

Note: This exam has special instructions.
Answer the questions according to these instructions.

שימו לב: בבחינה זו יש הנחיות מיוחדות.
יש לענות על השאלות על פי הנחיות אלה.

Mathematics

3 Points — 2nd Exam

מ ת מ ט י ק ה

3 יחידות לימוד – שאלון שני

Instructions

הוראות

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

א. משך הבחינה: שעה וארבעים וחמש דקות.

ב. Exam structure and breakdown of points:

ב. מבנה השאלון ומפתח ההערכה:

This exam has six questions.

Each question is worth 27 points.

You may answer as many questions as you like, completely or partially, but the maximum number of points you can earn is 100.

בשאלון זה שש שאלות. לכל שאלה – 27 נקודות.
מותר לענות, באופן מלא או חלקי, על מספר שאלות כרצונכם, אך סך הנקודות שתוכלו לצבור לא יעלה על 100.

ג. Material that may be used during the exam:

ג. חומר עזר מותר בשימוש:

(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.

(1) מחשבון לא גרפי.

(2) Formula sheets (attached).

אין להשתמש באפשרויות התכנות במחשבון שיש בו אפשרות תכנות.

(3) A Hebrew–foreign language / foreign language–Hebrew dictionary.

שימוש במחשבון גרפי או באפשרויות התכנות במחשבון עלול לגרום לפסילת הבחינה.

(2) דפי נוסחאות (מצורפים).

(3) מילון עברי–לועזי/לועזי–עברי.

ד. Special instructions:

ד. הוראות מיוחדות:

(1) Do not copy the question, but do indicate the number of the question you are answering.

(1) אין להעתיק את השאלה; יש לסמן את מספרה בלבד.

(2) Start each answer on a new page. Write the steps of the solution in your answer booklet, even when the calculations are done with a calculator. Explain all your work, including calculations, in detail and in a clear and organized fashion. Lack of detail may lower your score or lead to disqualification of your exam.

(2) יש להתחיל כל שאלה בעמוד חדש. יש לרשום במחברת את שלבי הפתרון, גם כאשר החישובים מתבצעים בעזרת מחשבון. יש להסביר את כל הפעולות, כולל חישובים, בפירוט ובצורה ברורה ומסודרת.
חוסר פירוט עלול לגרום לפגיעה בציון או לפסילת הבחינה.

Write in the answer booklet only. Write "טייטה" at the top of every page you use for rough work.

יש לכתוב במחברת הבחינה בלבד. יש לרשום "טייטה" בראש כל עמוד המשמש טייטה.

If you use pages outside the answer booklet for rough work, your exam may be disqualified.

כתיבת טייטה בדפים שאינם במחברת הבחינה עלולה לגרום לפסילת הבחינה.

Good Luck!

בהצלחה!

Questions

This exam consists of six questions. A complete answer is worth 27 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.

Algebra

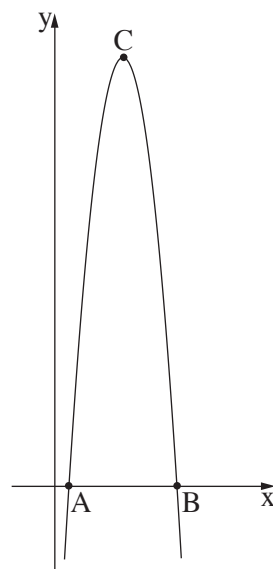
1. Consider the parabola whose equation is $y = -4x^2 + 20x - 9$.

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

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

Point C is the vertex of the parabola.

- ב. Find the coordinates of Point C.
ג. Calculate the area of Triangle ABC.
ד. (1) Give the x value for a point at which the parabola is negative.
(2) Find the y-coordinate of this point.



2. Oren read a certain book. Every day, he increased the number of pages he read compared with the previous day by a constant number.

On the second day, Oren read 13 pages, and on the seventh day he read 48 pages.

- א. How many more pages did Oren read every day compared with the previous day?
ב. How many pages did Oren read on the first day?

Oren finished reading the entire book in exactly 14 days.

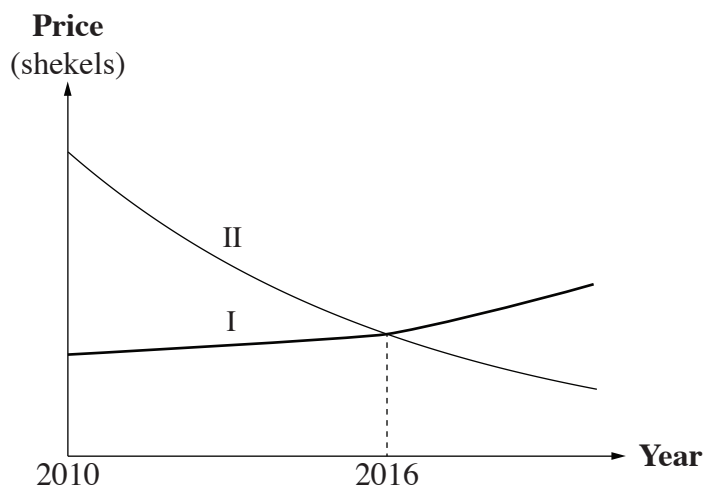
- ג. How many pages are there in the book?

On two consecutive days Oren read a total of 75 pages.

- ד. On which days did Oren read this number of pages?

3. The price of a vintage car increases by a fixed percentage every year, and the price of a family car decreases by a fixed percentage every year.

Graphs I and II below describe the price of each of these cars by year.



- א. According to the graphs, was the price of the vintage car higher than the price of the family car at the beginning of 2010?

The price of the vintage car was 40,000 shekels at the beginning of 2010 and 42,436 shekels at the beginning of 2012.

- ב. (1) By how many percent did the price of the vintage car increase every year?
(2) What was the price of the vintage car at the beginning of 2016?

The price of both cars was identical at the beginning of 2016.

The price of the family car decreases by 15 % every year.

Michal saved up to buy a car. She had 41,000 shekels at the beginning of 2017.

- ג. Could Michal afford to buy the family car at the beginning of 2017?

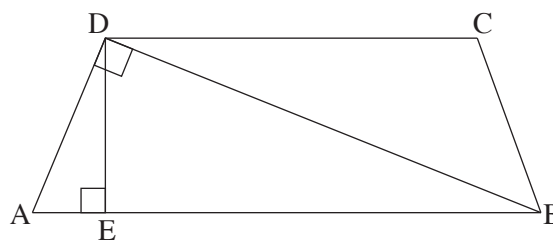
Explain your answer.

Trigonometry

4. In the isosceles trapezoid $ABCD$ ($AB \parallel DC$),
 DE is a height to Base AB (see figure).

We know that $DE = 39$, $AD = 42$.

- א. Find the length of Segment AE .
- ב. Find the size of Angle DAE .

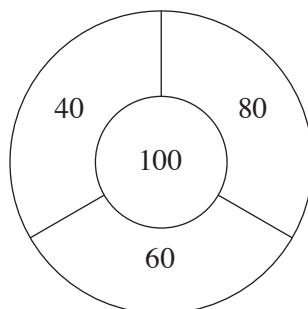


The diagonal of the trapezoid, BD , is perpendicular to Leg AD .

- א. (1) Find the length of Base AB .
 (2) Find the length of Base CD .
- ב. Calculate the area of Trapezoid $ABCD$.

Probability and Statistics

5. The board of a target shooting game is divided into four sections.
 Each section is marked with the number of points earned for hitting that section
 (see figure).



Orit is shooting at this target.

The probability that Orit will hit the section of the target marked 100 is $\frac{1}{2}$.

The probability that Orit will hit one of the sections of the target marked 40, 60, or 80 is the same for each section, and equals $\frac{1}{6}$.

- א. Orit took one shot at the target.

What is the probability that Orit scored 80 points or more?

Orit took two shots at the target.

- ב. What is the probability that Orit scored 40 points for each shot?
- ג. What is the probability that Orit scored the same number of points for each shot?
- ד. What is the probability that the total number of points Orit scored for both of her shots equals 160?

6. The scores on a national math exam have a normal distribution, with an average score of 73 .
- 7 % of examinees achieved a score higher than 85 .
- א. Find the standard deviation of the scores.
- ב. What percent of examinees achieved a score between 57 and 77 ?
- 3,886 examinees achieved a score between 57 and 77 .
- ג. Based on the normal distribution graph, how many people took this national exam?
- 16 % of the examinees – those with the lowest scores – are eligible for remedial classes.
- ד. Is an examinee with a score of 68 eligible for remedial classes? Explain your answer.

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

