DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.
Part I

Answer 30 questions from this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Write your answers in the spaces provided on the separate answer sheet. Where applicable, answers may be left in terms of $\pi$ or in radical form.

1. David has 7 blue pens, 6 black pens, and 5 red pens in his desk drawer. If he selects a pen at random, what is the probability that it will be either blue or black?

2. Solve for $x$: $0.05x - 2 = 8$

3. Let $p$ represent “The Sun is shining,” and let $q$ represent “Jaclyn is swimming.” Using $p$ and $q$, write in symbolic form, “If Jaclyn is not swimming, then the Sun is not shining.”

4. Solve for $x$: $\frac{x - 2}{8} = \frac{5}{4}$

5. Solve for $x$: $3x + 3 = 15 + 9x$

6. Express the sum of $4x^2 - 3x + 2$ and $-2x^2 + 7x + 3$ as a trinomial.

7. The lengths of the sides of $\triangle ABC$ are 4, 5, and 6. If the length of the longest side of similar triangle $DEF$ is 18, find the length of the shortest side of $\triangle DEF$.

8. In the accompanying diagram, $\overline{AB}$ and $\overline{CD}$ intersect at point $E$. If $m\angle AEC = 3x + 12$ and $m\angle DEB = x + 24$, find the value of $x$.

9. If $x$ varies directly as $y$ and $x = 10$ when $y = 3$, find $x$ when $y = 12$.

10. Solve the following system of equations for $x$:

   $x - 2y = 5$

   $3x + 2y = 23$

11. In $\triangle ABC$ below, $m\angle B = 55$ and an exterior angle at $C$ measures $105^\circ$. What is $m\angle A$?

   ![Diagram of triangle ABC with angles labeled]

12. A boy knows a telephone number begins with 777 and that the last four digits are 1, 2, 3, and 4, but he does not know their order. What is the maximum number of calls he would have to make to get the right number?

13. Two angles are complementary. The measure of one angle is twice as large as the measure of the other angle. What is the total number of degrees in the measure of the smaller angle?

14. In an isosceles triangle, the measure of a base angle is $65^\circ$. Find the number of degrees in the measure of the vertex angle.

Directions (15–35): For each question chosen, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question.

15. If $a = 2$ and $b = -1$, the expression $3ab^2$ is equal to

   (1) 6
   (2) 12
   (3) 36
   (4) $-12$
16 The distance from the Sun to the planet Neptune is about 2,790,000,000,000 miles. Expressed in scientific notation, this distance in miles is
(1) $2.79 \times 10^9$
(2) $2.79 \times 10^{-9}$
(3) $27.9 \times 10^7$
(4) $27.9 \times 10^{-7}$

17 Marcia has 5 blouses, 4 pairs of pants, and 3 pairs of shoes. How many different outfits made up of 1 blouse, 1 pair of pants, and 1 pair of shoes are possible for her to wear?
(1) 12
(2) 19
(3) 23
(4) 60

18 Which graph represents the inequality $-3 < x \leq 2$?

(1) ![Graph 1]
(2) ![Graph 2]
(3) ![Graph 3]
(4) ![Graph 4]

19 In the diagram below, figure B is the image of figure A under which transformation?

A

(1) line reflection
(2) rotation
(3) translation
(4) dilation

B

20 What is the slope of the graph of the equation $y = \frac{1}{2}x - 7$?
(1) $\frac{1}{2}$
(2) 2
(3) $-\frac{1}{2}$
(4) $-7$

21 If a parallelogram has a base of 6x and a height of 2x, what is the area of the parallelogram in terms of x?
(1) 12x
(2) 16x
(3) $12x^2$
(4) $16x^2$

22 The chart below shows how the cost of a specific notebook varied over a 5-week period.

<table>
<thead>
<tr>
<th>Week</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$5.00</td>
</tr>
<tr>
<td>2</td>
<td>$5.25</td>
</tr>
<tr>
<td>3</td>
<td>$3.00</td>
</tr>
<tr>
<td>4</td>
<td>$3.50</td>
</tr>
<tr>
<td>5</td>
<td>$4.75</td>
</tr>
</tbody>
</table>

Based on the chart, which statement is true about the cost of this notebook over this period?
(1) The mode was $3.00.
(2) The mean was $4.30.
(3) The median was $4.50.
(4) The median was $3.00.

23 If the radius of a circle is doubled, what change takes place in the circumference of the circle?
(1) It remains the same.
(2) It is multiplied by 2.
(3) It is multiplied by 4.
(4) It is multiplied by 8.

24 If $(x - 13)$ is one factor of $x^2 - 9x - 52$, the other factor is
(1) $(x + 4)$
(2) $(x - 4)$
(3) $(x + 5)$
(4) $(x - 39)$

25 Which type of symmetry does the letter H have?
(1) line symmetry, only
(2) point symmetry, only
(3) both point and line symmetry
(4) neither point nor line symmetry

26 Given two statements: $x \rightarrow y$ and $\neg x \rightarrow \neg y$. In which way is the second statement related to the first?
(1) converse
(2) contrapositive
(3) inverse
(4) biconditional

27 Which property is illustrated by the equation $-8 + 0 = -8$?
(1) additive inverse
(2) additive identity
(3) commutative property
(4) distributive property
28 The expression $\sqrt{8} - \sqrt{50}$ is equivalent to
   (1) $-7\sqrt{2}$  (3) $-3\sqrt{2}$
   (2) $-\sqrt{42}$  (4) $5\sqrt{2}$

29 Dawn is 3 years older than her sister Sara. If Dawn's age is represented by $x$, which expression represents Sara's age?
   (1) $3x$  (3) $\frac{1}{3}x$
   (2) $x + 3$  (4) $x - 3$

30 If the lengths of the legs of a right triangle are 3 and 8, what is the length of the hypotenuse?
   (1) $\sqrt{5}$  (3) $\sqrt{55}$
   (2) $\sqrt{11}$  (4) $\sqrt{73}$

31 When $8x^4 - 8x$ is divided by $8x$, the quotient is
   (1) $x^3$  (3) $x^3 - x$
   (2) $x^2$  (4) $x^3 - 1$

32 Which point is not on the line $2x - y = 3$?
   (1) $(1,-1)$  (3) $(3,-3)$
   (2) $(-1,-5)$  (4) $(7,11)$

33 If the diagonals of a parallelogram are perpendicular but not congruent, then the parallelogram is
   (1) a rectangle
   (2) a rhombus
   (3) a square
   (4) an isosceles trapezoid

34 In the table below, which interval contains the upper quartile?

<table>
<thead>
<tr>
<th>Interval</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>91–100</td>
<td>3</td>
</tr>
<tr>
<td>81–90</td>
<td>5</td>
</tr>
<tr>
<td>71–80</td>
<td>4</td>
</tr>
<tr>
<td>61–70</td>
<td>5</td>
</tr>
<tr>
<td>51–60</td>
<td>3</td>
</tr>
</tbody>
</table>

(1) 51–60  (3) 81–90
(2) 71–80  (4) 91–100

35 What is the solution set of $y^2 - y - 12 = 0$?
   (1) $[3,4]$  (3) $[-12,1]$  
   (2) $[3,-4]$  (4) $[-3,4]$
Answers to the following questions are to be written on paper provided by the school.

Part II

Answer four questions from this part. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Calculations that may be obtained by mental arithmetic or the calculator do not need to be shown. [40]

36 Solve the following system of equations algebraically and check.

\[
\begin{align*}
\frac{2}{3}x + y &= 13 \\
-x + 2y &= 5
\end{align*}
\] [8, 2]

37 Adam bought a package of marbles and sorted all of them by color as shown in the accompanying graph.

<table>
<thead>
<tr>
<th>Number of Marbles</th>
<th>Red</th>
<th>White</th>
<th>Black</th>
<th>Yellow</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

![Marbles Graph]

a What was the total number of marbles in the package? [1]

b If one marble was selected at random, find the probability that it was red, black, or yellow. [1]

c If two marbles were selected at random, with replacement, find the probability that
(1) the first marble was red and the second was yellow [2]
(2) one of the two marbles was blue [1]

d If two marbles were selected at random, without replacement, find the probability that
(1) two red marbles were selected [2]
(2) neither marble selected was red or black [3]

38 a On the same set of coordinate axes, graph this system of inequalities:

\[
\begin{align*}
3y &\geq 2x - 6 \\
x + y &> 7
\end{align*}
\] [8]

b Based on the graph drawn in part a, write the coordinates of a point in the solution set of this system of inequalities. [2]

39 Linda's Video Store sold three times as many Titanic tapes as Godzilla tapes. The price of a Titanic tape is $20 and the price of a Godzilla tape is $15. If her total sales for these tapes was $2250, what is the total number of each video that she sold? [Show or explain the procedure used to obtain your answer.] [10]

40 In the accompanying diagram, the length of each leg of isosceles trapezoid ABCD is 5 centimeters. The length of DC is 6 centimeters longer than the length of AB, and the perimeter of trapezoid ABCD is 36 centimeters. Circle O is inscribed in the trapezoid. Radius OE equals 2 centimeters. Find the area of the shaded region to the nearest tenth of a square centimeter. [10]

41 Find two consecutive integers such that the sum of three times the larger and twice the square of the smaller is 12. [Only an algebraic solution will be accepted.] [14, 6]
42  a On your answer paper, copy and complete the truth table for the tautology below. [8]

\[
\begin{array}{|c|c|c|c|c|c|c|}
\hline
p & q & \sim p & q \to p & \sim (q \to p) & \sim p \land q & \sim (q \to p) \iff \sim (p \land q) \\
\hline
& & & & & & T \\
& & & & & & T \\
& & & & & & T \\
& & & & & & T \\
\hline
\end{array}
\]

Let \( p \) represent “I will bake a cake” and let \( q \) represent “Company comes.”

b  Based on the tautology in part a, which sentence is equivalent to “It is not true that if company comes, then I will bake a cake”? [2]

(1) If I do not bake a cake, then company comes.
(2) I do not bake a cake or company comes.
(3) I do not bake a cake and company comes.
(4) If company comes, then I will bake a cake.
The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH – COURSE I

Tuesday, June 22, 1999 — 1:15 to 4:15 p.m., only

ANSWER SHEET

Pupil ........................................... Sex: □ Male □ Female Grade ............
Teacher ........................................... School .................................

Your answers to Part I should be recorded on this answer sheet.

Part I

Answer 30 questions from this part.

1 ........................................... 11 ........................................... 21 ........................................... 31 ...........................................
2 ........................................... 12 ........................................... 22 ........................................... 32 ...........................................
3 ........................................... 13 ........................................... 23 ........................................... 33 ...........................................
4 ........................................... 14 ........................................... 24 ........................................... 34 ...........................................
5 ........................................... 15 ........................................... 25 ........................................... 35 ...........................................
6 ........................................... 16 ........................................... 26 ...........................................
7 ........................................... 17 ........................................... 27 ...........................................
8 ........................................... 18 ........................................... 28 ...........................................
9 ........................................... 19 ........................................... 29 ...........................................
10 ......................................... 20 ........................................... 30 ...........................................

Your answers for Part II should be placed on paper provided by the school.

The declaration below should be signed when you have completed the examination.

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination, and that I have neither given nor received assistance in answering any of the questions during the examination.

________________________
Signature

Math, Course 1 – June '99

[7]