Board of Jewish Education of Greater New York
An Agency of UJA-Federation

2004 BJE High School Math Placement Test
First Semester Test ~ Math A1 ~ 1 hour & 15 minutes

Student's Name _____
Student's Elementary/Junior High School _____

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25. _____

Please check your work very carefully.

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Directions: Answer all questions in this part. Work is to be done in the space given for each problem. Then place your answers in the space given on the separate answer sheet. If additional space is necessary, use scrap paper and label your problems very carefully. You will have 1 hour and 15 minutes to complete the test.
Diagrams are not necessarily accurately drawn to scale.

1. Solve for y: $2y + 3.4 = 6.8$

2. The additive inverse of a – b is
   (A) $\frac{1}{a-b}$
   (B) -a + b
   (C) -a – b
   (D) a + b

3. Solve for x: $2x – (x – 5) = 4$

4. An experimenter planted 105 seeds, of which 84 sprouted. What percent of the seeds **failed** to sprout?

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5. Solve for x: $\frac{x-1}{3} = 8$

6. If the average of two numbers is 2x + 1 and one of the numbers is x, the other number is
   (A) x +1
   (B) 2x - 1
   (C) 3x + 1
   (D) 3x + 2

7. If k represents an odd integer, which expression represents an even integer?
   (A) k + 2
   (B) 3k + 1
   (C) 2k - 1
   (D) 3k - 2

8. Express -3(x – 3) – 10(1 – x) as a binomial.

9. Solve for **a in terms of q and p**: 3a – q = p

10. Expressed in scientific notation, 0.003146 is
    (A) 31.46×10^4
    (B) 3.146×10^3
    (C) 3.146×10^{-3}
    (D) 3.146×10^{-2}

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11. Two cars start at the same time and travel in opposite directions. The first averages 28 miles per hour and the second averages 35 miles per hour. In how many hours will they be 252 miles apart? Let x represent the number of hours when they are 252 miles apart. **Write an equation (do not solve)** that could be used to find the number of hours it will take before they are 252 miles apart.

12. Find three consecutive even integers such that the sum of the smallest and twice the second is 20 more than the third. If x represents the first even integer, **write an equation (do not solve)** that can be used to solve for x.

13. Find the value of $x^2 + x^3$ if $x = -3$

14. If the angles of a triangle are represented by 2x, 3x – 20, and 5x, the triangle must be
    (A) obtuse
    (B) right
    (C) acute
    (D) isosceles

15. Two angles are supplementary. The measure of one angle is 60 more than twice the measure of the other angle. What is the measure of the larger angle?

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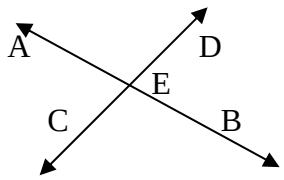
16. If the length of a side of a rhombus is represented by x + 3, which expression represents the perimeter of the rhombus?
    (A) 4x + 3
    (B) 4x + 12
    (C) $x^2 + 9$
    (D) $x^2 + 6x + 9$

17. What is the inverse of the statement "If it is snowing, then I will wear my boots?"
    (A) If I wear my boots, then it is snowing.
    (B) If I do not wear my boots, then it is not snowing.
    (C) If I wear my boots, then it is not snowing.
    (D) If it is not snowing, then I will not wear my boots.

18. Which inequality is true for the set 9, 12, 6, 7, 8, 9, 3?
    (A) mean<median<mode
    (B) median<mean<mode
    (C) mode<mean<median
    (D) mean<mode<median

19. In the accompanying diagram, lines AB and CD intersect in E. If the measure of angle AED = 3x + 16 and the measure of angle AEC = 6x - 34, find x.



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20.

Speed Interval	Frequency
96-100	**9**
91-95	**7**
86-90	**9**
81-85	**8**
76-80	**6**
71-75	**5**

The table shows the results of a math test given to a number of students.
How many students scored at, or below, the 25^{th} percentile?

21. A family consumes **q quarts** of milk in **d days**. The amount of milk consumed in **one day** is represented by

(A) $\frac{q}{d}$

(B) $\frac{d}{q}$

(C) qd

(D) q + d

22. In a class of 450 students, 300 are taking a mathematics course and 260 are taking a science course. If 140 of these students are taking both courses, how many students are not taking either of these two courses?

(A) 30

(B) 40

(C) 110

(D) 140

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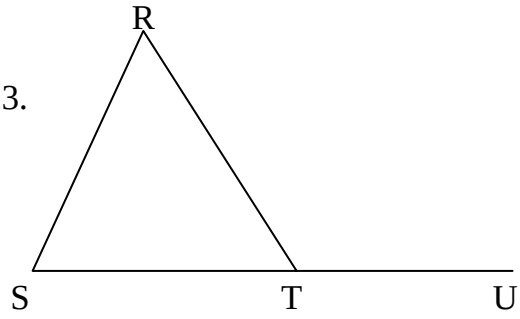
23. 

The measure of angle RTU is 3x + 40. If the measure of angle S is 70, and the measure of angle R is 81, find x.

24. Solve for x: $x - 6(1 + x) > 14$

25. Express $(1 - x)(3 + 8x)$ as a trinomial.

Please check your work very carefully.

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Second Semester Test ~ Math A2 ~ 1 hour & 45 minutes

Student's Name _____
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1. _____ 11. _____

2. _____ 12. _____

3. _____ 13. _____

4. _____ 14. _____

5. _____ 15. _____

6. _____ 16. _____

7. _____ 17. _____

8. _____ 18. _____

9. _____ 19. _____

10. _____ 20. _____

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Directions: Answer all questions in this part. Work is to be done in the space given for each problem. Then place your answers in the space given on the separate answer sheet. If additional space is necessary, use scrap paper and label your problems very carefully. You will have 1 hour and 45 minutes to complete the test.
Diagrams are not necessarily accurately drawn to scale.

1. Solve for x: $x^2 - 10x = -9$

2. Solve the following system for x: $x - 4y = 16$
   $y = 1 - x$

3. Multiply and express in <u>simplest</u> form.

$$\left[\frac{y^2 - 9y}{y^2 - 9}\right] \cdot \left[\frac{3 + y}{y - 9}\right]$$

4. In the graph of $y \leq -x$, which quadrant is completely shaded?
   (A) I
   (B) II
   (C) III
   (D) IV

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5. The expression $5\sqrt{3}$ - $\sqrt{27}$ is equivalent to

   (A) $-2\sqrt{3}$

   (B) $-8\sqrt{3}$

   (C) $2\sqrt{3}$

   (D) $8\sqrt{3}$

6. For what value of x is the expression $\frac{x+3}{10-x}$ undefined?

7. The length of the hypotenuse of a right triangle is 7 and the length of one leg is 4. What is the length of the other leg?

   (A) 3

   (B) $\sqrt{33}$

   (C) 11

   (D) $\sqrt{65}$

8. What is the slope of the line whose equation is 2y = 3x + 14?

9. What is the equation of the line parallel to the x – axis and 3 units above it?

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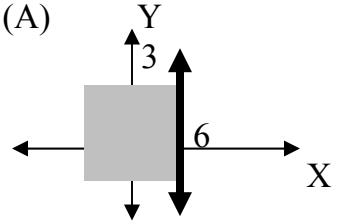
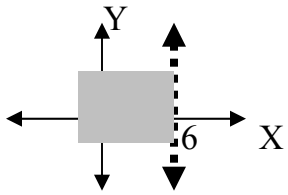
10. What is the area of the rectangle with coordinates A(0,0), B(6,0), C(6,3), and D(0,3)?

11. Which graph represents the inequality $x \leq 6$?

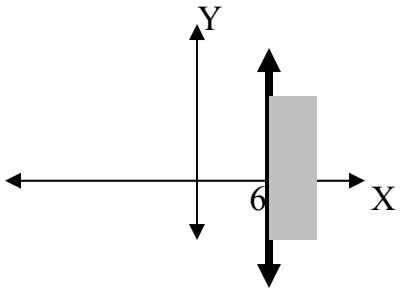
(A)



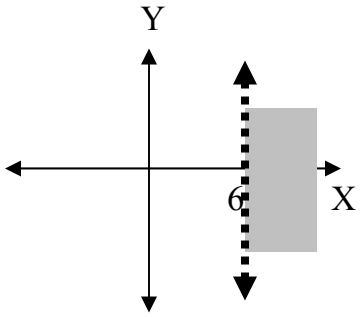
(B)



(C)



(D)



12. What is the area of a square whose perimeter is represented by 12x?

(A) $6x\sqrt{2}$

(B) $9x^2$

(C) $12x^2$

(D) $144x^2$

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13. Which is an irrational number?

(A) $\sqrt{.09}$

(B) 1.03

(C) $\sqrt{9.09}$

(D) $(3\sqrt{3})^2$

14. If a + b = c, and a = c, what is the numerical value of b?

15. Point P lies on the graph of $2x - y = 1$. If the abscissa of P is 2, what is the ordinate of P?

16. In which quadrilateral are the diagonals **always** equal?

(A) rectangle

(B) parallelogram

(C) rhombus

(D) trapezoid

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17. If the bases of a trapezoid are represented by 10x and 6x and the altitude of the trapezoid is 3x, express, in simplest form, the area of the trapezoid.

18. Solve for x: $\frac{x-3}{2x} = \frac{1}{3}$

19. A 12 – foot tree casts a 16 – foot shadow. How many feet tall is a nearby tree that casts a 20 – foot shadow at the same time?

20. How many times larger than $\frac{1}{4}$ x is 5x?

(A) 20
(B) 9
(C) $\frac{5}{4}$
(D) $\frac{4}{5}$

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Directions: Answer any three (3) out of five (5) questions. Show all work in the booklet and/or on scrap paper. Remember, diagrams are not necessarily accurately drawn to scale.

1. Rachel has a cellular phone that costs $12.95 per month plus 25 cents per minute for each call. Jordan has a cellular phone that costs $14.95 per month plus 15 cents per minute for each call. For what number of minutes do the two plans cost the same?

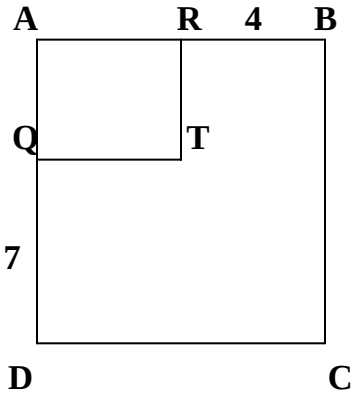
2a. Solve for x and check: $\frac{5+x}{2x} - 1 = \frac{x+1}{x}$

2b. Multiply and simplify: $\frac{(a+b)^2}{a} \bullet \frac{a^2b}{ab+b^2}$

3. When Tony received his weekly allowance, he decided to purchase candy bars for all of his friends. Tony bought **three Milk Chocolate bars** and **four Creamy Nougat bars**, which cost a total of $4.25. Then he realized his candy would not be enough for his friends, so he returned to the store and bought an additional **six Milk Chocolate bars** and **four Creamy Nougat bars**, which cost a total of $6.50. How much did **each** type of candy bar cost?

4. The sum of two numbers is 8. The sum of the squares of the numbers is 34. Find the numbers. **[Only an algebraic solution will be acceptable.]**

5.



If the area of rectangle ABCD is 108 square units, what is the length in units of the side of the **square ARTQ**? [**Only an algebraic solution will be acceptable**.]
Note: RB is 4 units and QD is 7 units.

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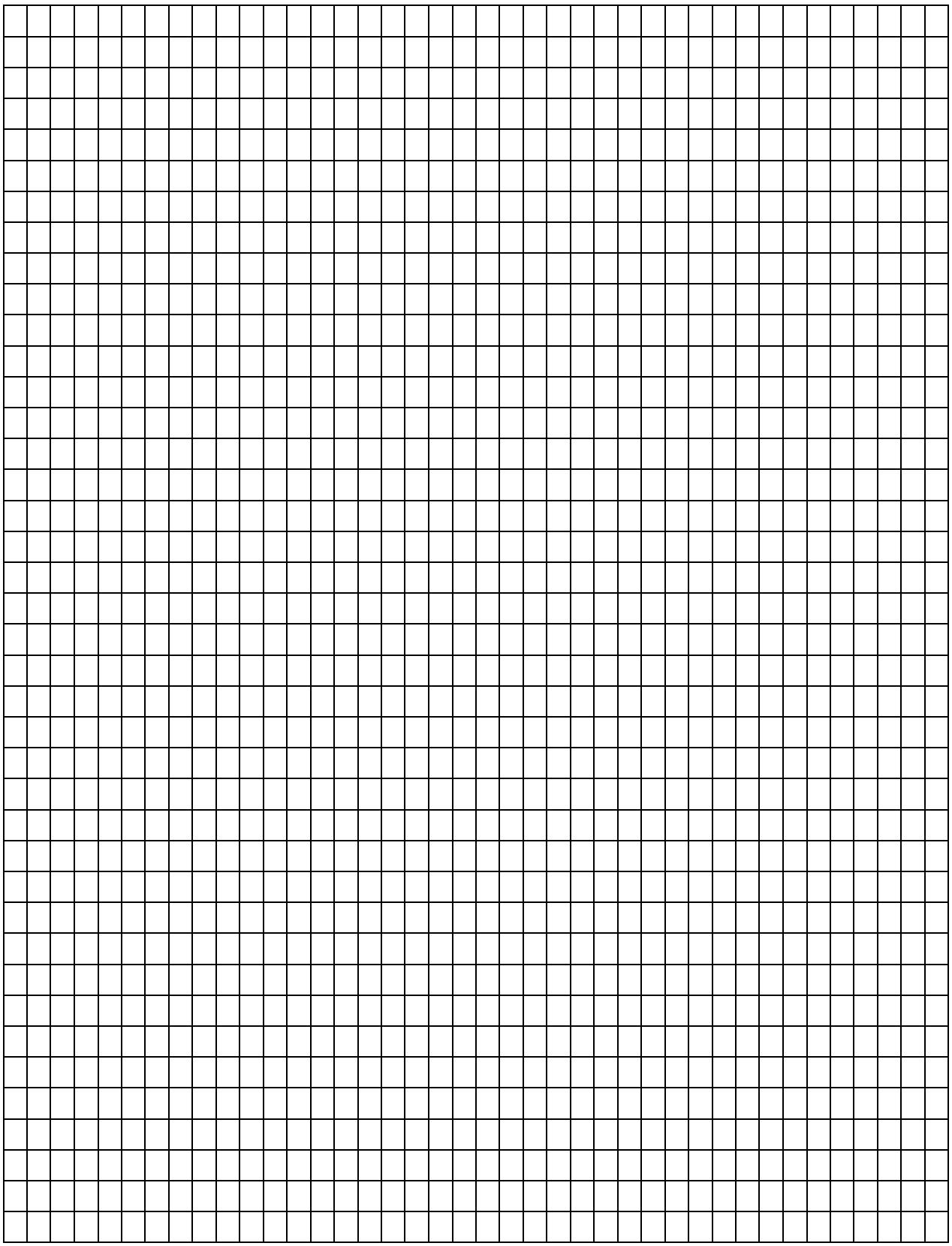

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2004 BJE High School Math Placement Test ~ Math A2 ~ 1 hour & 45 minutes

PART 1

1.	{9,1}	11.	A
2.	4	12.	B
3.	y/(y-3)	13.	C
4.	C	14.	0
5.	C	15.	3
6.	10	16.	A
7.	B	17.	$24x^2$
8.	$-\frac{3}{2}$	18.	9
9.	y = 3	19.	15
10.	18	20.	A

PART 2

1. Let x = time it takes before both plans cost the same amount; $1295 + 25x = 1495 + 15x$

   x = 20 minutes

2a. Rewriting the equation (common denominator) gives us the following:

$\frac{5+x}{2x} - \frac{2x}{2x} = \frac{2(x+1)}{2x}$; $5 + x - 2x = 2x + 2$;

x = 1

2b. Factoring and simplifying we have $\frac{(a+b)(a+b)}{a} \cdot \frac{a^2b}{b(a+b)}$

a(a+b)

3. Let x = cost of a Milk Chocolate bar; y = cost of a Creamy Nougat bar
   $3x + 4y = 425$; $6x + 4y = 650$; Subtracting the second equation from the first equation gives us $-3x = -225$, or x = 75 cents. Substituting for x gives us y = 50 cents.

   x = 75 cents and y = 50 cents

4. Let x = first number; (8-x) = second number;
   $x^2 + (8 - x)^2 = 34$; expanding, we have $x^2 + 64 - 16x + x^2 = 34$; $2x^2 - 16x + 64 = 34$;
   $2x^2 - 16x + 30 = 0$; $2(x^2 - 8x + 15) = 0$; $2(x - 5)(x - 3) = 0$

   x = 5 and (8 – x) = 3

5. Let x = side of the square; $(4 + x)(7 + x) = 108$; multiplying out we have
   $28 + 7x + 4x + x^2 = 108$; $x^2 + 11x - 80 = 0$; $(x + 16)(x - 5) = 0$; x = -16(reject) and x = 5

   x = 5 units