The State of Israel
Ministry of Education
Exam Type: *Bagrut* for high schools
Exam Date: Summer 2011
Exam Number: 035801
Appendix: Formula sheets for 3 points
English Translation (3)

מדינת ישראל
משרד החינוך
סוג הבחינה: בגרות לבתי ספר על־יסודיים
מועד הבחינה: קיץ תשע"א, 2011
מספר השאלון: 035801
נספח: דפי נוסחאות ל־3 יחידות לימוד
תרגום לאנגלית (3)

Mathematics

3 Points — First Questionnaire
Experimental Program
(First questionnaire for examinees in the experimental program, 3 points)

Instructions for examinees

א. Duration of the exam: One hour and 15 minutes.

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 the 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 test booklet.**
(2) For draft paper, use pages in the answer booklet (including those at the end of the booklet) or paper you receive from the proctors. Use of other draft paper may lead to the disqualification of the exam.
(3) 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 the exam.

Note! You may answer in your mother tongue only if you have the special permission slip with you.

Good Luck !

/Continued on the following page/

מ ת מ ט י ק ה

3 יחידות לימוד - שאלון ראשון
תכנית ניסוי

(שאלון ראשון לנבחנים בתכנית ניסוי, 3 יחידות לימוד)

הוראות לנבחן

א. משך הבחינה: שעה ורבע.

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 בגוף השאלון.**
(2) לטיוטה יש להשתמש בדפים שבגוף השאלון (כולל הדפים שבסופו) או בדפים שקיבלת מהמשגיחים. שימוש בטיוטה אחרת עלול לגרום לפסילת הבחינה.
(3) הסבר את כל פעולותיך, כולל חישובים, בפירוט ובצורה ברורה ומסודרת.
חוסר פירוט עלול לגרום לפגיעה בציון או לפסילת הבחינה.

ב ה צ ל ח ה !

/המשך מעבר לדף/

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 test 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 the exam.

Algebra

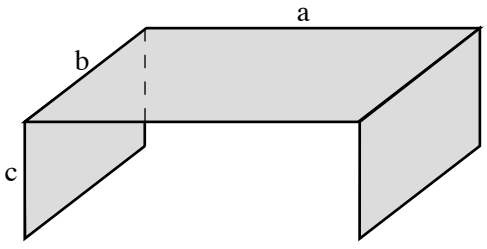
1. The cost of a cupboard, including delivery, was 700 shekels.
   Following an increase in the cost of wood, the cost of the cupboard itself increased by 15%, but the cost of delivery did not change.
   The total cost, including delivery, after the price increase is 796 shekels.
   א. A customer is interested in transporting the cupboard himself, in order to save money. Will the amount of money he saves by transporting it himself be greater, smaller or unchanged after the price increase?
   ב. Use x to represent the price of the cupboard alone before the increase, and express the price of delivery in terms of x.
   ג. Express the price of the cupboard alone after the increase in terms of x.
   ד. Find the price of the cupboard itself before the increase and the price of delivery.

/Continued on page 3/

/Continued on page 4/

2. A factory produces wooden tables.

Each table is made up of three rectangular wooden boards, as shown in the figure.



The dimensions of the table are:

a cm — length of the table

b cm — width of the table

c cm — height of the table

The total area of the wooden boards is calculated according to the formula:

$S = ab + 2bc$.

א. Which expression in the formula for calculating S represents the area of the upper surface of the table?

ב. A table was constructed using wooden boards that have a total area of 12,000 cm^2. The height of the table, c, is 70 cm.

(1) Write out an expression for the value of the width of the table, b (express b in terms of a).

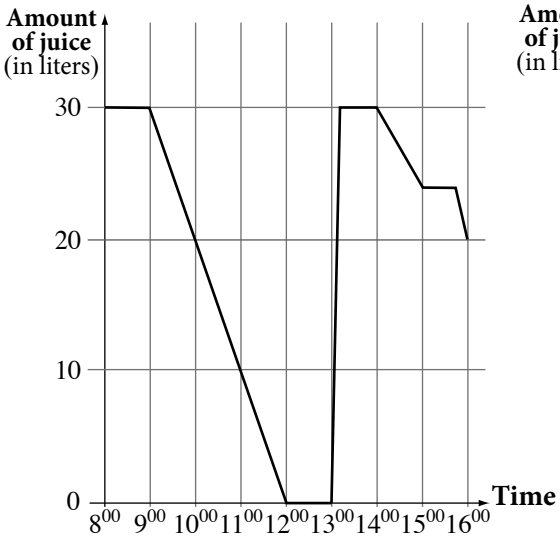
(2) Calculate the width, b, if it is known that the length of the table, a, is 100 cm.

/Continued on page 5/

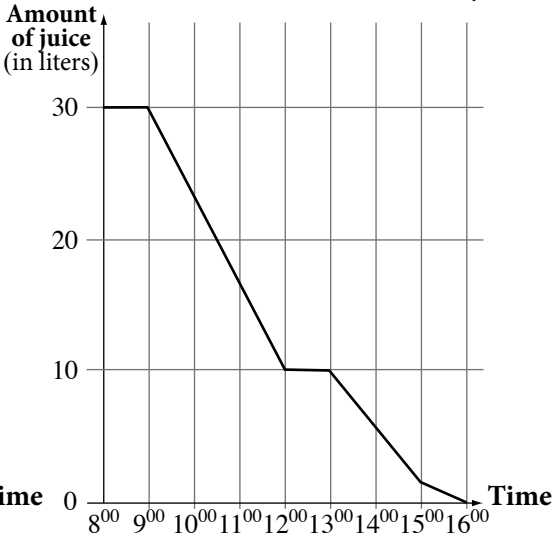
/Continued on page 6/

3. In a certain school, a juice machine is available to the students. If the machine is emptied during the course of the school day, it is refilled.
The students begin their school day at 8:00 in the morning and finish at 16:00 in the afternoon.
Two graphs are shown below:
Graph א describes the amount of juice in the machine over the course of a Sunday at the school.
Graph ב describes the amount of juice in the machine over the course of a Monday at the school.

Graph ב



Graph א



Study the graphs and answer Items א-ה.

א. How much juice was there in the machine at the beginning of the school day on Sunday?

ב. How many liters of juice did the students take from the machine between 9:00 and 12:00:
(1) on Sunday?
(2) on Monday?

ג. (1) At what time was the machine empty on Sunday?
(2) At what time was the machine empty on Monday?

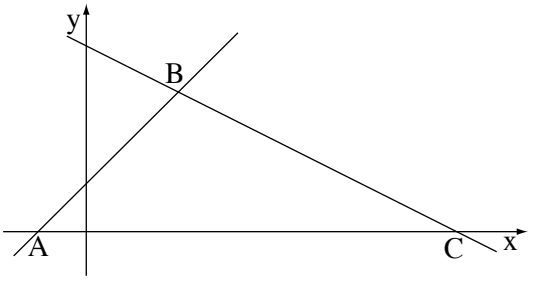
ד. What was the total number of liters of juice taken from the machine on Monday?

ה. On Monday, how much time passed from the moment that the machine was emptied until it began to dispense juice once again?

/Continued on page 7/

/Continued on page 8/

4. The line whose equation is $y = x + 2$, the line whose equation is $y = -\frac{1}{2}x + 8$ and the x-axis together form Triangle ABC (see figure).



א. Find the coordinates of the vertices A, B and C.

ב. Find the distance between the two vertices of the triangle that rest on the x-axis.

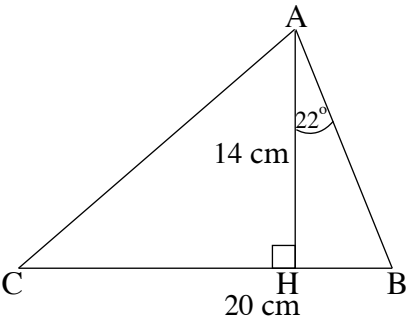
ג. Calculate the area of Triangle ABC.

/Continued on page 9/

/Continued on page 10/

Trigonometry

5. In Triangle ABC, the length of the height AH is 14 cm and the length of Side BC is 20 cm. The angle between Side AB and the height AH is 22° (see figure).



א. Calculate the length of Segment BH.

ב. Calculate the size of Angle ∢CAH.

/Continued on page 11/

/Continued on page 12/

Probability

6. A certain factory prints 600 raffle tickets and sells them to its workers.

A winning ticket will earn its owner one prize.

The prizes to be distributed in the raffle are:

1 car, 6 computers, 10 weekend getaways and 25 wall clocks.

What is the probability that a worker who bought one ticket:

א. will win the car?

ב. will win a wall clock?

ג. will win any prize?

ד. will not win any prize at all?

/Continued on page 13/

Good Luck! **בהצלחה!**

/Extra notebook pages are attached./