

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

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

הוראות
א. משך הבחינה: שעה וארבעים וחמש דקות.

ב. Exam structure and breakdown of points:

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.

ב. מבנה השאלון ומפתח ההערכה:

בשאלון זה שש שאלות.

לכל שאלה – 27 נקודות.

מוותר לכם 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.

(2) Formula sheets (attached).

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

(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. 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.

(2) יש להתחיל כל שאלה בעמוד חדש. יש לרשום במחברת את

שלבי הפתרון, גם כאשר החישובים מתבצעים בעזרת

מחשבון.

Explain all your work, including calculations, in detail and in a clear and organized fashion.

יש להסביר את כל הפעולות, כולל חישובים, בפירוט

ובצורה ברורה ומסודרת.

Lack of detail may lower your score or lead to disqualification of your exam.

חוסר פירוט עלול לגרום לפגיעה בציון או לפסילת הבחינה.

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

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

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

כתיבת טיוטה בדפים שאינם במחברת הבחינה עלולה לגרום לפסילת הבחינה.

Good Luck!

בהצלחה!

Questions

This exam has 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. The figure on the right shows the graphs of two functions:

$$f(x) = x^2 - 12x + 32 ,$$

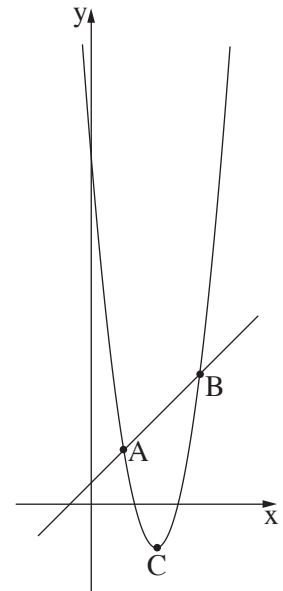
$$g(x) = x + 2 .$$

One of the graphs is a parabola, and the other graph is a line.

- א. Which of the functions, $f(x)$ or $g(x)$, describes the parabola?
- ב. Find the coordinates of the parabola's vertex, Point C.
- ג. Find on which intervals the parabola is increasing and on which it is decreasing.

Points A and B are the intersection points of the parabola and the line, as shown in the figure.

- ד. Find the coordinates of Point A and Point B.



2. The figure on the right shows a structure consisting of two identical walls supporting a slanting roof.

Each wall has 6 vertical metal poles.

The lengths of the metal poles in each wall form an arithmetic sequence.

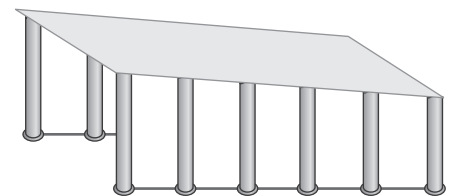
The length of the shortest pole in each wall is 5 meters 10 cm.

The length of the longest pole in each wall is 6 meters 30 cm.

- א. Find how much longer each pole is than the preceding pole.
- ב. Find the total length of all the metal poles in the two walls.

The cost of one meter of metal pole is 78 shekels.

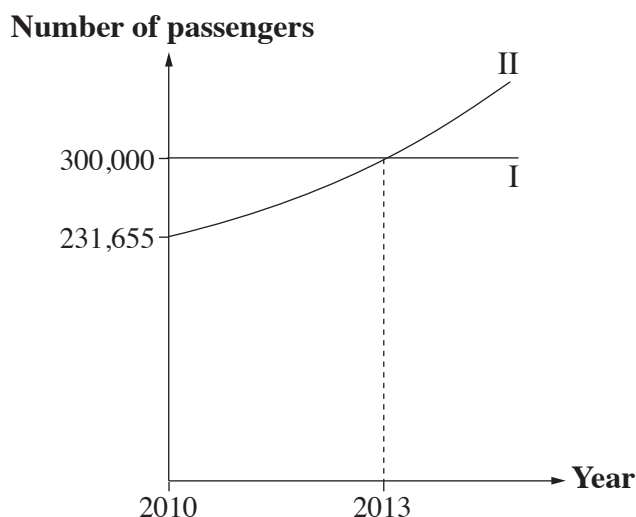
- ג. Find the total cost of all the metal poles in the two walls.



3. At an airport, there are two ways to check passengers' passports – at a computerized checkpoint or by security personnel.

In the years 2010–2016 the number of passengers whose passports were checked at a computerized checkpoint grew by a fixed annual percentage, while the number of passengers whose passports were checked by security personnel remained unchanged.

Each of the graphs I–II below describes the number of passengers whose passports were checked by one of the two methods used in the airport, by year.



- א. Which of the graphs, I or II, describes the number of passengers whose passports were checked at a computerized checkpoint?

At the beginning of 2013 the number of passengers whose passports were checked at a computerized checkpoint was equal to the number of passengers whose passports were checked by security personnel.

- ב. (1) According to the graph, how many passengers had their passports checked at a computerized checkpoint at the beginning of 2013?
 (2) By how many percent did the number of passengers whose passports are checked at a computerized checkpoint increase annually?
- ג. Find the number of passengers whose passports were checked at a computerized checkpoint at the beginning of 2016.
- ד. How much time after the beginning of 2013 was the number of passengers whose passports were checked at a computerized checkpoint greater by 56,430 than the number of passengers whose passports were checked by security personnel?

Trigonometry

4. The figure on the right shows Trapezoid ABCD ($AB \parallel DC$).

DE and CM are heights in the trapezoid.

We know that $AE = 5$, $CB = 12$,

$$\angle DAE = 61^\circ.$$

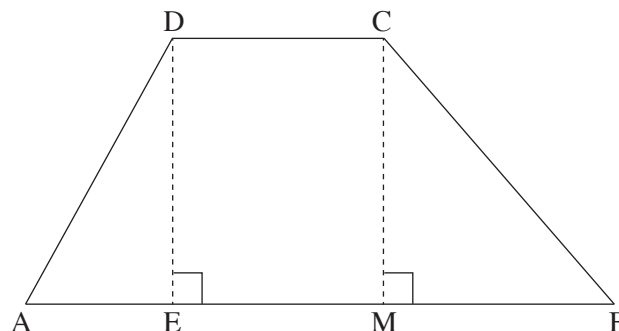
א. Find the length of Height DE.

ב. Find the size of Angle CBM.

We know that $AB = 20$.

ג. Find the length of Base DC.

ד. Calculate the area of Trapezoid ABCD.



Probability and Statistics

5. A travel agency sells vacation packages to five different destinations in Israel.

The table below shows the price (in shekels) of each vacation package, by destination.

Destination	Tzfat	Tveria	Yerushalayim	Tel Aviv	Eilat
Package price (shekels)	1,300	1,900	2,700	3,800	4,300

א. Find the average price of the vacation packages to these five destinations.

The travel agency decided to offer a vacation package to an additional destination –

Yam Hamelach.

We know that after the addition of the new destination, the average price of the vacation packages to the six destinations is 2,700 shekels.

ב. (1) Find the price of a vacation package to Yam Hamelach.

(2) Find the median price of vacation packages to the six destinations.

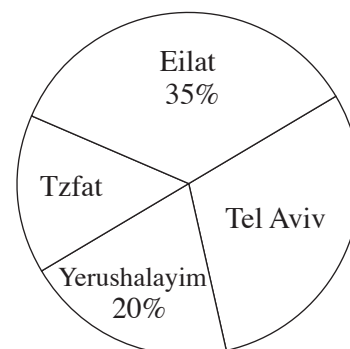
Guy, a travel agent, ordered a total of 80 vacation packages to four destinations from the travel agency.

The pie chart on the right shows the distribution of vacation packages that Guy ordered, by destination.

We know that the number of vacation packages to Tel Aviv that Guy ordered was 2 times greater than the number of vacation packages to Tzfat that he ordered.

ג. (1) Find what percentage of all the vacation packages that Guy ordered were vacation packages to Tzfat.

(2) Find how much Guy paid for all the vacation packages to Tzfat that he ordered.



6. The lengths of the stalks of a certain variety of ornamental plant have a normal distribution.

The average length of the plants' stalks is 32 cm.

84% of the plants have a stalk shorter than 38 cm.

א. Find the standard deviation of the lengths of the plants' stalks.

ב. What percentage of the plants have stalks shorter than 23 cm?

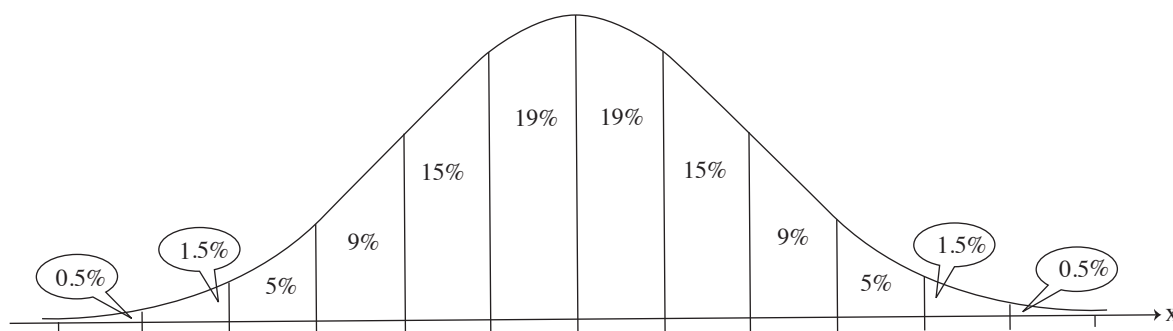
Plants with a stalk longer than 44 cm and plants with a stalk shorter than 23 cm are sold on the local market. The rest of the plants are exported.

ג. What percentage of the plants are sold on the local market?

In one particular month, 12,000 plants were picked.

ד. Based on the normal distribution graph, how many plants were exported that month?

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



Good Luck!

All rights reserved by the State of Israel.
Copying or publication without the consent of the
Ministry of Education is prohibited.

בהצלחה!

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