

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.

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.
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.

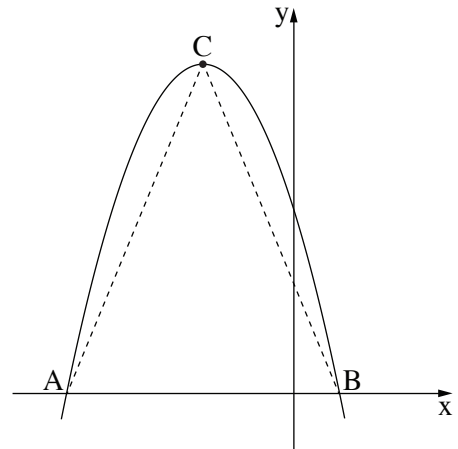
Algebra

1. The parabola $y = -x^2 - 4x + 5$ intersects the x-axis at Points A and B, as shown in the figure on the right.

- א. (1) Find the coordinates of Points A and B.
- (2) Find the length of Segment AB.

Point C is the vertex of the parabola.

- ב. Find the coordinates of Point C.
- ג. Calculate the area of Triangle ACB.
- ד. Give the interval on which the parabola is increasing.



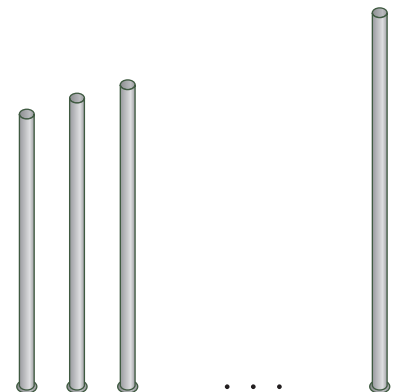
2. The figure on the right shows a fence made of metal poles arranged in a row (the figure shows only some of the poles).

The length of the first pole in the row is 144 cm.

The length of the last pole in the row is 200 cm.

Each pole in the fence is 8 cm longer than the previous pole.

- א. What is the length of the second pole in the row, and what is the length of the third pole in the row?
- ב. How many poles are there in the fence?
- ג. Calculate the total length of all the metal poles that make up the fence.

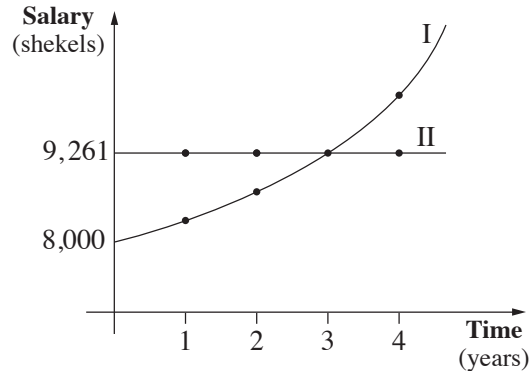


The price of one meter (100 cm) of metal pole is 25 shekels.

- ד. What is the total price of all the metal poles that make up the fence?

3. Danny and Yuval began working in the same year.

Below are two graphs (I and II) that describe Yuval and Danny's salaries over the course of 4 years, as a function of time.



Danny's salary increases every year by a constant percentage.

Yuval's salary is fixed and does not change.

⌘. Determine which graph describes Danny's salary and which graph describes Yuval's salary.

Given: After 3 years Danny and Yuval were earning the same salary.

Answer Items 7-3, based on the graphs.

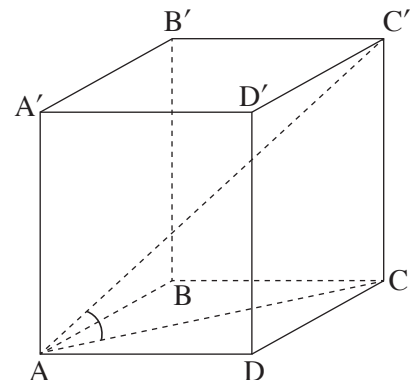
1. (1) What was Danny's starting salary?
- (2) What was Danny's salary 3 years after he started work?
2. By what percentage did Danny's salary rise every year?
7. Calculate Danny's salary 4 years after he started work.

Trigonometry

4. The figure on the right shows the cuboid $ABCD A'B'C'D'$.

Given: $AD = 14$ cm, $DC = 10$ cm, $CC' = 16$ cm.

- ⌘. Calculate the length of the diagonal of the base, AC .
1. Calculate the size of the angle between the diagonal of the cuboid, AC' , and the base $ABCD$.
2. Calculate the volume of the cuboid.



Probability and Statistics

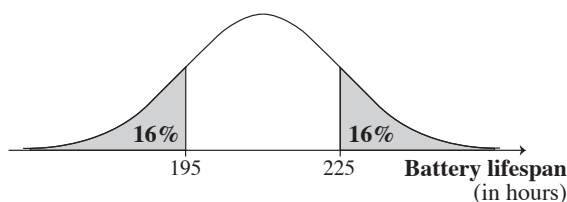
5. At a shooting competition, Danny fires two shots at the same target.

The probability that he will hit the target with his first shot is 0.8, and the probability that he will hit the target with his second shot is 0.75.

- א. What is the probability that Danny will hit the target with both shots?
- ב. What is the probability that Danny will hit the target with exactly one of the two shots?
- ג. What is the probability that Danny will hit the target with at least one of the two shots?

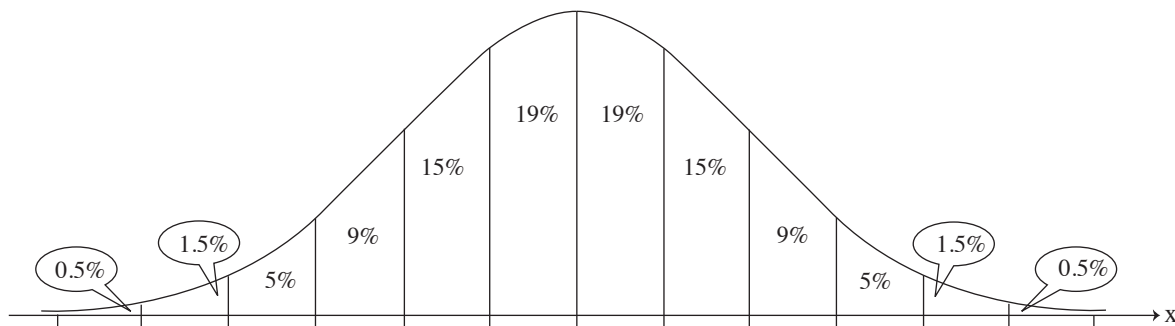
6. The lifespan of batteries (the number of hours they can function) has a normal distribution.

The graph below describes the distribution of the lifespan of a battery.



- א. (1) Find the average lifespan of a battery.
(2) Find the standard deviation.
- ב. (1) What is the percentage of batteries with a lifespan of less than 240 hours?
(2) What is the percentage of batteries with a lifespan of between 195 and 240 hours?
- ג. A factory bought 1,000 batteries. According to the normal distribution graph, how many of them can function for between 195 and 240 hours?

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