

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 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.

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.

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

הוראות

א. משך הבחינה: שעה וחצי.

ב. מבנה השאלון ומפתח ההערכה:

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. 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) לטיוטה יש להשתמש בדפים שבנוסח העברי של השאלון.
שימוש בטיוטה אחרת עלול לגרום לפסילת הבחינה.

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

Write **all** your calculations and answers in the **Hebrew exam booklet**.

Algebra

1. The figure on the right shows the parabola $y = 2x^2 - 10x + 14$ and a line whose equation is $y = 6x - 18$.

Point C is the vertex of the parabola.

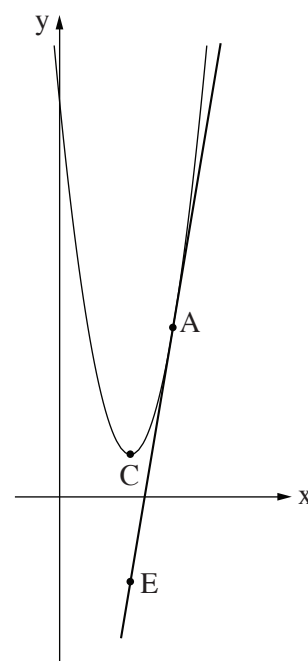
- א. Find the coordinates of Point C.
- ב. Find the intervals on which the parabola is increasing and decreasing.

The line and the parabola meet at Point A.

- ג. Find the coordinates of Point A.

Point E is located on the line and its x-coordinate is the same as the x-coordinate of Point C.

- ד. Find the coordinates of Point E.



2. Noa and Dafna are studying for an English test. Each of them is learning a total of 465 words. They began to study for the test on the same day.

Noa learned 10 words, and then on every consecutive day she learned 3 more words than on the previous day.

- א. How many words did Noa learn on the fifth day?
- ב. After how many days did Noa finish learning all the words for the test?

Dafna learned 31 words every day.

- ג. Did it take Noa and Dafna the same number of days to learn all the words required for the test? Explain your answer.

3. Gilad made plum jam. When he finished making the jam, its temperature was 50 degrees Celsius, and he put it in the refrigerator.
- In the refrigerator, the jam's temperature decreased by a fixed percentage every minute.
- 2 minutes after he put the jam in the refrigerator, its temperature was 48.02 degrees Celsius.
- Find by what percentage the jam's temperature decreases every minute.
 - Find the jam's temperature a quarter of an hour (15 minutes) after it was put in the refrigerator.
 - After one hour in the refrigerator, was the temperature of the jam less than 13 degrees Celsius? Explain your answer.

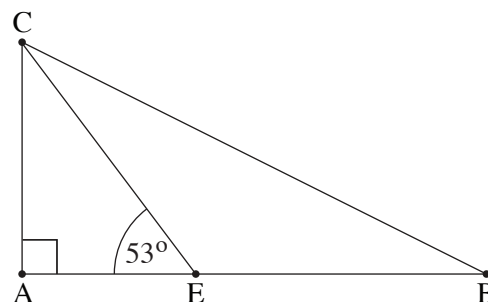
Trigonometry

4. The figure on the right shows a right triangle ABC ($\angle CAB = 90^\circ$).

Point E is located on Side AB such that $CE = BE$.

We know that $CE = 6$ and $\angle CEA = 53^\circ$.

- Find the length of Segment AC .
- Find the length of Segment AE .
- Find the area of Triangle ABC .
- Find the size of Angle ABC .
- Find the perimeter of Triangle CEB .



Probability and Statistics

5. The daily forecast of wave height in the Mediterranean Sea uses three terms to describe wave height: low, medium, or high.

Each day during a certain period, the probability of low waves is 0.6

and the probability of medium waves is 0.25.

- What is the probability of high waves on each day during this period?

Hadar plans to go to the Mediterranean Sea on two specific days during this period.

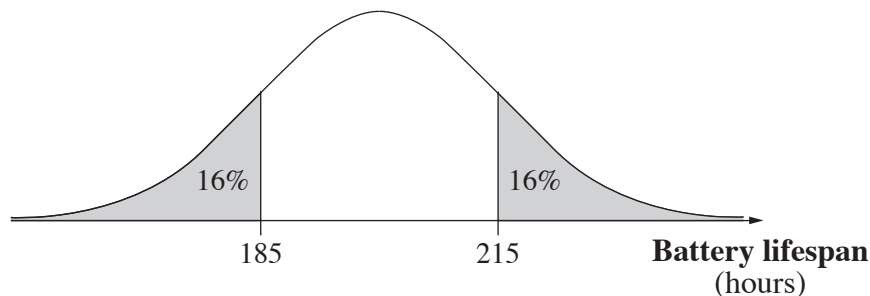
- What is the probability that there will be low waves on both days?
 - What is the probability of wave height being the same on both days?

Hadar only surfs in the Mediterranean Sea when the waves are medium or high.

- What is the probability that Hadar will surf on at least one of these two days?

6. The lifespan of batteries produced at certain factory has a normal distribution.

The normal distribution graph below shows the lifespan of the batteries produced at this factory.



- א. (1) Find the average lifespan of batteries produced at this factory.
(2) Find the standard deviation of the lifespan of batteries produced at this factory.
ב. Find the percentage of batteries from this factory whose lifespan is greater than 207.5 hours.

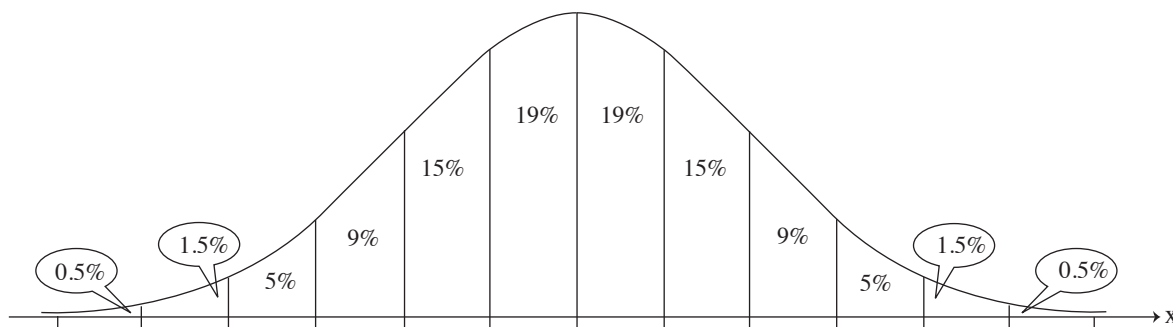
On a certain day this factory produced 248 batteries with a lifespan of more than 207.5 hours.

- ג. According to the normal distribution graph, how many batteries did the factory produce in total on that day?

2% of the batteries produced at this factory—those with the shortest lifespan—are considered defective.

- ד. Is a battery with a lifespan of 172 hours considered defective? Explain your answer.

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