

Mathematics

3 Points — 2nd Exam

מ ת מ ט י ק ה

3 יחידות לימוד — שאלון שני

Instructions

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, 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) Do not copy the question, but do indicate the number of the question you are answering.
- (2) Start each question on a new page. Write the steps of the solution in the answer booklet, even when the calculations are done with a calculator. 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.

Write only in the answer booklet. Write "טייטה" at the top of each draft page.

If you write draft material on paper outside the answer booklet, your exam may be disqualified.

הוראות

א. משך הבחינה: שעה וחצי.

ב. מבנה השאלון ומפתח ההערכה:

בשאלון זה שש שאלות.

כל שאלה – 25 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) אין להעתיק את השאלה; יש לסמן את מספרה בלבד.

(2) יש להסביר 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.

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

המשמש טייטה.

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 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.

Algebra

1. Consider the parabola $f(x) = x^2 - 12x + 20$.

Point C is the vertex of the parabola.

- א. Find the coordinates of Point C.

The parabola intersects the y-axis at Point A.

A line is drawn from Point A, parallel to the x-axis.

This line intersects the parabola at Point B (see figure).

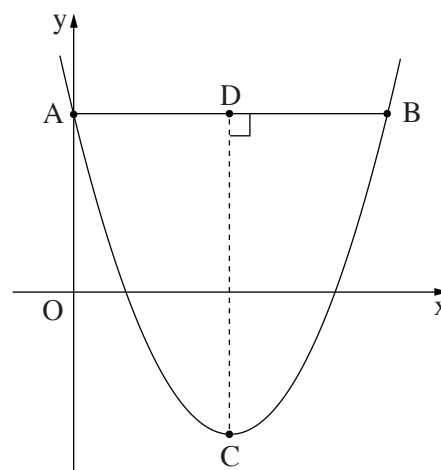
- א. (1) Find the coordinates of Point A.

- (2) Find the coordinates of Point B.

A line is drawn from Point C, perpendicular to Segment AB and intersecting Segment AB at Point D.

- א. (1) Find the length of Segment CD.

- (2) Find the area of Triangle ABC.



2. A group of hikers went on a 12-day hike. On each day of the hike, they walked along a different trail.

Every day, the trail they took was longer than the previous day's trail by a fixed number of kilometers.

On the second day, the length of the trail was 5 km.

On the sixth day, the length of the trail was 11 km.

- א. By how many kilometers was each trail longer than the previous day's trail?

- א. How long was the trail on the first day of the hike?

Smadar and Danny went on this hike. Below is a statement that Smadar made and a statement that Danny made.

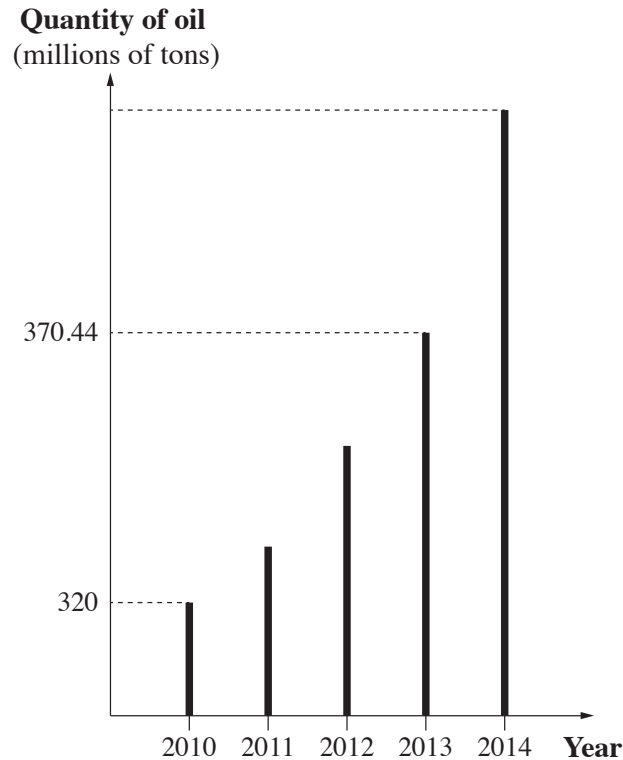
Smadar: The length of the trail on the last day was 3 times greater than the length of the trail on the fourth day.

Danny: The total length of all the trails on the hike was 141 km.

- א. Determine whether each of these statements is correct or incorrect. Explain your answers.

3. The quantity of oil produced in a certain country increases by a fixed percentage every year.
 The diagram below shows the quantity of oil (in millions of tons) produced in this country in the years 2010–2014.

Use the diagram to answer Items א–ד.



- א. (1) What quantity of oil did this country produce in 2010?
 (2) What quantity of oil did this country produce in 2013?
 ב. By what percentage did the quantity of oil produced in this country increase every year?
 ג. Find the quantity of oil that this country produced in 2014.

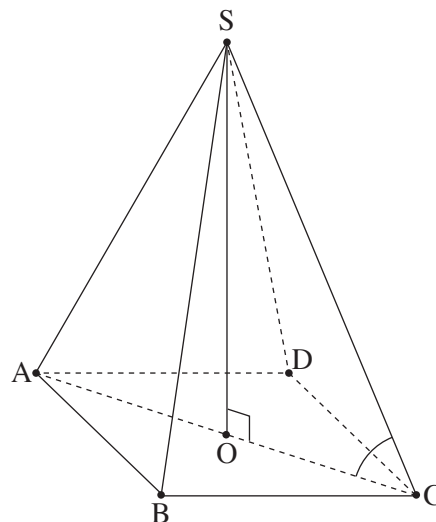
A neighboring country also produces oil. The quantity of oil produced in this neighboring country decreases every year by 8% .

In 2014 both countries produced the same quantity of oil.

- ד. How much oil did the neighboring country produce in 2017?

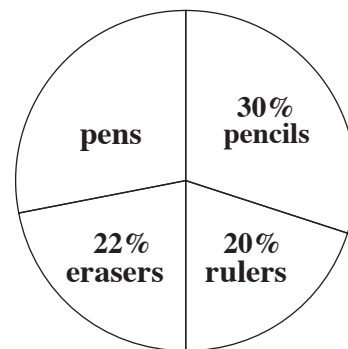
Trigonometry

4. The figure on the right describes a right pyramid $SABCD$, whose base $ABCD$ is a rectangle. SO is the height of the pyramid. We know that $AB = 9$, $BC = 13$.
- Find the length of AC , the diagonal of the pyramid's base.
- We know that $SC = 20$.
- Find the size of the angle between the edge SC and the base of the pyramid.
 - Find the length of SO , the height of the pyramid.
 - Find the volume of the pyramid.



Probability and Statistics

5. A stationery store sold four types of products on a certain day. The pie chart on the right shows the distribution of the store's sales on that day according to type of product.
- What percentage of all the products sold that day were pens?
- The table below shows the prices of the four types of products sold. On that day, a total of 200 products were sold.



	Pencil	Ruler	Eraser	Pen
Price of product (shekels)	3	5	6	12
Number of products				

- Copy the table into the answer booklet and complete the table.
- Calculate the average price of all the products sold that day.
 - Calculate the median price of the products sold that day.

Later, it was discovered that the store had sold an additional 30 pens that day.

The price of each of these additional pens was x shekels.

The average price of all the products sold that day (including the additional pens) was 7 shekels.

- Find x .

6. A certain species of flower has stems whose lengths have a normal distribution.

The average length of the stems of these flowers is 26 cm.

7% of the flower stems are longer than 35 cm.

א. Find the standard deviation of the length of the stems.

ב. What percentage of the flower stems are shorter than 20 cm?

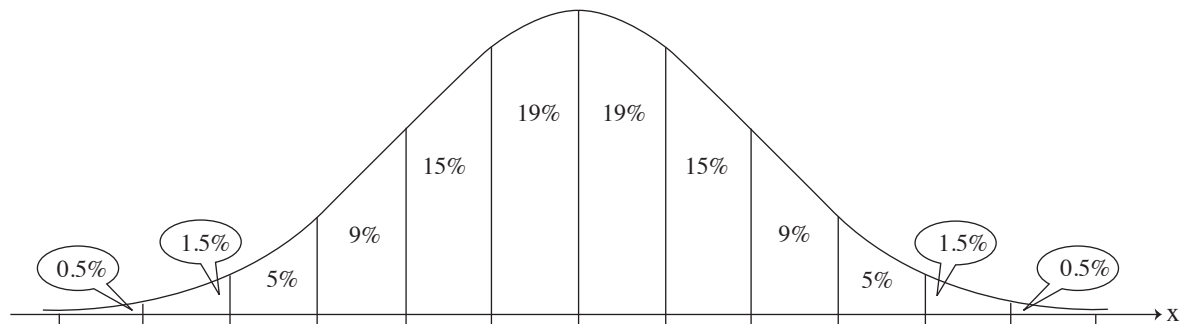
Flowers whose stems are longer than 35 cm and flowers whose stems are shorter than 20 cm are sold on the local market. The rest of the flowers are exported.

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

In a certain month, 24,000 flowers of this species were picked.

ד. According to the normal distribution graph, how many flowers were exported in this month?

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