The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, June 17, 1992 — 9:15 a.m. to 12:15 p.m., only

Notice . . .

Calculators must be available to all students taking this examination.

The last page of the booklet is the answer sheet. Fold the last page along the perforations and, slowly and carefully, tear off the answer sheet. Then fill in the heading of your answer sheet.

When you have completed the examination, you must sign the statement printed at the end of the answer paper, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer paper cannot be accepted if you fail to sign this declaration.

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 π or in radical form. [60]

1 A letter is chosen at random from the word "REGENTS." Find the probability that the letter chosen is an E.

2 Let p represent the statement "The triangle is isosceles," and let q represent the statement "The triangle is scalene." Write in symbolic form: "If the triangle is isosceles, then the triangle is *not* scalene."

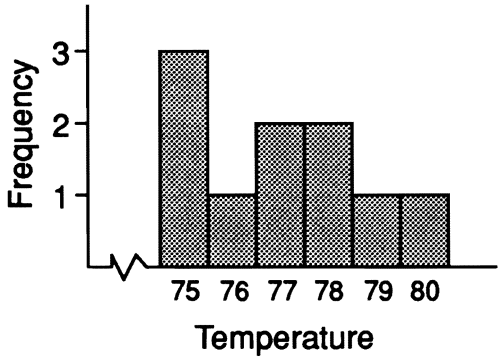
3 Solve for x: $3(2x - 1) = x + 2$

4 In a basketball game, the number of points scored by five members of the team were 28, 20, 16, 15, and 8. How many players scored fewer than the mean number of points?

5 Solve for x: $0.5x - 12 = 3.5$

6 If $x = 5$ and $y = -2$, what is the value of $\frac{2x - y}{3}$?

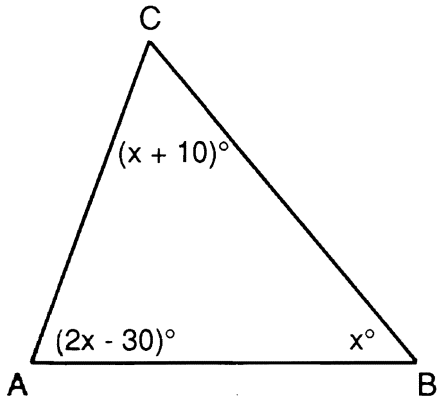
7 The histogram below shows the distribution of temperatures for ten days. Which temperature is the mode?



8 A rectangle has an area of 20. If the length of the rectangle is doubled and the width remains the same, what is the area of the new rectangle?

9 Solve for y: $\frac{3}{4}y - 8 = 1$

10 In the accompanying diagram, $m\angle A = 2x - 30$, $m\angle B = x$, and $m\angle C = x + 10$. Find the number of degrees in $\angle B$.

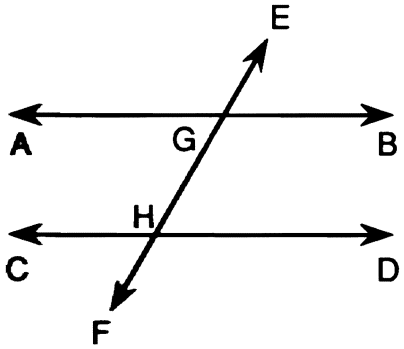


11 If $x = 4y$, what is the value of $\frac{x}{y}$, $y \neq 0$?

12 What is the inverse of $\sim s \rightarrow t$?

13 The sides of a triangle measure 6, 11, and 15. If the smallest side of a similar triangle measures 4, find the length of its longest side.

14 In the accompanying diagram, $\overleftrightarrow{AB}$ is parallel to $\overleftrightarrow{CD}$ and transversal $\overleftrightarrow{EF}$ intersects $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ at G and H, respectively. If $m\angle DHG : m\angle BGH = 1:2$, find $m\angle DHG$.



15 The length of a rectangular solid is 3.0 meters, the width is 0.6 meter, and the height is 0.4 meter. Find, to the *nearest tenth*, the number of cubic meters in the volume of the solid.

16 If the coordinates of the vertices of $\triangle ABC$ are $A(-5,0)$, $B(5,0)$, and $C(0,8)$, what is the area of the triangle?

17 Which value for n makes this sentence true?

$$0.00045 = 4.5 \times 10^n$$

18 The area of a circle is 49π. Find, in terms of π, the circumference of the circle.

19 If x varies directly as y and $x = 3$ when $y = 4$, find x when $y = 20$.

Directions (20–35): 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.

20 If $n + 7$ represents an even number, the next larger even number is represented by

(1) $n + 8$
(2) $n + 9$
(3) $10n + 7$
(4) $2n + 7$

21 What is the total number of lines of symmetry in a square?

(1) 1
(2) 2
(3) 0
(4) 4

22 If $3x + c = 4$, then x equals

(1) $4 - c$
(2) $\frac{4 - c}{3}$
(3) $\frac{c - 4}{3}$
(4) $c - 4$

23 If $-21a^6b$ is divided by $-3a^2b$, the quotient is

(1) $7a^4$
(2) $-7a^3$
(3) $7a^3b$
(4) $7a^4b$

24 Which is the greatest integer that makes the inequality $3 - 2x > 9$ a true statement?

(1) -2
(2) 2
(3) 5
(4) -4

25 Let p represent "x is prime," and let q represent "x is even." Which statement is true if $x = 2$?

(1) $\sim p \wedge q$
(2) $\sim q \wedge p$
(3) $p \wedge q$
(4) $\sim(p \wedge q)$

26 A line is represented by the equation $y = 3x - 7$. Which statement about the line is true?

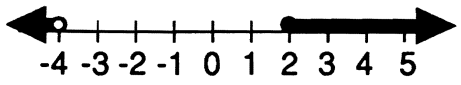
(1) The slope of the line is $\frac{1}{3}$.

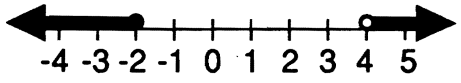
(2) The y-intercept is -7.

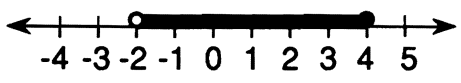
(3) Point (1,4) lies on the line.

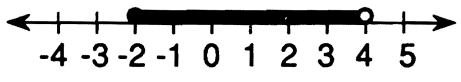
(4) This line is parallel to the line whose equation is $y = 2x - 7$.

27 Which graph shows the solution set of $-2 \leq x < 4$?

(1)


(2)


(3)


(4)


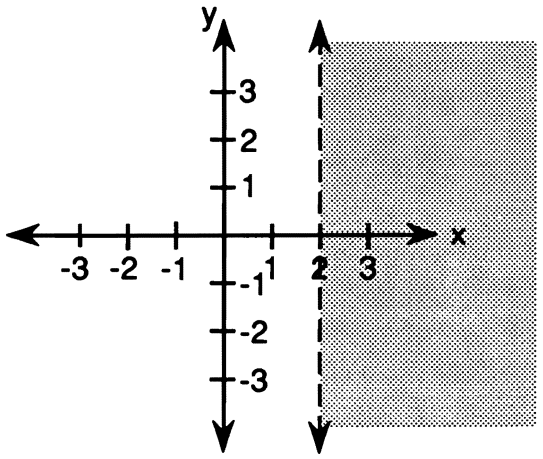
28 The expression $\sqrt{500}$ is equivalent to

(1) $5\sqrt{10}$
(2) $10\sqrt{5}$
(3) $500\sqrt{2}$
(4) $5\sqrt{100}$

29 If the length and width of a rectangle are 8 and 5, the length of a diagonal is

(1) 89
(2) $\sqrt{39}$
(3) $\sqrt{89}$
(4) $\sqrt{13}$

30 Which inequality is illustrated in the accompanying graph?



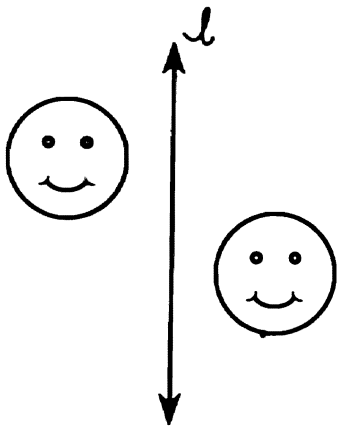
(1) $x > 2$
(2) $x < 2$
(3) $y > 2$
(4) $y < 2$

31 The perimeter of a rectangle is $12x + 4$. If the width is $2x$, the length of the rectangle is
(1) $6x + 2$
(2) $6x - 2$
(3) $4x + 2$
(4) $4x - 2$

32 The solution set for $2x^2 - 7x - 4 = 0$ is
(1) $\{2,-1\}$
(2) $\left\{-\frac{1}{2},4\right\}$
(3) $\{-2,1\}$
(4) $\left\{\frac{1}{2},-4\right\}$

33 In parallelogram $ABCD$, $m\angle A = 2x + 50$ and $m\angle C = 3x + 40$. The measure of $\angle A$ is
(1) 18°
(2) 20°
(3) 70°
(4) 86°

34 In the accompanying diagram, the faces are congruent.



Which transformation is illustrated?
(1) a reflection in line l
(2) a dilation
(3) a translation
(4) a rotation

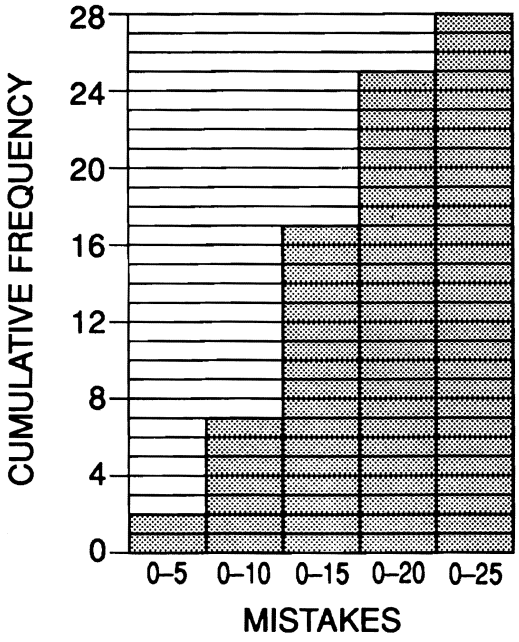
35 If the probability that an event will occur is p, what is the probability that the event will *not* occur?
(1) $1 - p$
(2) $p - 1$
(3) p
(4) $\frac{1}{p}$

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 The cumulative frequency histogram below shows the number of mistakes 28 students in a French language class made on a test.



a *On your answer paper,* copy and complete the frequency table below using the data shown in the cumulative frequency histogram. [4]

Frequency Table

Number of Mistakes	Number of Students
0–5	
6–10	
11–15	
16–20	
21–25	

b If the number of mistakes John made is included in the interval that contains the median, what is the maximum number of mistakes that John could have made? [2]

c What percent of the French class made fewer than 11 mistakes? [2]

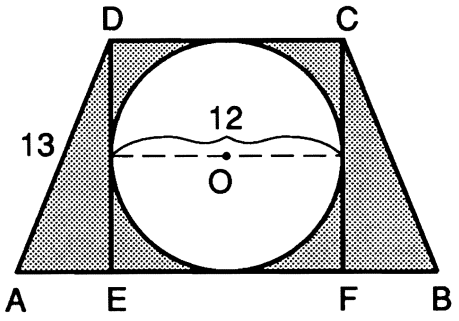
d What is the probability that a student selected at random made *at least* 16 mistakes? [2]

37 Find three positive consecutive integers such that the product of the first and second is two more than three times the third. [*Only an algebraic solution will be accepted.*] [5,5]

38 *a* *On your answer paper*, construct and complete a truth table for the statement $(p \leftrightarrow q) \rightarrow (\sim p \vee q)$. [9]

b From the truth table constructed in part *a*, is the statement $(p \leftrightarrow q) \rightarrow (\sim p \vee q)$ a tautology? [1]

39 In the accompanying diagram, *ABCD* is an isosceles trapezoid with bases $\overline{AB}$ and $\overline{DC}$, $DA = 13$, *CDEF* is a square, and circle *O* has a diameter of 12. The length of a side of the square is equal to the diameter of the circle.



a Find the measure of

(1) $\overline{AE}$ [2]

(2) $\overline{AB}$ [1]

b Find the area of trapezoid *ABCD*. [2]

c Find the area of the circle in terms of π. [2]

d Using $\pi = 3.14$, find, to the *nearest integer*, the area of the shaded region. [3]

40 The width of a rectangle is two more than a side of a square. The length of the rectangle is one less than twice the side of the square. If the area of the rectangle is 68 more than the area of the square, find the measure of a side of the square. [*Show or explain the procedure used to obtain your answer.*] [10]

41 *a* On the same set of coordinate axes, graph the following system of inequalities. Label the region that represents the solution set *S*.

$$y - 2x \geq 0$$
$$x + y < 6$$ [8]

b Write the coordinates of a point that does *not* satisfy either inequality graphed in part *a*. [2]

42 The letters **M**, **A**, **T**, and **H** are put in a jar.

a One letter is drawn at random from the jar, not replaced, and then a second letter is drawn.

(1) Draw a tree diagram or list the sample space showing all possible outcomes. [4]

(2) Find the probability that one of the two letters selected has both horizontal and vertical line symmetry. [2]

(3) Find the probability that both letters selected have at least one line of symmetry. [2]

b Using all the letters **M**, **A**, **T**, and **H**, how many different four-letter arrangements can be made? [2]

Tear Here

Tear Here

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Wednesday, June 17, 1992 — 9:15 a.m. to 12:15 p.m., only

Use only *red* ink or *red* pencil in rating Regents papers. Do not attempt to *correct* the pupil's work by making insertions or changes of any kind. Use checkmarks to indicate pupil errors.

Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Part I

Allow a total of 60 credits, 2 credits for each of 30 of the following. [If more than 30 are answered, only the first 30 answered should be considered.] Allow no partial credit. For questions 20–35, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

(1) $\frac{2}{7}$

(2) $p \rightarrow \sim q$

(3) 1

(4) 3

(5) 31

(6) 4

(7) 75

(8) 40

(9) 12

(10) 50

(11) 4

(12) $s \rightarrow \sim t$

(13) 10

(14) 60

(15) 0.7

(16) 40

(17) –4

(18) 14π

(19) 15

(20) 2

(21) 4

(22) 2

(23) 1

(24) 4

(25) 3

(26) 2

(27) 4

(28) 2

(29) 3

(30) 1

(31) 3

(32) 2

(33) 3

(34) 3

(35) 1

[OVER]

Part II

Please refer to the Department's pamphlet *Guide for Rating Regents Examinations in Mathematics*. Care should be exercised in making deductions as to whether the error is purely a mechanical one or due to a violation of some principle. A mechanical error generally should receive a deduction of 10 percent, while an error due to a violation of some cardinal principle should receive a deduction ranging from 30 percent to 50 percent, depending on the relative importance of the principle in the solution of the problem.

Note: In October 1991, a supplement to the *Guide for Rating Regents Examinations in Mathematics* was sent to all schools. This supplement includes references to problem solving and calculator use. Teachers should become familiar with these modifications before rating student papers.

(36) *b* 15 [2]

c 25 [2]

d $\frac{11}{28}$ [2]

(37) 4, 5, 6 [5,5]

(38) *b* Yes [1]

(39) *a* (1) 5 [2]

(2) 22 [1]

b 204 [2]

c 36π [2]

d 91 [3]

(40) 7 [10]

(42) *a* (2) $\frac{6}{12}$ [2]

(3) 1 [2]

b 24 [2]