

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 30 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. Do 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**.
If you use other draft paper your exam may be disqualified.

Note: At the back of the Hebrew exam booklet there is draft paper for you to use. Do not add any other paper to the exam booklet.

מתמטיקה

3 יחידות לימוד — שאלון שני

הוראות לנבחן

א. משך הבחינה: שעה וחצי.

ב. מבנה השאלון ומפתח ההערכה:

בשאלון זה שש שאלות.
לכל שאלה — 30 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 has six questions. A complete answer is worth 30 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

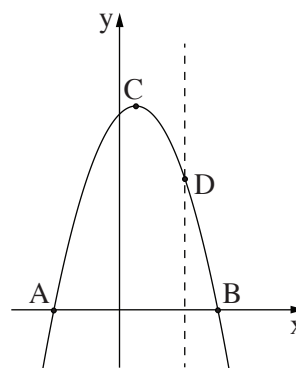
1. Given: the parabola $y = -x^2 + x + 6$.

The parabola intersects the x-axis at Points A and B ,
as shown in the figure (A is to the left of B).

- א. Find the coordinates of Points A and B .
ב. Find the coordinates of the vertex of the parabola, Point C .

Line $x = 2$ intersects the parabola at Point D, as shown
in the figure.

- ג. Find the coordinates of Point D .
ד. Calculate the area of Triangle ABD .



2. A bank offers its clients the opportunity to deposit their money in an annual savings account. The percentage of annual profit in this account is fixed.
- On 1/1/2010 Mr Israeli deposited 250,000 shekels in the savings account.
- On 1/1/2020 there were 370,061 shekels in Mr Israeli's savings account.
- We know that between these two dates Mr Israeli neither withdrew money from his savings account nor deposited any money in it.
- א. (1) By what factor did the amount in the savings account increase every year?
(2) What is the annual profit percentage in the savings account?
- ב. How much was in Mr Israeli's savings account on 1/1/2015 ?

3. Yaniv bought a computer in monthly installments that form an arithmetic sequence.

In the second and third month Yaniv paid 512 shekels in total.

In the fourth month Yaniv paid 400 shekels.

א. How much did Yaniv pay in the first month?.

In the last month Yaniv paid 592 shekels.

ב. In how many installments did Yaniv pay for his computer?

Trigonometry

4. Base ABCD of the quadrilateral right pyramid SABCD

is a rectangle.

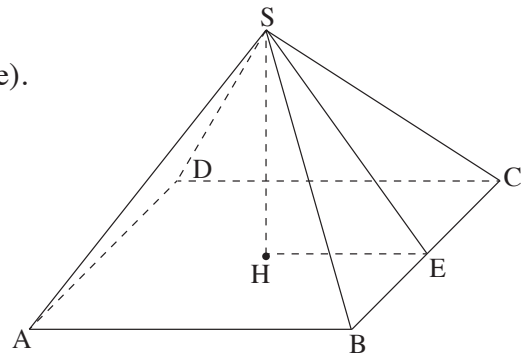
SE is a slant height of the lateral face SBC (see figure).

Given: $BC = 13 \text{ cm}$, $AB = 20 \text{ cm}$, $SE = 17 \text{ cm}$.

א. Find the length of the diagonal of the pyramid's base.

ב. Calculate the height of the pyramid, SH .

ג. Calculate the size of the angle between a lateral edge and the pyramid's base.



Probability and Statistics

5. Uri, Dani and Yossi are playing basketball and taking turns throwing the ball into the basket.

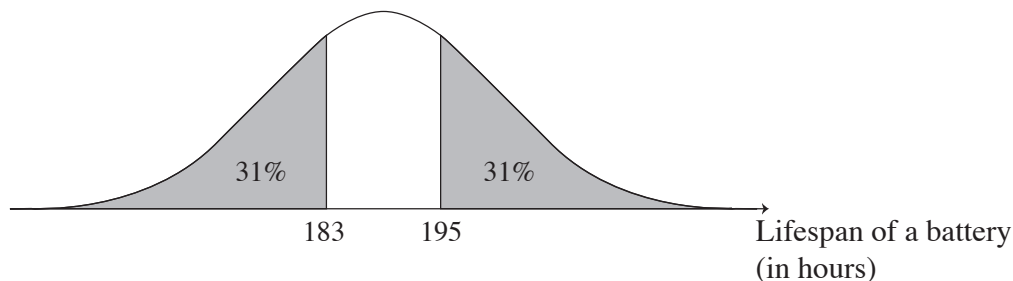
The probability that Uri scores a basket is 0.9 .

The probability that Dani scores a basket is 0.8 .

The probability that Yossi scores a basket is 0.7 .

- א. What is the probability that all three score a basket?
- ב. What is the probability that all three do not score a basket?
- ג. What is the probability that Uri does not score a basket but Dani and Yossi do score a basket?
- ד. What is the probability that exactly two of them score a basket?

6. The lifespan of a battery has a normal distribution. Its lifespan is measured in hours.
Below is a graph that describes the distribution of the lifespan of a battery.



א. (1) Find the average lifespan of a battery.

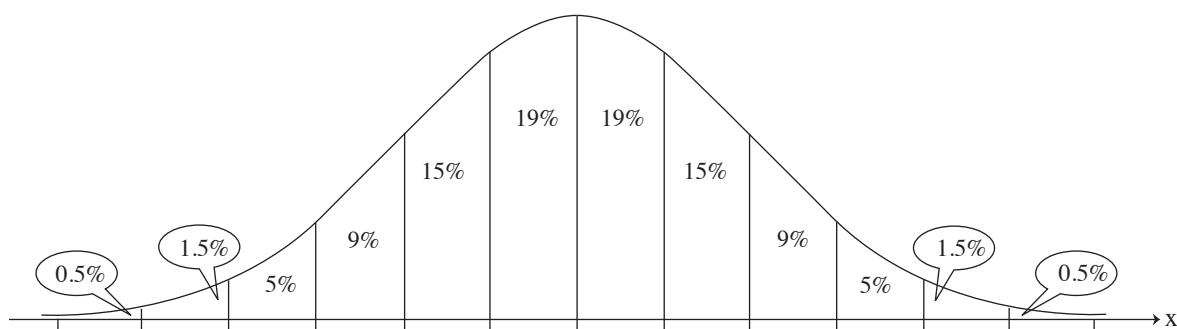
(2) Find the standard deviation.

ב. (1) What percentage of batteries have a lifespan longer than 171 hours?

(2) A factory bought 1,000 batteries.

According to the normal distribution curve, how many of these batteries have a lifespan that is longer than 171 hours?

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