285 students
142 passing
50% pass rate

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA 2/TRIGONOMETRY

Friday, June 14, 2013 — 1:15 to 4:15 p.m., only

Student Name: _____

School Name: _____

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

Print your name and the name of your school on the lines above.

A separate answer sheet for Part I has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet.

This examination has four parts, with a total of 39 questions. You must answer all questions in this examination. Record your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in Parts II, III, and IV directly in this booklet. All work should be written in pen, except for graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc.

The formulas that you may need to answer some questions in this examination are found at the end of the examination. This sheet is perforated so you may remove it from this booklet.

Scrap paper is not permitted for any part of this examination, but you may use the blank spaces in this booklet as scrap paper. A perforated sheet of scrap graph paper is provided at the end of this booklet for any question for which graphing may be helpful but is not required. You may remove this sheet from this booklet. Any work done on this sheet of scrap graph paper will *not* be scored.

When you have completed the examination, you must sign the statement printed at the end of the answer sheet, 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 sheet cannot be accepted if you fail to sign this declaration.

Notice...

A graphing calculator and a straightedge (ruler) must be available for you to use while taking this examination.

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

ALGEBRA 2/TRIGONOMETRY

Part I

Answer all 27 questions in this part. Each correct answer will receive 2 credits. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [54]

Use this space for computations.

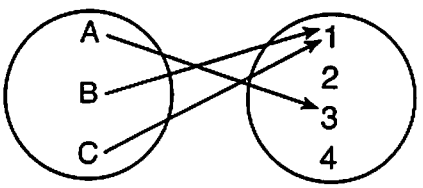
1 A market research firm needs to collect data on viewer preferences for local news programming in Buffalo. Which method of data collection is most appropriate?

11 (1) census
260 (2) survey
11 (3) observation
3 (4) controlled experiment

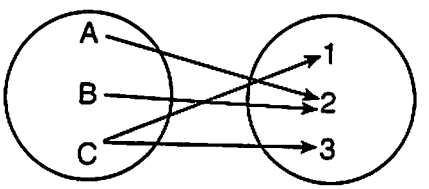
2 What is the number of degrees in an angle whose radian measure is $\frac{8\pi}{5}$?

14 (1) 576
238 (2) 288
16 (3) 225
15 (4) 113

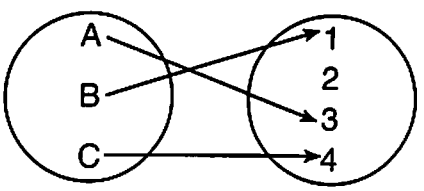
3 Which diagram represents a relation that is both one-to-one and onto?



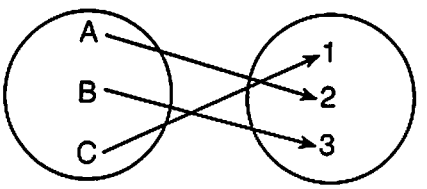
13 (1)



38 (3)



19 (2)



215 (4)

Use this space for computations.

4 The sum of the first eight terms of the series $3 - 12 + 48 - 192 + \ldots$ is

10 (1) $-13{,}107$

257 (3) $-39{,}321$

8 (2) $-21{,}845$

10 (4) $-65{,}535$

5 The simplest form of $\dfrac{1 - \frac{4}{x}}{1 - \frac{2}{x} - \frac{8}{x^2}}$ is

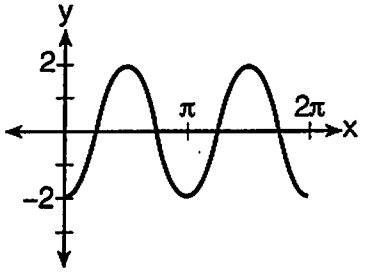
33 (1) $\frac{1}{2}$

19 (3) $\frac{x}{3}$

177 (2) $\frac{x}{x+2}$

51 (4) $-\frac{x}{x-2}$

6 Which equation represents the graph below?



38 (1) $y = -2\sin 2x$

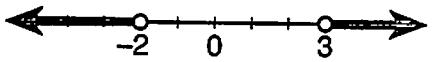
212 (3) $y = -2\cos 2x$

12 (2) $y = -2\sin\frac{1}{2}x$

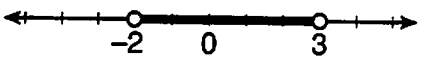
23 (4) $y = -2\cos\frac{1}{2}x$

7 What is the graph of the solution set of $|2x - 1| > 5$?

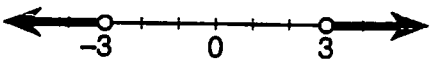
Use this space for computations.



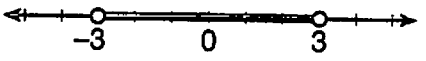
205 (1)



27 (2)

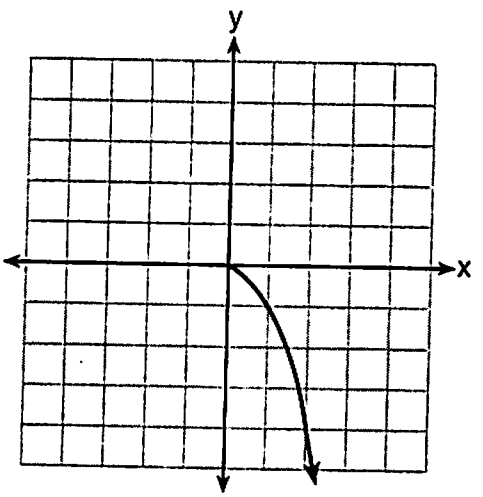


42 (3)



11 (4)

8 What is the range of the function shown below?



30 (1) $x \leq 0$

22 (2) $x \geq 0$

199 (3) $y \leq 0$

34 (4) $y \geq 0$

Use this space for computations.

9 The expression $\sin(\theta + 90)°$ is equivalent to

12 (1) $-\sin\theta$

32 (2) $-\cos\theta$

42 (3) $\sin\theta$

199 (4) $\cos\theta$

10 The points $(2,3)$, $(4,\frac{3}{4})$, and $(6,d)$ lie on the graph of a function. If y is inversely proportional to the square of x, what is the value of d?

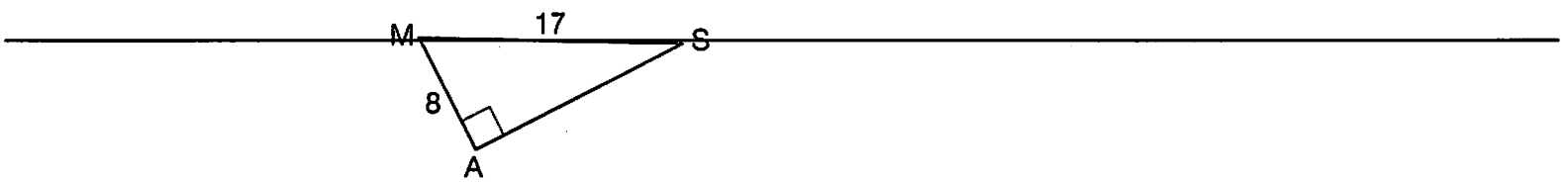
26 (1) 1

177 (2) $\frac{1}{3}$

53 (3) 3

28 (4) 27

11 In the right triangle shown below, what is the measure of angle S, to the *nearest minute*?



58 (1) 28°1′

193 (2) 28°4′

23 (3) 61°56′

11 (4) 61°93′

12 Which ordered pair is in the solution set of the system of equations shown below?

$$y^2 - x^2 + 32 = 0$$
$$3y - x = 0$$

26 (1) (2,6)

36 (2) (3,1)

22 (3) (−1,−3)

201 (4) (−6,−2)

Use this space for computations.

13 Susie invests \$500 in an account that is compounded continuously at an annual interest rate of 5%, according to the formula $A = Pe^{rt}$, where A is the amount accrued, P is the principal, r is the rate of interest, and t is the time, in years. Approximately how many years will it take for Susie's money to double?

30 (1) 1.4

196 (3) 13.9

24 (2) 6.0

35 (4) 14.7

14 If n is a negative integer, then which statement is always true?

43 (1) $6n^{-2} < 4n^{-1}$

144 (3) $6n^{-1} < 4n^{-1}$

43 (2) $\frac{n}{4} > -6n^{-1}$

55 (4) $4n^{-1} > (6n)^{-1}$

15 The expression $4 + \sum_{k=2}^{5} 3(k - x)$ is equal to

18 (1) $58 - 4x$

61 (3) $58 - 12x$

38 (2) $46 - 4x$

167 (4) $46 - 12x$

16 Which value of r represents data with a strong positive linear correlation between two variables?

146 (1) 0.89

89 (3) 1.04

13 (2) 0.34

43 (4) 0.01

Use this space for computations.

17 Which problem involves evaluating ${}_6P_4$?

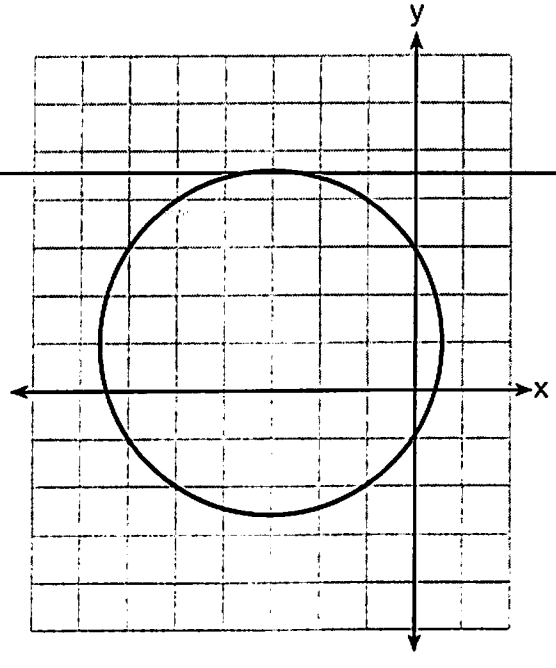
174 (1) How many different four-digit ID numbers can be formed using 1, 2, 3, 4, 5, and 6 without repetition?

56 (2) How many different subcommittees of four can be chosen from a committee having six members?

35 (3) How many different outfits can be made using six shirts and four pairs of pants?

20 (4) How many different ways can one boy and one girl be selected from a group of four boys and six girls?

18 Which equation is represented by the graph below?



67 (1) $(x - 3)^2 + (y + 1)^2 = 5$

50 (2) $(x + 3)^2 + (y - 1)^2 = 5$

22 (3) $(x - 1)^2 + (y + 3)^2 = 13$

145 (4) $(x + 3)^2 + (y - 1)^2 = 13$

Use this space for computations.

19 If $x = 3i$, $y = 2i$, and $z = m + i$, the expression xy^2z equals

39 (1) $-12 - 12mi$

151 (3) $12 - 12mi$

41 (2) $-6 - 6mi$

54 (4) $6 - 6mi$

20 An angle, P, drawn in standard position, terminates in Quadrant II if

51 (1) $\cos P < 0$ and $\csc P < 0$

107 (3) $\csc P > 0$ and $\cot P < 0$

85 (2) $\sin P > 0$ and $\cos P > 0$

48 (4) $\tan P < 0$ and $\sec P > 0$

21 The expression $\log 4m^2$ is equivalent to

165 (1) $2(\log 4 + \log m)$

134 (3) $\log 4 + 2\log m$

40 (2) $2\log 4 + \log m$

6 (4) $\log 16 + 2\log m$

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22 In $\triangle PQR$, p equals

29 (1) $\frac{r \sin P}{\sin Q}$

61 (3) $\frac{r \sin R}{\sin P}$

148 (2) $\frac{r \sin P}{\sin R}$

46 (4) $\frac{q \sin R}{\sin Q}$

23 If $\tan\left(\text{Arc}\cos\frac{\sqrt{3}}{k}\right) = \frac{\sqrt{3}}{3}$, then k is

48 (1) 1

28 (3) $\sqrt{2}$

154 (2) 2

52 (4) $3\sqrt{2}$

Use this space for computations.

24 Which expression is equivalent to $\frac{2x^{-2}y^{-2}}{4y^{-5}}$?

130 (1) $\frac{y^3}{2x^2}$

19 (3) $\frac{2x^2}{y^3}$

8 (2) $\frac{2y^3}{x^2}$

55 (4) $\frac{x^2}{2y^3}$

25 Expressed with a rational denominator and in simplest form, $\frac{x}{x-\sqrt{x}}$ is

107 (1) $\frac{x^2+x\sqrt{x}}{x^2-x}$

25 (3) $\frac{x+\sqrt{x}}{1-x}$

62 (2) $-\sqrt{x}$

91 (4) $\frac{x+\sqrt{x}}{x-1}$

26 What is the common ratio of the sequence $\frac{1}{64}a^5b^3, -\frac{3}{32}a^3b^4, \frac{9}{16}ab^5, \ldots$?

81 (1) $-\frac{3b}{2a^2}$

38 (3) $-\frac{3a^2}{b}$

138 (2) $-\frac{6b}{a^2}$

27 (4) $-\frac{6a^2}{b}$

27 In $\triangle KLM$, $KL = 20$, $LM = 13$, and $m\angle K = 40$. The measure of $\angle M$

161 (1) must be between 0° and 90°

10 (2) must equal 90°

32 (3) must be between 90° and 180°

82 (4) is ambiguous