The State of Israel
Ministry of Education
Exam Type: *Bagrut*
Exam Date: Summer 2017, ***Moed Bet***
Exam Number: 035381
Appendix: Formula sheets for 3 points
English Translation (3)

מדינת ישראל
משרד החינוך
סוג הבחינה: . בגרות
מועד הבחינה: קיץ תשע"ז, **מועד ב**
מספר השאלון: 035381
נספח: דפי נוסחאות ל־3 יחידות לימוד
תרגום לאנגלית (3)

Mathematics
Reform for Meaningful Learning Program
Second Questionnaire — 3 Points

מ ת מ ט י ק ה
על פי תכנית הרפורמה ללמידה משמעותית
שאלון שני מ-3 יחידות לימוד

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 25 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. 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 of your calculations and answers in the Hebrew test 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 pages in the **Hebrew test booklet** (including those at the end of the booklet).
Use of other draft paper may lead to the disqualification of your exam.

הוראות לנבחן

א. משך הבחינה: שעה וחצי.

ב. מבנה השאלון ומפתח ההערכה:
בשאלון זה שש שאלות.
לכל שאלה — 25 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) לטיוטה יש להשתמש בדפים ש**בנוסח העברי של השאלון** (כולל הדפים שבסופו).
שימוש בטיוטה אחרת עלול לגרום לפסילת הבחינה.

Good Luck!

ב ה צ ל ח ה !

Questions

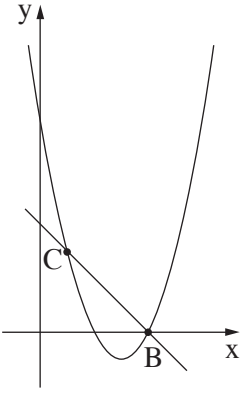
This exam has six questions. A complete answer is worth 25 points.
You may answer as many questions as you like, completely or partially,
but the maximum number of points that you can earn is 100.

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.

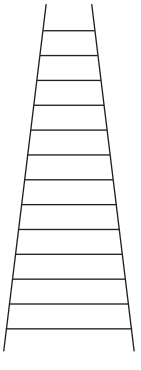
Algebra

1. The figure to the right shows the graphs of two functions:
   $f(x) = x^2 - 6x + 8$
   $g(x) = -x + 4$.
   The two graphs intersect at Points B and C,
   as shown in the figure.



   א. Find the coordinates of the vertex [קדקוד] of the parabola.
   ב. Find the intervals on which the parabola increases and decreases.
   ג. Find the coordinates of Points B and C.
   ד. Calculate the length of Segment BC.

2. A ladder has 13 wooden rungs. Each rung is shorter than the rung below it by a constant amount.
   The length of the lowest rung is 83 cm and the length of the fourth rung from the bottom is 71 cm (see figure).



   א. By how many cm is each rung on the ladder shorter than the rung below it?
   ב. Find the length of the rung that is fourth from the top of the ladder.
   ג. Calculate the total length of all the rungs on the ladder.

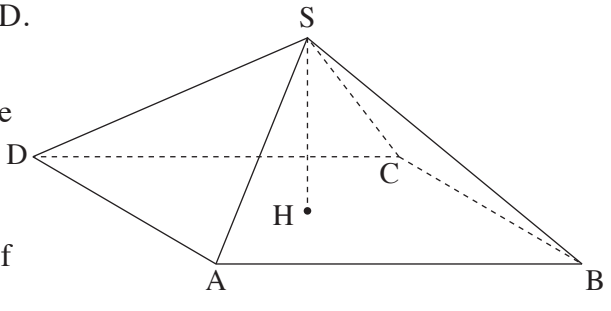
/Continued on page 3/

3. An experiment was conducted in a lab. In this experiment, bacteria were inserted into two test tubes at the same time.
   The first test tube contained 24,000 bacteria at the beginning of the experiment.
   The number of bacteria in the first test tube increased by 30% every month.
   א. How many bacteria did the first test tube contain 5 months after the experiment began?

   The second test tube contained 32,000 bacteria at the beginning of the experiment.
   The number of bacteria in the second test tube increased by a constant percentage every month.
   Two months after the experiment began, the second test tube contained 50,000 bacteria.
   ב. By what percentage did the number of bacteria in the second test tube increase every month?
   ג. Which test tube (the first or the second) contained more bacteria 5 months after the experiment began?

Trigonometry

4. Given: a right pyramid SABCD, whose base, ABCD, is a rectangle.
   SH is a height in the pyramid (see figure).
   Given: AC = 30 cm, AB = 25 cm, SH = 12 cm.
   א. Calculate the length of AD.
   ב. Calculate the size of the angle between a side edge of the pyramid and the pyramid's base.
   ג. Calculate the perimeter of the triangle ABS.



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Probability and Statistics

5. In an exam, a student can receive a grade ranging from 0 to 100.
   A student took four exams and got the following grades:
   58, 72, 80, and 90.
   א. (1) What is the average of these four grades?
      (2) What is the median of these four grades?
   The student took a fifth exam.
   ב. (1) What is the highest possible average grade he can get for all five exams?
      (2) What is the lowest possible average grade he can get for all five exams?
   ג. What grade must the student get in the fifth exam so that his average for the five exams will be 72?

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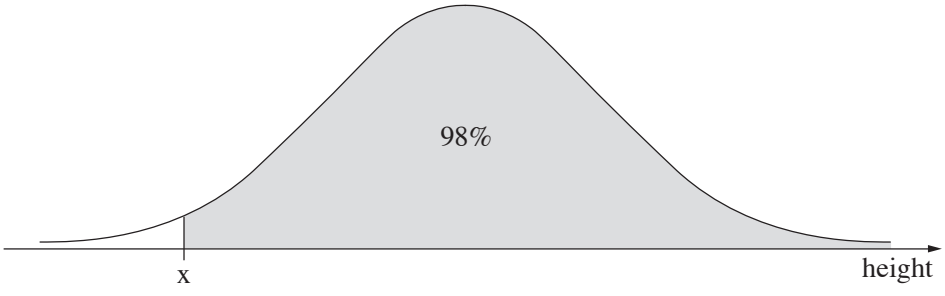
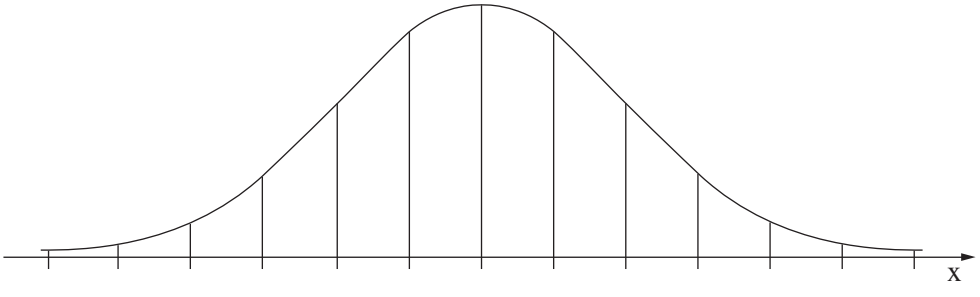
6. The heights of the children in a certain group have a normal distribution.
   The height of 69% of the children in the group is less than 146 cm.
   The height of 69% of the children in the group is greater than 140 cm.
   א. (1) Calculate the average height of the children in the group.
   (2) Calculate the standard deviation of the heights of the children in the group.
   ב. The height of 98% of the children in the group is greater than x cm (see figure). Find the value of x.



A sketch of a normal distribution curve (from the formula sheet) is shown below. You may use it in your calculations.



Good Luck!

בהצלחה!