Part I

Answer all 30 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question. [60]

Use this space for computations.

1 An example of an equation is

(1) $2x^2 - 4x + 12$

(2) $|x - 6|$

(3) $4(x + 6)(x - 2)$

(4) $2x = x^2 + 3$

2 The greatest common factor of $3m^2n + 12mn^2$ is

(1) $3n$

(2) $3m$

(3) $3mn$

(4) $3mn^2$

3 Jeremy is hosting a Halloween party for 80 children. He will give each child *at least* one candy bar. If each bag of candy contains 18 candy bars, which inequality can be used to determine how many bags, c, Jeremy will need to buy?

(1) $18c \geq 80$

(2) $18c \leq 80$

(3) $\frac{c}{18} \geq 80$

(4) $\frac{c}{18} \leq 80$

4 Which statement regarding biased sampling is *false*?

(1) Online sampling is biased because only the people who happen to visit the web site will take the survey.

(2) A radio call-in survey is biased because only people who feel strongly about the topic will respond.

(3) A survey handed to every third person leaving a library is biased because everyone leaving the library was not asked to participate.

(4) Asking for experts to take a survey is biased because they may have particular knowledge of the topic.

Use this space for computations.

5 Which relation is *not* a function?

(1) $\{(2,4), (1,2), (0,0), (-1,2), (-2,4)\}$

(2) $\{(2,4), (1,1), (0,0), (-1,1), (-2,4)\}$

(3) $\{(2,2), (1,1), (0,0), (-1,1), (-2,2)\}$

(4) $\{(2,2), (1,1), (0,0), (1,-1), (2,-2)\}$

6 What is an equation of the line that passes through the point $(-2,-8)$ and has a slope of 3?

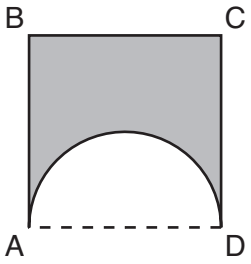
(1) $y = 3x - 2$

(2) $y = 3x - 22$

(3) $y = 3x + 2$

(4) $y = 3x + 22$

7 A figure consists of a square and a semicircle, as shown in the diagram below.



If the length of a side of the square is 6, what is the area of the shaded region?

(1) $36 - 3\pi$

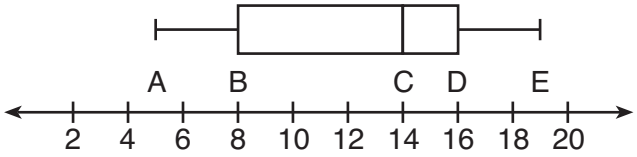
(2) $36 - 4.5\pi$

(3) $36 - 6\pi$

(4) $36 - 9\pi$

Use this space for computations.

8 The box-and-whisker plot shown below represents the number of magazine subscriptions sold by members of a club.



Which statistical measures do points B, D, and E represent, respectively?

(1) minimum, median, maximum

(2) first quartile, median, third quartile

(3) first quartile, third quartile, maximum

(4) median, third quartile, maximum

9 What is the slope of a line represented by the equation $2y = x - 4$?

(1) 1

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

(3) -1

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

10 What is the solution of the system of equations below?

$$2x + 3y = 7$$
$$x + y = 3$$

(1) (1,2)

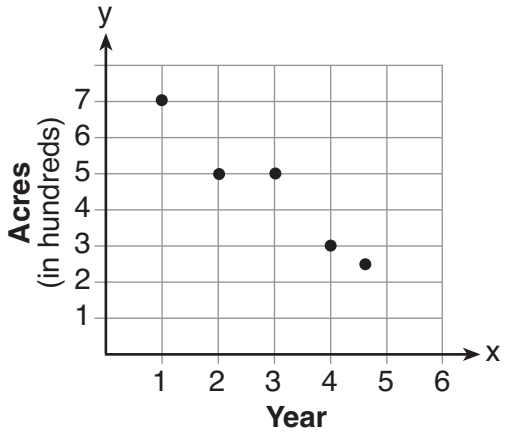
(2) (2,1)

(3) (4,−1)

(4) (4,1)

Use this space for computations.

11 The graph below illustrates the number of acres used for farming in Smalltown, New York, over several years.



Using a line of best fit, approximately how many acres will be used for farming in the 5th year?

(1) 0
(2) 200
(3) 300
(4) 400

12 When $16x^3 - 12x^2 + 4x$ is divided by $4x$, the quotient is

(1) $12x^2 - 8x$
(2) $12x^2 - 8x + 1$
(3) $4x^2 - 3x$
(4) $4x^2 - 3x + 1$

13 The width of a rectangle is 4 less than half the length. If ℓ represents the length, which equation could be used to find the width, w?

(1) $w = \frac{1}{2}(4 - \ell)$
(2) $w = \frac{1}{2}(\ell - 4)$
(3) $w = \frac{1}{2}\ell - 4$
(4) $w = 4 - \frac{1}{2}\ell$

Use this space for computations.

14 Which data can be classified as quantitative?

(1) favorite stores at which you shop

(2) U.S. Representatives and their home states

(3) sales tax rate in each New York county

(4) opinion of a freshman on the color of Paul's shirt

15 Two cubes with sides numbered 1 through 6 were rolled 20 times. Their sums are recorded in the table below.

4	9	8	9	2
9	4	6	12	10
8	7	9	11	10
8	7	9	3	5

What is the empirical probability of rolling a sum of 9?

(1) $\frac{4}{20}$

(2) $\frac{5}{20}$

(3) $\frac{4}{36}$

(4) $\frac{5}{36}$

16 What is the vertex of the graph of the equation $y = 3x^2 + 6x + 1$?

(1) $(-1,-2)$

(2) $(-1,10)$

(3) $(1,-2)$

(4) $(1,10)$

17 The length and width of a rectangle are 48 inches and 40 inches. To the *nearest inch*, what is the length of its diagonal?

(1) 27

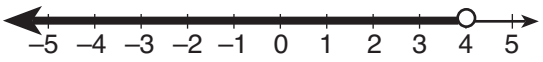
(2) 62

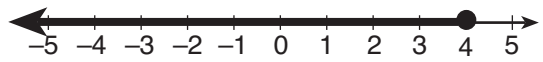
(3) 88

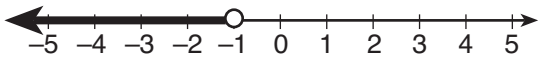
(4) 90

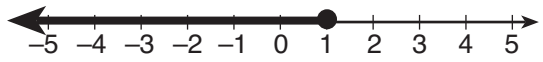
Use this space for computations.

18 Which graph represents the solution set of $2x - 5 < 3$?

(1) 

(2) 

(3) 

(4) 

19 Jonathan drove to the airport to pick up his friend. A rainstorm forced him to drive at an average speed of 45 mph, reaching the airport in 3 hours. He drove back home at an average speed of 55 mph. How long, to the *nearest tenth of an hour*, did the trip home take him?

(1) 2.0 hours
(2) 2.5 hours
(3) 2.8 hours
(4) 3.7 hours

20 The expression $\frac{2n}{5} + \frac{3n}{2}$ is equivalent to

(1) $\frac{5n}{7}$
(2) $\frac{6n^2}{10}$
(3) $\frac{19n}{10}$
(4) $\frac{7n}{10}$

Use this space for computations.

21 When $x = 4$, the value of $2x^0 + x!$ is

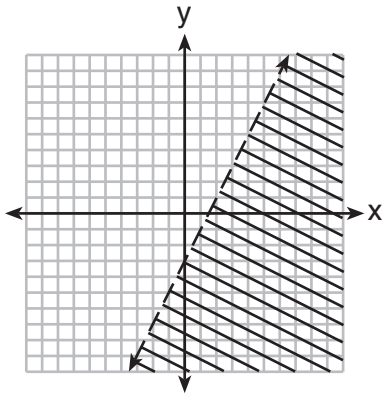
(1) 24

(2) 25

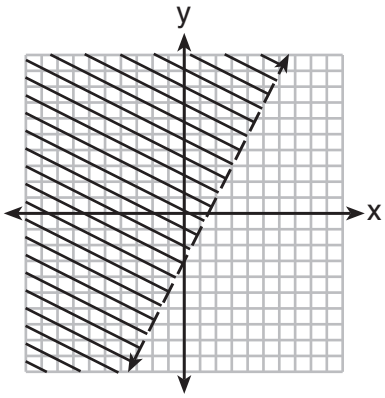
(3) 26

(4) 28

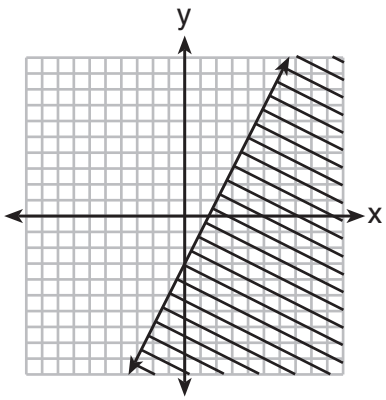
22 Which graph represents the solution of $2y + 6 > 4x$?



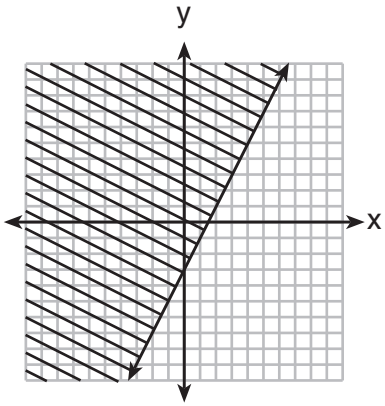
(1)



(3)



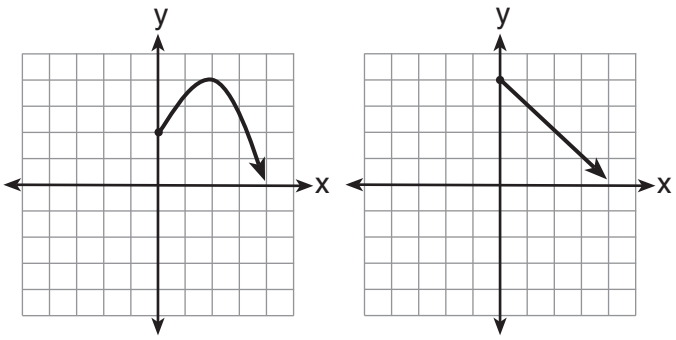
(2)



(4)

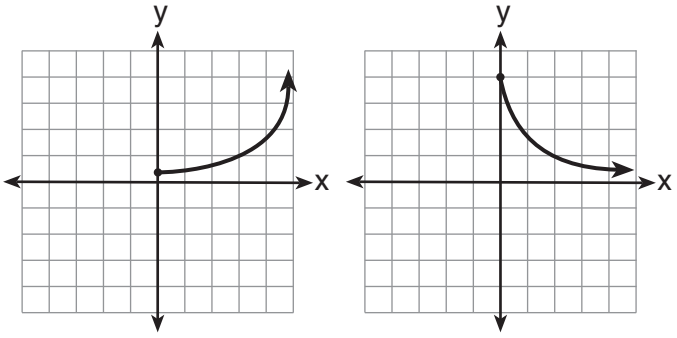
Use this space for computations.

23 Which graph represents the exponential decay of a radioactive element?



(1)

(3)



(2)

(4)

24 Which fraction represents $\frac{x^2-25}{x^2-x-20}$ expressed in simplest form?

(1) $\frac{5}{4}$

(2) $\frac{x-5}{x-4}$

(3) $\frac{x+5}{x+4}$

(4) $\frac{25}{x+20}$

25 If $abx - 5 = 0$, what is x in terms of a and b?

(1) $x = \frac{5}{ab}$

(2) $x = -\frac{5}{ab}$

(3) $x = 5 - ab$

(4) $x = ab - 5$

Use this space for computations.

26 Given:

$U = \{x | 0 < x < 10 \text{ and } x \text{ is an integer}\}$

$S = \{x | 0 < x < 10 \text{ and } x \text{ is an odd integer}\}$

The complement of set S within the universal set U is

(1) $\{0, 2, 4, 6, 8, 10\}$

(2) $\{2, 4, 6, 8, 10\}$

(3) $\{0, 2, 4, 6, 8\}$

(4) $\{2, 4, 6, 8\}$

27 The roots of the equation $2x^2 - 8x = 0$ are

(1) -2 and 2

(2) 0, -2, and 2

(3) 0 and -4

(4) 0 and 4

28 Which equation illustrates the multiplicative inverse property?

(1) $a \cdot 1 = a$

(2) $a \cdot 0 = 0$

(3) $a\left(\frac{1}{a}\right) = 1$

(4) $(-a)(-a) = a^2$

29 What is the result when $4x^2 - 17x + 36$ is subtracted from $2x^2 - 5x + 25$?

(1) $6x^2 - 22x + 61$

(2) $2x^2 - 12x + 11$

(3) $-2x^2 - 22x + 61$

(4) $-2x^2 + 12x - 11$

30 Julie has three children whose ages are consecutive odd integers. If x represents the youngest child's age, which expression represents the sum of her children's ages?

(1) $3x + 3$

(2) $3x + 4$

(3) $3x + 5$

(4) $3x + 6$

Part II

Answer all 3 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [6]

31 Express $\frac{\sqrt{84}}{2\sqrt{3}}$ in simplest radical form.

32 The cumulative frequency table below shows the number of minutes 31 students spent text messaging on a weekend.

Text-Use Interval (minutes)	**Cumulative Frequency**
41–50	2
41–60	5
41–70	10
41–80	19
41–90	31

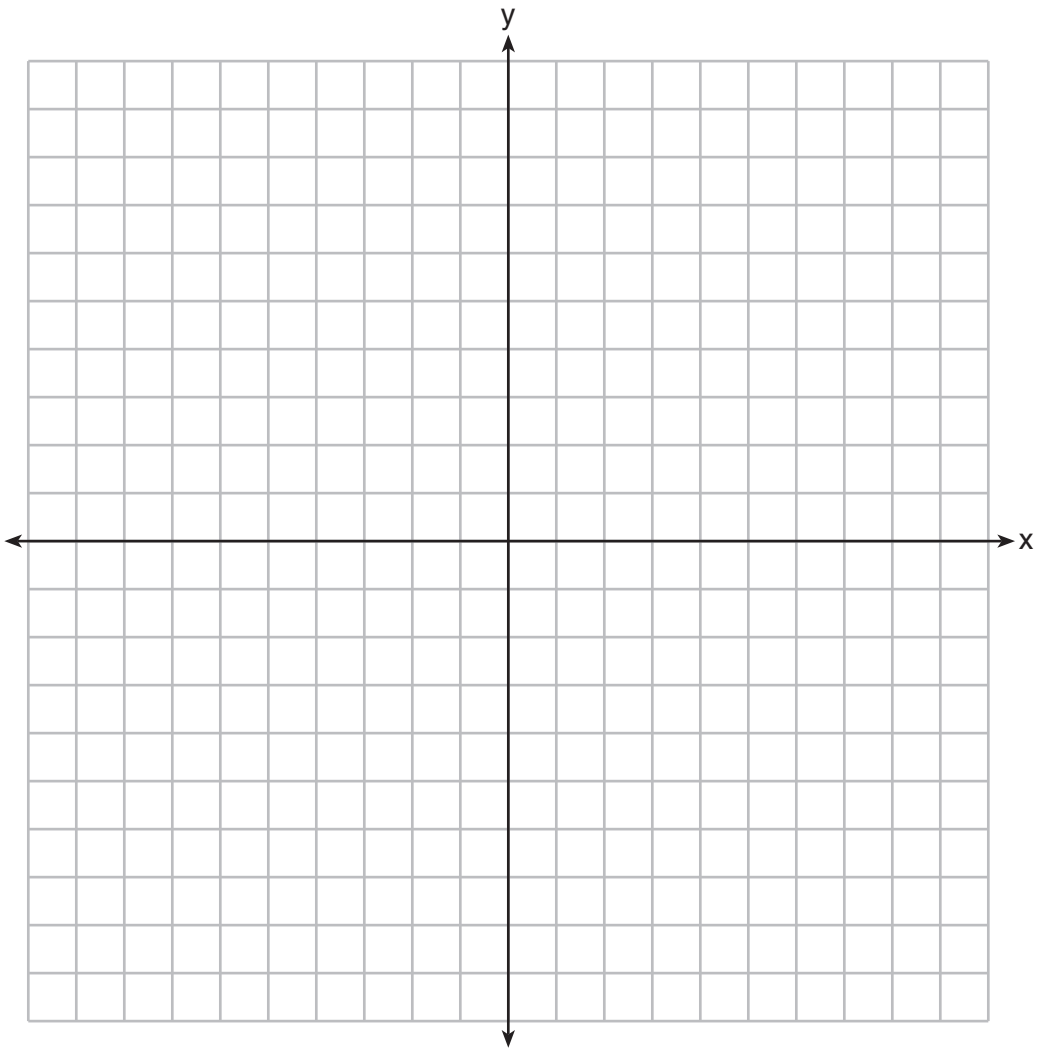
Determine which 10-minute interval contains the median. Justify your choice.

33 Kirsten invested $1000 in an account at an annual interest rate of 3%. She made no deposits or withdrawals on the account for 5 years. The interest was compounded annually. Find the balance in the account, to the *nearest cent*, at the end of 5 years.

Part III

Answer all 3 questions in this part. Each correct answer will receive 3 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [9]

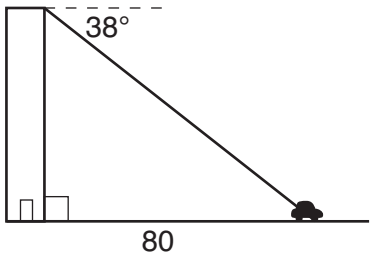
34 Graph and label the functions $y = |x|$ and $y = |2x|$ on the set of axes below.



Explain how increasing the coefficient of x affects the graph of $y = |x|$.

35 Terry estimated the length of the edge of a cube to be 5 cm. The actual length of the side is 5.2 cm. Find the relative error of the surface area of the cube, to the *nearest thousandth*.

36 From the top of an apartment building, the angle of depression to a car parked on the street below is 38 degrees, as shown in the diagram below. The car is parked 80 feet from the base of the building. Find the height of the building, to the *nearest tenth of a foot*.

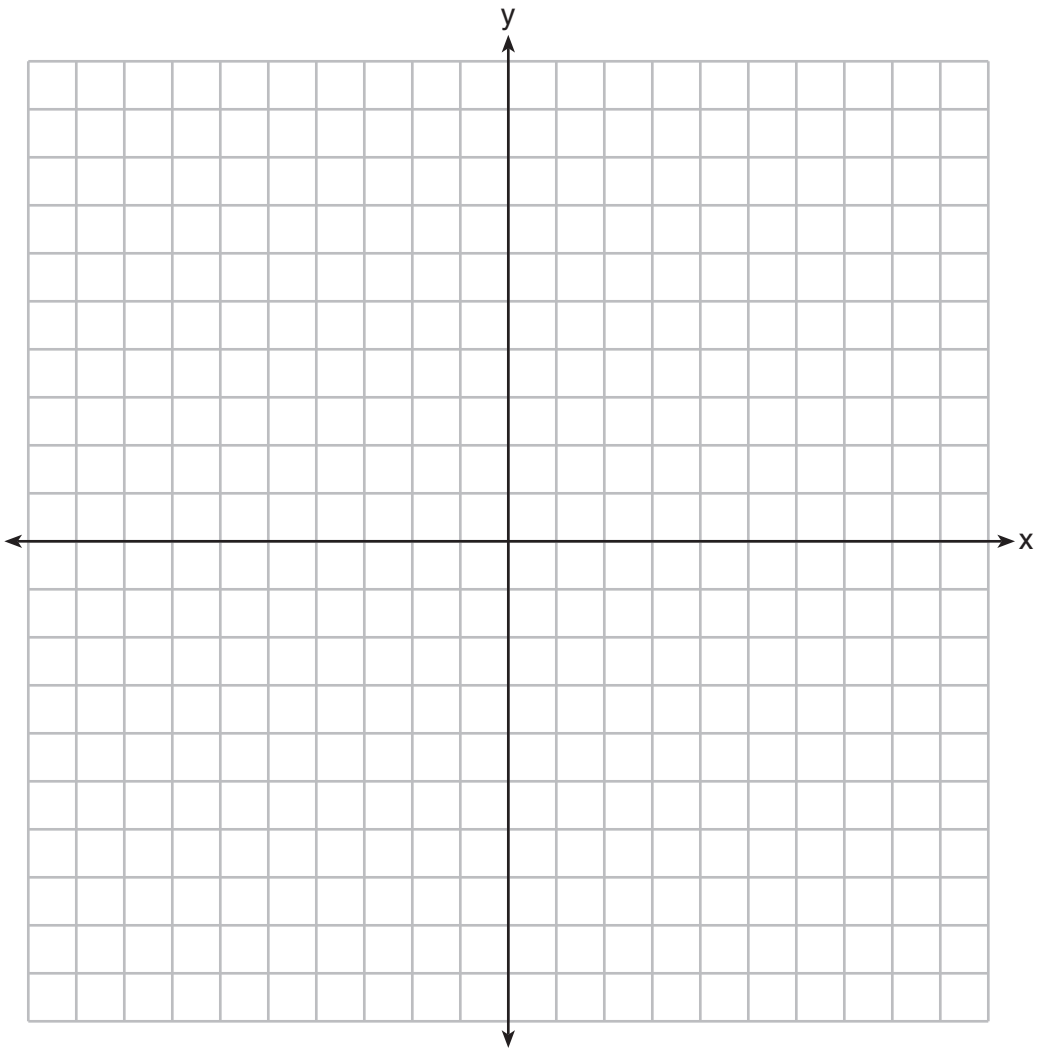


Part IV

Answer all 3 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [12]

37 On the set of axes below, solve the following system of equations graphically for all values of x and y. State the coordinates of all the solutions.

$$y = x^2 + 4x - 5$$
$$y = 2x + 3$$



38 Solve algebraically for all values of x: $\frac{3}{x+5} = \frac{2x}{x^2-8}$

39 Doug has four baseball caps: one tan, one blue, one red, and one green. He also has three jackets: one blue, one red, and one white. Draw a tree diagram or list a sample space to show all possible outfits consisting of one baseball cap and one jacket.

Find the number of Doug's outfits that consist of a cap and a jacket that are different colors.

On Spirit Day, Doug wants to wear either green or white, his school's colors. Find the number of his outfits from which he can choose.

If the student's responses for the multiple-choice questions are being hand scored prior to being scanned, the scorer must be careful not to make any marks on the answer sheet except to record the scores in the designated score boxes. Marks elsewhere on the answer sheet will interfere with the accuracy of the scanning.

Part I

Allow a total of 60 credits, 2 credits for each of the following.

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

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site at: http://www.p12.nysed.gov/assessment/ and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

Beginning in January 2013, the Department is providing supplemental scoring guidance, the "Sample Response Set," for the Regents Examination in Integrated Algebra. This guidance is not required as part of the scorer training. It is at the school's discretion to incorporate it into the scorer training or to use it as supplemental information during scoring. While not reflective of all scenarios, the sample student responses selected for the Sample Response Set illustrate how less common student responses to open-ended questions may be scored. The Sample Response Set will be available on the Department's web site at http://www.nysedregents.org/IntegratedAlgebra/.