases every year by a fixed percentage.

At the start of 2023 the car's price was 40,000 shekels.

At the start of 2025 the car's price was 38,416 shekels.

ג. Find by what percentage the car's price decreases every year.

ד. Was the amount of money Nitsan had in the savings account at the start of 2026 enough to buy the car? Explain your answer.

Trigonometry

4. The figure on the right shows Square ABCD .

Point N is the midpoint of Side AD .

We know that the side length of the square is 18 .

א. Calculate the size of the angle NCD .

Point F is located on Side CD .

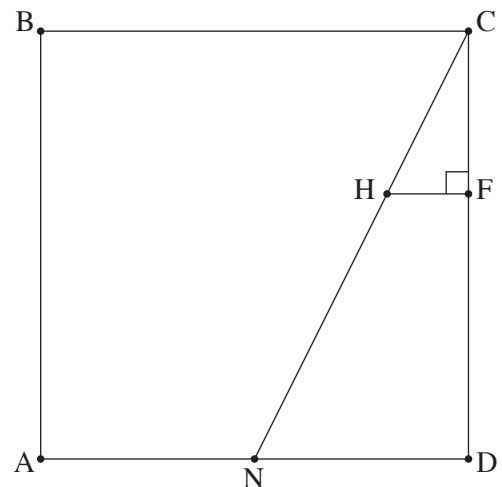
Point H is located on Segment CN .

Segment HF is perpendicular to Side CD (see figure).

We know that $CF = 7$.

ב. Find the length of Segment CH .

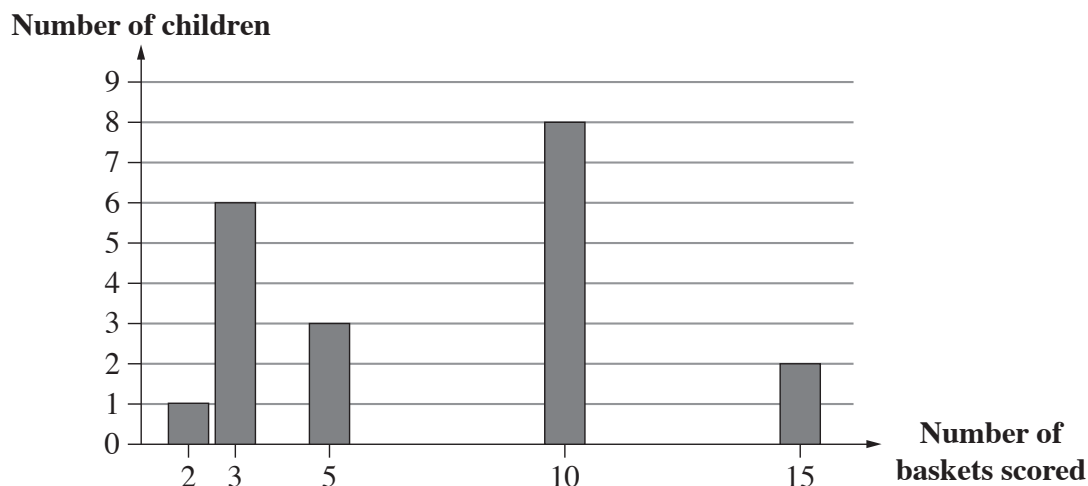
ג. Find the length of Segment NH .



Probability and Statistics

5. Before a children's basketball game, the children had a basketball shooting practice.

The bar chart below shows the distribution of the number of baskets scored by all of the children who participated in the practice.



- א. (1) Find the number of children who participated in the practice.
(2) Find the average number of baskets scored per child in the practice.

The basketball game took place the next day.

The number of children who participated in the game was 80% of the number of children who participated in the practice.

- ב. Find the number of children who participated in the game.

The table below (and in the Hebrew exam booklet) shows the distribution of the number of baskets scored by all of the children who participated in the game.

Number of baskets	18	x	6	4
Number of children	1	3	7	

- ג. Fill in the number of children who scored 4 baskets in the game in the table in the **Hebrew exam booklet**.

We know that the average number of baskets scored per child in the practice equals the average number of baskets scored per child in the game.

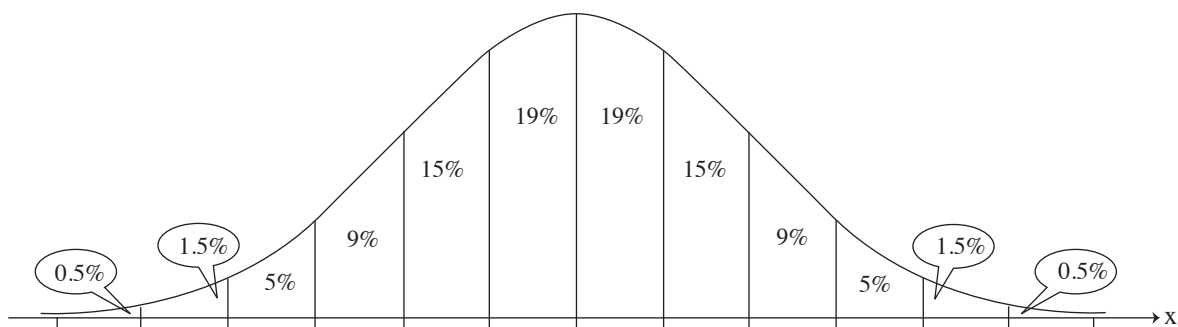
- ד. Find the value of x .

Tomer was one of the children who participated in the practice, but not in the game. Tomer claims that had he participated in the game and scored 6 baskets, the average number of baskets scored per child in the game would have been greater.

- ה. Is Tomer's claim correct? Explain your answer.

6. The grades on a national exam are normally distributed, and the standard deviation is 6 .
- 93 % of the students received a grade lower than 88 .
- א. Find the average grade on the exam.
 - ב. Find the percentage of students who received a grade higher than 67 .
- 21,840 students received a grade higher than 67 and lower than 88 .
- ג. According to the normal distribution graph, how many students took the exam?

Below is the normal distribution curve 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