

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, August 14, 1984 — 8:30 to 11:30 a.m., only

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.

1 If the probability of an event *not* happening is $\frac{7}{10}$, what is the probability that the event will happen?

2 Solve for x : $3x + 5 = 17$

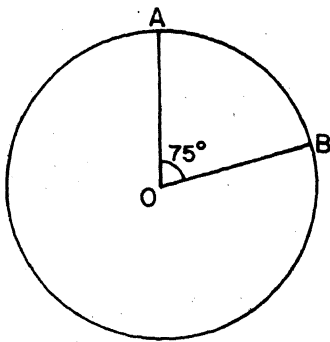
3 If the replacement set for the variable x is $\{2, 9, 21, 54, 83\}$, what is the solution set for the inequality $3x < 54$?

4 Let p represent "This is an easy exam" and let q represent "I know my Course I material." Using p and q , write in symbolic form: "This is an easy exam or I know my Course I material."

5 Evaluate $5a^2 - b$ if $a = -2$ and $b = 3$.

6 Solve for x : $0.06x = 1.8$

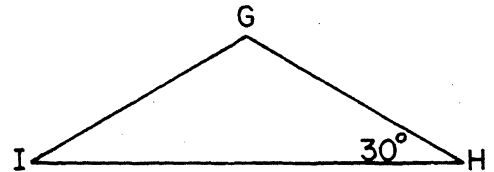
7 As shown in the accompanying diagram, the measure of central angle AOB is 75° . What is the number of degrees in the measure of minor arc AB ?



8 A picnic cooler contains 8 cans of cola and 4 cans of ginger ale. If one can is removed at random, what is the probability that it is a can of cola?

9 Find the number of square centimeters in the area of a triangle with a base of 10 centimeters and an altitude of 5 centimeters.

10 In the accompanying diagram, triangle GHI is isosceles with side \overline{HI} as the base. If $m\angle H = 30^\circ$, find $m\angle G$.

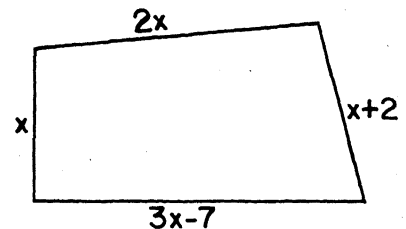


11 The point whose coordinates are $(4, k)$ lies on the line whose equation is $y = 3x - 2$. Find the value of k .

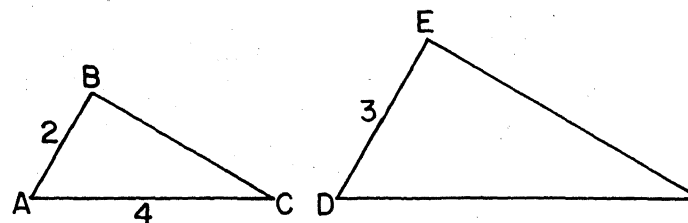
12 If n represents an integer, express the next larger consecutive integer in terms of n .

13 A team won 15 out of 20 games. What percent of the games did the team win?

14 In the accompanying diagram, the lengths of the sides of the quadrilateral are represented by x , $2x$, $x + 2$, and $3x - 7$. Express the perimeter as a binomial in terms of x .



15 In the diagram below, $\triangle ABC$ is similar to $\triangle DEF$, with $\angle A \cong \angle D$, $\angle B \cong \angle E$, and $\angle C \cong \angle F$. If $AB = 2$, $AC = 4$, and $DE = 3$, find DF .



16 The mean for the set of data 7, x , 6, 11 is 9. Find the value of x .

17 Solve for x : $\frac{2}{3}x - 3 = 5$

18 The measures of two supplementary angles are in the ratio 1:5. Find the number of degrees in the measure of the smaller angle.

19 Factor: $x^2 - 3x - 10$

20 If $C = \pi d$, solve for π in terms of C and d .

Directions (21–34): 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.

21 If $p \wedge q$ is a true statement, then

- (1) p is true and q is false
- (2) p is false and q is true
- (3) both p and q are false
- (4) both p and q are true

22 A line has a slope of -2 and a y -intercept of 3. An equation of the line is

- (1) $y = 2x + 3$
- (2) $y = 3x - 2$
- (3) $y = 3x + 2$
- (4) $y = -2x + 3$

23 Which describes the graph of the equation $y = -2$ on the coordinate plane?

- (1) a line parallel to the x -axis and 2 units above it
- (2) a line parallel to the x -axis and 2 units below it
- (3) a line parallel to the y -axis and 2 units to the right of it
- (4) a line parallel to the y -axis and 2 units to the left of it

24 The hypotenuse of a right triangle has a length of 15. If one leg has a length of 12, find the length of the other leg.

- (1) 9
- (2) 27
- (3) 3
- (4) $\sqrt{369}$

25 The quotient of $\frac{-4a^6b^2}{2a^2b}$ is

- (1) $2a^3b^2$
- (2) $-2a^4b^2$
- (3) $-2a^4b$
- (4) $-6a^3b$

26 If the length of a rectangle is doubled and its width is multiplied by 4, the area of the rectangle is multiplied by

- (1) 6
- (2) 2
- (3) 8
- (4) 4

27 Which is the converse of the statement $p \rightarrow \sim q$?

- (1) $\sim p \rightarrow \sim q$
- (2) $\sim q \rightarrow p$
- (3) $q \rightarrow \sim p$
- (4) $q \rightarrow p$

28 The expression $4!$ is equivalent to

- (1) 24
- (2) 2
- (3) 16
- (4) 4

29 Which is a rational number?

- (1) $\sqrt{6}$
- (2) $\sqrt{2}$
- (3) $\sqrt{3}$
- (4) $\sqrt{4}$

30 The value of ${}_6P_2$ is

- (1) 6
- (2) 12
- (3) 30
- (4) 720

31 What is the median for the following data?
3, 4, 4, 6, 7, 12

- (1) 9
- (2) 6
- (3) 5
- (4) 4

32 The expression $2\sqrt{2} + \sqrt{50}$ is equivalent to

- (1) $7\sqrt{2}$
- (2) $27\sqrt{2}$
- (3) $2\sqrt{52}$
- (4) $3\sqrt{52}$

33 One factor of $25x^2 - 9$ is $5x - 3$. The other factor is

- (1) $5x - 3$
- (2) $5x + 3$
- (3) $-5x - 3$
- (4) $-5x + 3$

34 If $a < b$ is false, which statement must be true?

(1) $a > b$

(2) $a = b$

(3) $a \leq b$

(4) $a \geq b$

Directions (35): Leave all construction lines on the answer sheet.

35 *On the answer sheet,* using a compass and straightedge, construct an equilateral triangle using \overline{AB} as a side.

Answers to the following questions are to be written on paper provided by the school.

Part II

Answer four questions from this part. Show all work unless otherwise directed.

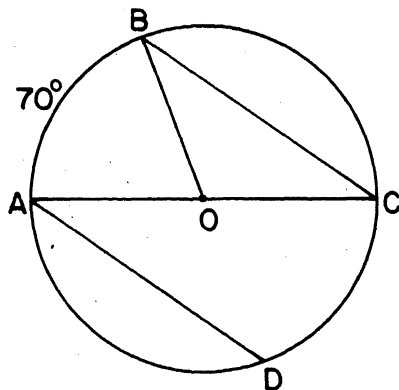
- 36 *a* On the same set of coordinate axes, graph the following system of inequalities:

$$\begin{aligned} y &< -3x + 5 \\ x - y &\geq 2 \end{aligned} \quad [8]$$

- b* Write the coordinates of a point in the solution set of the graph drawn in answer to part *a*. [2]

- 37 A square and a rectangle have equal areas. The length of the rectangle is twice the length of the side of the square. The width of the rectangle is 2 less than the length of the side of the square. Find the length of the side of the square. [Only an algebraic solution will be accepted.] [5,5]

- 38 In the accompanying diagram, \overline{AC} is a diameter of circle O . Chord \overline{AD} is parallel to chord \overline{BC} . The measure of arc AB is 70° .



- a* Find, in degrees, the measure of angle AOB . [2]
b Find, in degrees, the measure of angle ACB . [2]
c Find, in degrees, the measure of angle CAD . [2]
d Find, in degrees, the measure of angle OBC . [2]
e If the area of circle O is 64π , find the circumference of circle O in terms of π . [2]
- 39 Solve the following system of equations algebraically and check:

$$\begin{aligned} 2x - 3y &= 10 \\ 5x + 2y &= 6 \end{aligned} \quad [8,2]$$

- 40 A fair coin and a fair die are tossed simultaneously.

- a* Make a tree diagram or list the sample space showing all possible outcomes. [4]
b What is the probability of getting a head and an even number? [2]
c What is the probability of getting a 7 and a head? [2]
d What is the probability of getting a 5 or a tail? [2]

- 41 *a* On your answer paper, construct a truth table for the statement $\sim(p \vee q) \rightarrow (\sim p \wedge \sim q)$. [9]

- b* Using your results from part *a*, is $\sim(p \vee q) \rightarrow (\sim p \wedge \sim q)$ a tautology? [1]

- 42 The table below shows the distribution of bowling scores.

Interval	Frequency	Cumulative Frequency
91-110	10	
111-130	13	
131-150	8	
151-170	4	
171-190	4	
191-210	5	

- a* On your answer paper, copy the table and complete the Cumulative Frequency column. [2]
b Using the data in the Cumulative Frequency column of the table, draw a cumulative frequency histogram. [4]
c Use your results from part *b* to answer the following questions.
 (1) In which interval does the median lie? [2]
 (2) In which interval does the upper quartile lie? [2]

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REGENTS HIGH SCHOOL EXAMINATION

SEQUENTIAL MATH — COURSE I

Tuesday, August 14, 1984 — 8:30 to 11:30 a.m., only

Part I Score
Part II Score
Total Score
Rater's Initials:

ANSWER SHEET

Pupil.....Teacher.....

School.....Grade.....

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 Answer question
35 on the other
side of this
sheet. |
| 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

FOR TEACHERS ONLY

SCORING KEY

THREE-YEAR SEQUENCE FOR HIGH SCHOOL MATHEMATICS

COURSE I

Tuesday, August 14, 1984 — 8:30 to 11:30 a.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 21–34, allow credit if the pupil has written the correct answer instead of the numeral 1, 2, 3, or 4.

- | | | | |
|--------------------|-----------------------|--------|-------------------|
| (1) $\frac{3}{10}$ | (11) 10 | (21) 4 | (31) 3 |
| (2) 4 | (12) $n + 1$ | (22) 4 | (32) 1 |
| (3) 2, 9 | (13) 75 | (23) 2 | (33) 2 |
| (4) $p \vee q$ | (14) $7x - 5$ | (24) 1 | (34) 4 |
| (5) 17 | (15) 6 | (25) 3 | (35) construction |
| (6) 30 | (16) 12 | (26) 3 | |
| (7) 75 | (17) 12 | (27) 2 | |
| (8) $\frac{8}{12}$ | (18) 30 | (28) 1 | |
| (9) 25 | (19) $(x - 5)(x + 2)$ | (29) 4 | |
| (10) 120 | (20) $\frac{C}{d}$ | (30) 3 | |

[OVER]

Part II

Please refer to the Department's pamphlet *Suggestions on the Rating of Regents Examination Papers 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.

(37) Analysis	[5]	(40) $b \frac{3}{12}$	[2]
4	[5]	$c \ 0$	[2]
		$d \ \frac{7}{12}$	[2]
(38) $a \ 70$	[2]		
$b \ 35$	[2]		
$c \ 35$	[2]	(41) $b \ \text{yes}$	[1]
$d \ 35$	[2]		
$e \ 16\pi$	[2]		
		(42) $c \ (1) \ 111-130$	[2]
		$(2) \ 151-170$	[2]
(39) $x = 2$	[8]		
$y = -2$			
check	[2]		