REGENTS EXAMINATION IN INTEGRATED ALGEBRA

TEST SAMPLER

FALL 2007

October 2007

Dear Colleagues:

Welcome back to a new school year. As I wrote to you last month, this is the first year of the transition to the new Regents Examinations in mathematics. We are continuing to develop the new Regents Examination in Integrated Algebra, which will be administered for the first time in June 2008. That administration will be the first step in the transition from Mathematics A and Mathematics B to Integrated Algebra, Geometry, and Algebra 2/ Trigonometry that will take place over the next several years.

The Regents Examination in Integrated Algebra is being developed to evaluate student achievement of the mathematics Learning Standard and the core curriculum. This Regents Examination in Integrated Algebra Test Sampler consists of the types of questions, the formatting, and the scoring guides that are being developed for the examination. It also includes examples of student work from the field tests. This Test Sampler may be printed and duplicated for use in classroom instruction.

The Department is proud of its tradition of involving New York State teachers in a variety of curriculum guidance initiatives. Over the years, thousands of teachers have worked with us and the expertise of diverse educators representing New York's diverse student population is essential in guiding this important work.

Through our Call for Expertise on the Department's web site, **we encourage teachers to become involved in test development and standard-setting activities**. Please download and complete the Call for Expertise application found at:

http://www.emsc.nysed.gov/ciai/call.htm

Thank you for all the work that you do on behalf of the students in New York State.

Sincerely,

David Abrams

Contents

Introduction

In March 2005, the Board of Regents adopted a new Learning Standard for Mathematics and issued a revised Mathematics Core Curriculum, resulting in the need for the development and phasing in of three new mathematics Regents Examinations: Integrated Algebra, Geometry, and Algebra 2/Trigonometry. These new Regents Examinations in mathematics will replace the current Regents Examinations in Mathematics A and Mathematics B. In order to fulfill the mathematics Regents Examination requirement for graduation, students must pass any one of these new commencement-level Regents Examinations. The first administration of the Regents Examination in Integrated Algebra will take place in June 2008, Geometry in June 2009, and Algebra 2/Trigonometry in June 2010. The Mathematics Core Curriculum (Revised 2005) contains the content on which the Regents Examination in Integrated Algebra will be based.

The Regents Examination in Integrated Algebra Test Sampler provides examples of the format and types of questions that will comprise the operational examinations. The scoring guide in the sampler includes examples of student responses from field testing and the credit allowed for each response.

The reference sheet included in the test sampler will also be provided as part of the operational examination booklet. A ruler and a graphing calculator must be available for the exclusive use of each student taking the examination. Students may not use calculators that are capable of symbol manipulation or that can communicate with other calculators through infrared sensors.

The sampler may be duplicated for use in your classroom.

INTEGRATED ALGEBRA
TEST SAMPLER
FALL 2007

GENERAL DIRECTIONS TO THE STUDENT

Answer all 39 questions in this examination. A reference sheet, which you may need to answer some questions in this examination, is included.

No partial credit will be allowed on the multiple-choice section, Part I. Record your answers in the spaces provided on the separate answer sheet for Part I.

For Parts II, III, and IV, clearly indicate the necessary steps, including formula substitutions, diagrams, graphs, charts, etc. For all questions in these parts, a correct numerical answer with no work shown will receive only 1 credit.

If a graphing calculator is used to answer a graphing question in Part II, III, or IV, you are expected to show each of the following:

1) A sketch of the viewing window

2) Scales indicated on the x and y axes

3) Clearly labeled x and y intercepts and points of intersections, if needed for the solution.

Part I

Answer all 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]
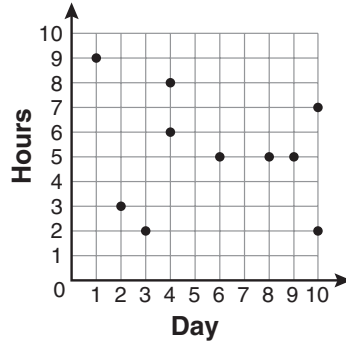
1 For 10 days, Romero kept a record of the number of hours he spent listening to music. The information is shown in the table below.

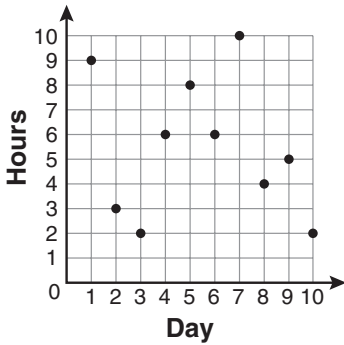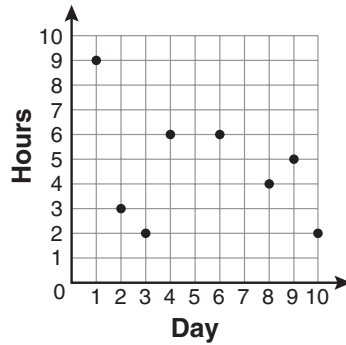| Day	1	2	3	4	5	6	7	8	9	10
Hours	9	3	2	6	8	6	10	4	5	2

Which scatter plot shows Romero's data graphically?

(1)

(3)

(2)

(4)
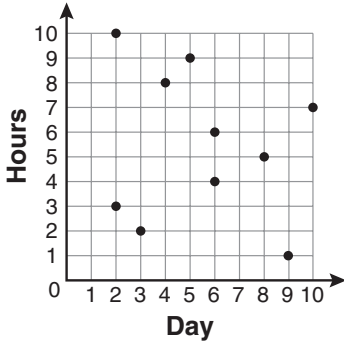
2 Throughout history, many people have contributed to the development of mathematics. These mathematicians include Pythagoras, Euclid, Hypatia, Euler, Einstein, Agnesi, Fibonacci, and Pascal. What is the probability that a mathematician's name selected at random from those listed will start with either the letter *E* or the letter *A*?

(1) $\frac{2}{8}$ (3) $\frac{4}{8}$

(2) $\frac{3}{8}$ (4) $\frac{6}{8}$

3 Which expression represents $\dfrac{\left(2x^3\right)\left(8x^5\right)}{4x^6}$ in simplest form?

(1) x^2 (3) $4x^2$

(2) x^9 (4) $4x^9$

4 Which interval notation represents the set of all numbers from 2 through 7, inclusive?

(1) $(2,7]$ (3) $[2,7)$

(2) $(2,7)$ (4) $[2,7]$

5 Which property is illustrated by the equation $ax + ay = a(x + y)$?

(1) associative   (3) distributive

(2) commutative   (4) identity

6 The expression $x^2 - 16$ is equivalent to

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

   (2) $(x - 2)(x + 8)$ (4) $(x + 8)(x - 8)$

**7** Which situation describes a correlation that is *not* a causal relationship?

   (1) The rooster crows, and the Sun rises.

   (2) The more miles driven, the more gasoline needed.

   (3) The more powerful the microwave, the faster the food cooks.

   (4) The faster the pace of a runner, the quicker the runner finishes.

8 The equations $5x + 2y = 48$ and $3x + 2y = 32$ represent the money collected from school concert ticket sales during two class periods. If x represents the cost for each adult ticket and y represents the cost for each student ticket, what is the cost for each adult ticket?

   (1) $20   (3) $8

   (2) $10   (4) $4

9 The data set 5, 6, 7, 8, 9, 9, 9, 10, 12, 14, 17, 17, 18, 19, 19 represents the number of hours spent on the Internet in a week by students in a mathematics class. Which box-and-whisker plot represents the data?

(1)

(2)

(3)

(4)
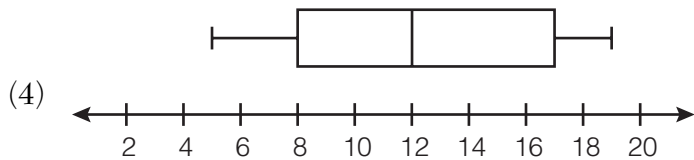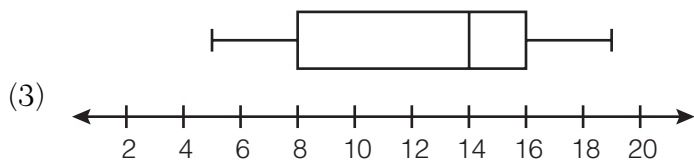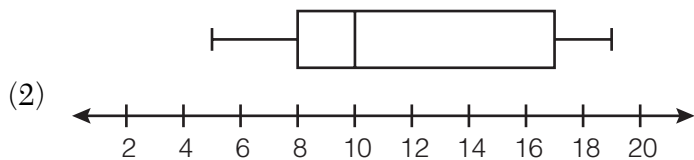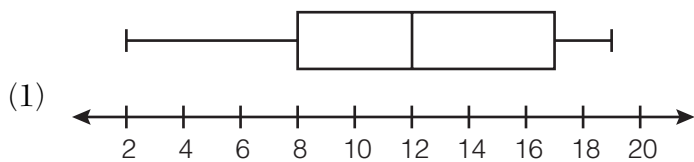
10 Given:

Set A = {(–2,–1), (–1,0), (1,8)}

Set B = {(–3,–4), (–2,–1), (–1,2), (1,8)}.

What is the intersection of sets A and B?

(1) {(1,8)}

(2) {(–2,–1)}

(3) {(–2,–1), (1,8)}

(4) {(–3,–4), (–2,–1), (–1,2), (–1,0), (1,8)}

11 Tanya runs diagonally across a rectangular field that has a length of 40 yards and a width of 30 yards, as shown in the diagram below.
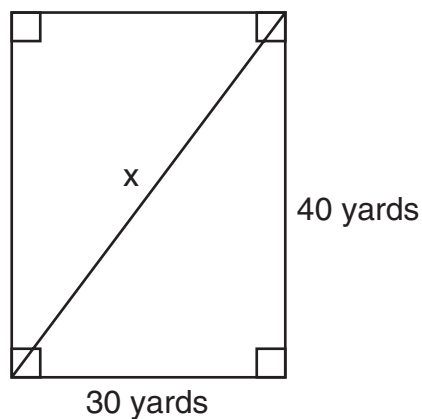
What is the length of the diagonal, in yards, that Tanya runs?

(1) 50   (3) 70

(2) 60   (4) 80

12 A cylindrical container has a diameter of 12 inches and a height of 15 inches, as illustrated in the diagram below.
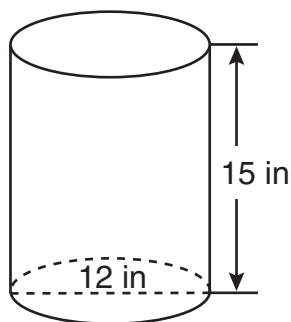
(Not drawn to scale)

What is the volume of this container to the *nearest tenth* of a cubic inch?

(1) 6,785.8   (3) 2,160.0

(2) 4,241.2   (4) 1,696.5

13 What is an equation for the line that passes through the coordinates (2,0) and (0,3)?

(1) $y = -\dfrac{3}{2}x + 3$

(3) $y = -\dfrac{2}{3}x + 2$

(2) $y = -\dfrac{3}{2}x - 3$

(4) $y = -\dfrac{2}{3}x - 2$

14 Which situation should be analyzed using bivariate data?

(1) Ms. Saleem keeps a list of the amount of time her daughter spends on her social studies homework.

(2) Mr. Benjamin tries to see if his students' shoe sizes are directly related to their heights.

(3) Mr. DeStefan records his customers' best video game scores during the summer.

(4) Mr. Chan keeps track of his daughter's algebra grades for the quarter.

15 An electronics store sells DVD players and cordless telephones. The store makes a $75 profit on the sale of each DVD player (d) and a $30 profit on the sale of each cordless telephone (c). The store wants to make a profit of at least $255.00 from its sales of DVD players and cordless phones. Which inequality describes this situation?

(1) $75d + 30c < 255$

(3) $75d + 30c > 255$

(2) $75d + 30c \leq 255$

(4) $75d + 30c \geq 255$

16 What is the slope of the line containing the points (3,4) and (–6,10)?

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

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

17 Which type of graph is shown in the diagram below?
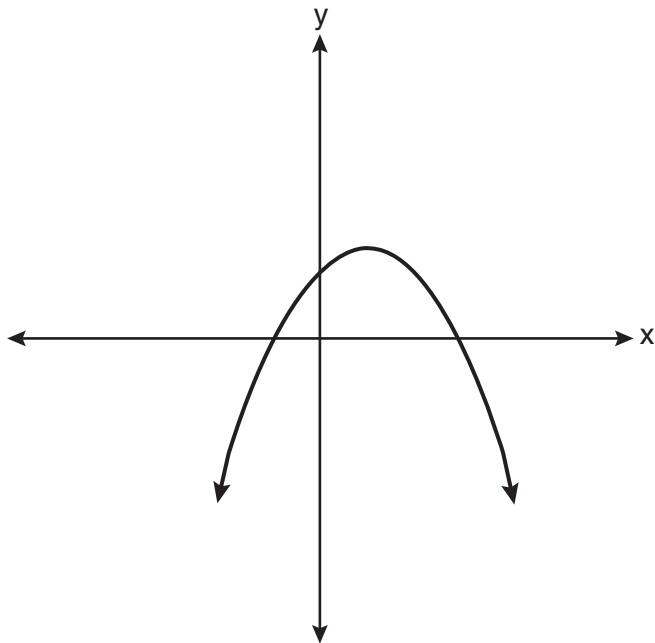
(1) absolute value   (3) linear

(2) exponential   (4) quadratic

18 The expression $\dfrac{9x^4 - 27x^6}{3x^3}$ is equivalent to

(1) $3x(1 - 3x)$

(3) $3x(1 - 9x^5)$

(2) $3x(1 - 3x^2)$

(4) $9x^3(1 - x)$

19 Daniel's Print Shop purchased a new printer for \$35,000. Each year it depreciates (loses value) at a rate of 5%. What will its approximate value be at the end of the fourth year?

(1) \$33,250.00

(3) \$28,507.72

(2) \$30,008.13

(4) \$27,082.33

20 Which inequality is represented by the graph below?
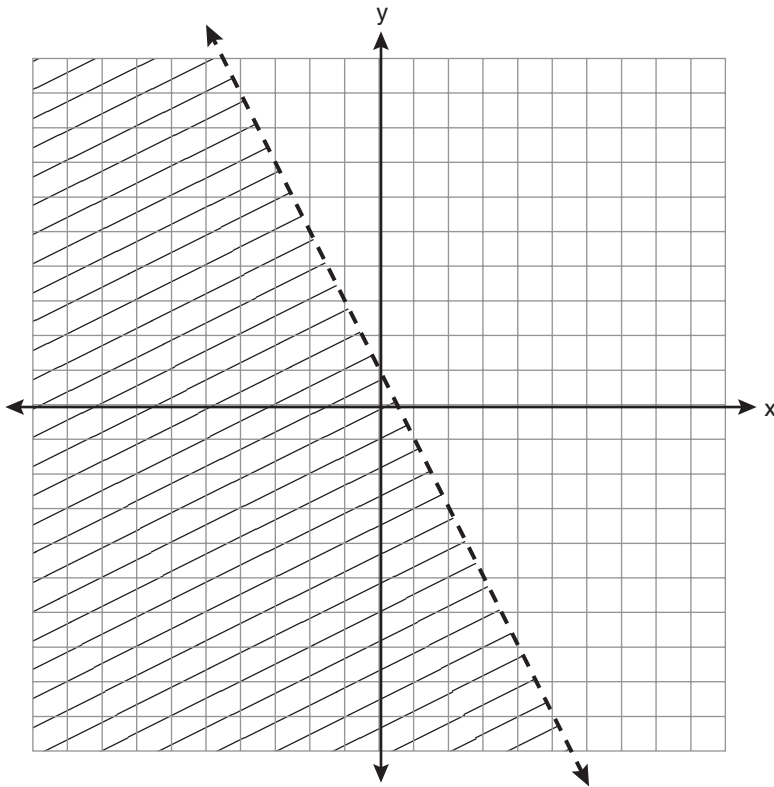
(1) $y < 2x + 1$ (3) $y < \frac{1}{2}x + 1$

(2) $y < -2x + 1$ (4) $y < -\frac{1}{2}x + 1$

21 In triangle MCT, the measure of $\angle T = 90°$, $MC = 85$ cm, $CT = 84$ cm, and $TM = 13$ cm. Which ratio represents the sine of $\angle C$?

(1) $\frac{13}{85}$ (3) $\frac{13}{84}$

(2) $\frac{84}{85}$ (4) $\frac{84}{13}$

22 The diagram below shows the graph of $y = |x - 3|$.

Which diagram shows the graph of $y = -|x - 3|$?

(1)

(3)

(2)

(4)
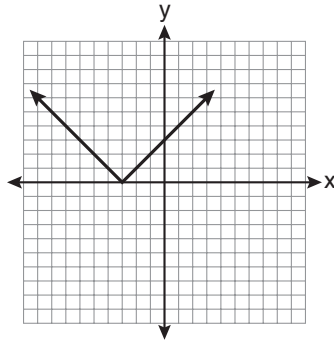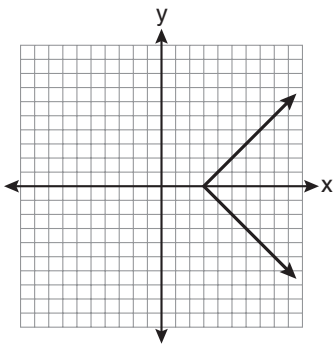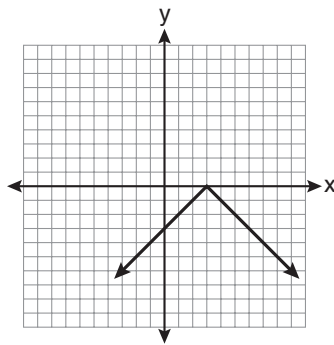
23 The groundskeeper is replacing the turf on a football field. His measurements of the field are 130 yards by 60 yards. The actual measurements are 120 yards by 54 yards. Which expression represents the relative error in the measurement?

(1) $\dfrac{(130)\,(60) - (120)\,(54)}{(120)\,(54)}$

(3) $\dfrac{(130)\,(60) - (120)\,(54)}{(130)\,(60)}$

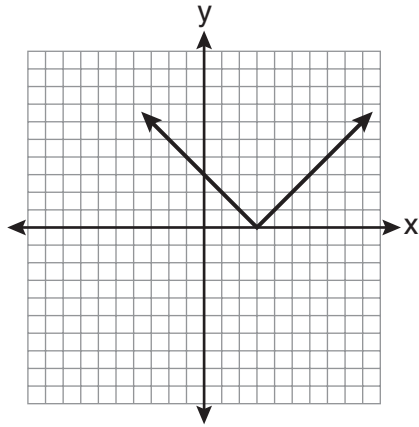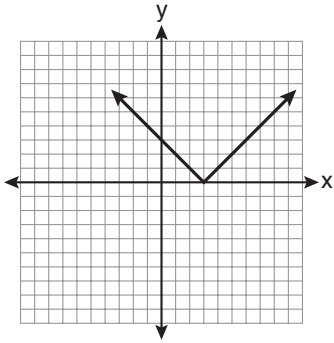(2) $\dfrac{(120)\,(54)}{(130)\,(60) - (120)\,(54)}$

(4) $\dfrac{(130)\,(60)}{(130)\,(60) - (120)\,(54)}$

24 Which value of x is in the solution set of the inequality $-2x + 5 > 17$?

(1) -8 (3) -4

(2) -6 (4) 12

25 What is the quotient of 8.05×10^6 and 3.5×10^2?

(1) 2.3×10^3 (3) 2.3×10^8

(2) 2.3×10^4 (4) 2.3×10^{12}

26 The length of a rectangular window is 5 feet more than its width, w. The area of the window is 36 square feet. Which equation could be used to find the dimensions of the window?

(1) $w^2 + 5w + 36 = 0$ (3) $w^2 - 5w + 36 = 0$

(2) $w^2 - 5w - 36 = 0$ (4) $w^2 + 5w - 36 = 0$

27 What is the sum of $\dfrac{d}{2}$ and $\dfrac{2d}{3}$ expressed in simplest form?

(1) $\dfrac{3d}{5}$ (3) $\dfrac{7d}{5}$

(2) $\dfrac{3d}{6}$ (4) $\dfrac{7d}{6}$

28 For which value of x is $\dfrac{x-3}{x^2-4}$ undefined?

(1) –2   (3) 3

(2) 0   (4) 4

29 Which verbal expression represents $2(n-6)$?

(1) two times n minus six

(2) two times six minus n

(3) two times the quantity n less than six

(4) two times the quantity six less than n

30 Which graph represents a function?
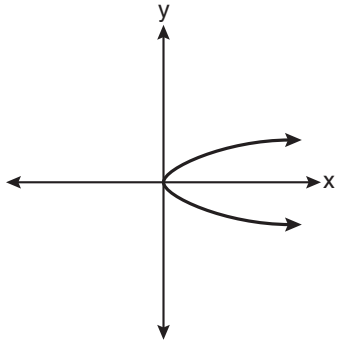
(1)
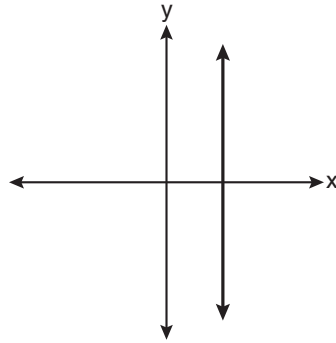
(3)
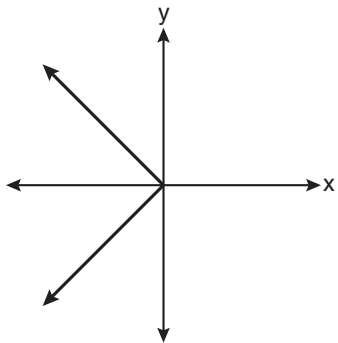
(2)

(4)

Part II

Answer all 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. [6]

31 Express $5\sqrt{72}$ in simplest radical form.

32 Solve for g: $3 + 2g = 5g - 9$

33 Serena's garden is a rectangle joined with a semicircle, as shown in the diagram below. Line segment *AB* is the diameter of semicircle *P*. Serena wants to put a fence around her garden.

Calculate the length of fence Serena needs to the *nearest tenth of a foot*.

Part III

Answer all 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. [9]

34 Hannah took a trip to visit her cousin. She drove 120 miles to reach her cousin's house and the same distance back home.

It took her 1.2 hours to get halfway to her cousin's house. What was her average speed, in miles per hour, for the first 1.2 hours of the trip?

Hannah's average speed for the remainder of the trip to her cousin's house was 40 miles per hour. How long, in hours, did it take her to drive the remaining distance?

Traveling home along the same route, Hannah drove at an average rate of 55 miles per hour. After 2 hours her car broke down. How many miles was she from home?

35 A prom ticket at Smith High School is $120. Tom is going to save money for the ticket by walking his neighbor's dog for $15 per week. If Tom already has saved $22, what is the minimum number of weeks Tom must walk the dog to earn enough to pay for the prom ticket?

36 Mr. Laub has three children: two girls (Sue and Karen) and one boy (David). After each meal, one child is chosen at random to wash dishes.

If the same child can be chosen for both lunch and dinner, construct a tree diagram or list a sample space of all the possible outcomes of who will wash dishes after lunch and dinner on Saturday.

Determine the probability that one boy and one girl will wash dishes after lunch and dinner on Saturday.
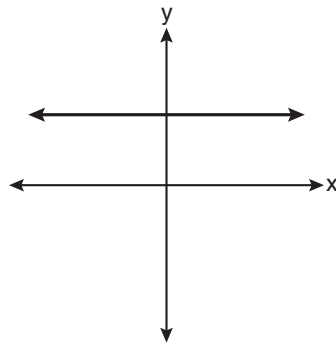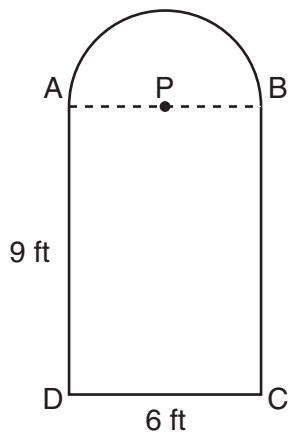
Part IV

Answer all 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. [12]

37 The values of 11 houses on Washington St. are shown in the table below.

Value per House	Number of Houses
$100,000	1
$175,000	5
$200,000	4
$700,000	1

Find the mean value of these houses in dollars.

Find the median value of these houses in dollars.

State which measure of central tendency, the mean or the median, *best* represents the values of these 11 houses. Justify your answer.

38 Solve the following systems of equations graphically, on the set of axes below, and state the coordinates of the point(s) in the solution set.

$$y = x^2 - 6x + 5$$
$$2x + y = 5$$
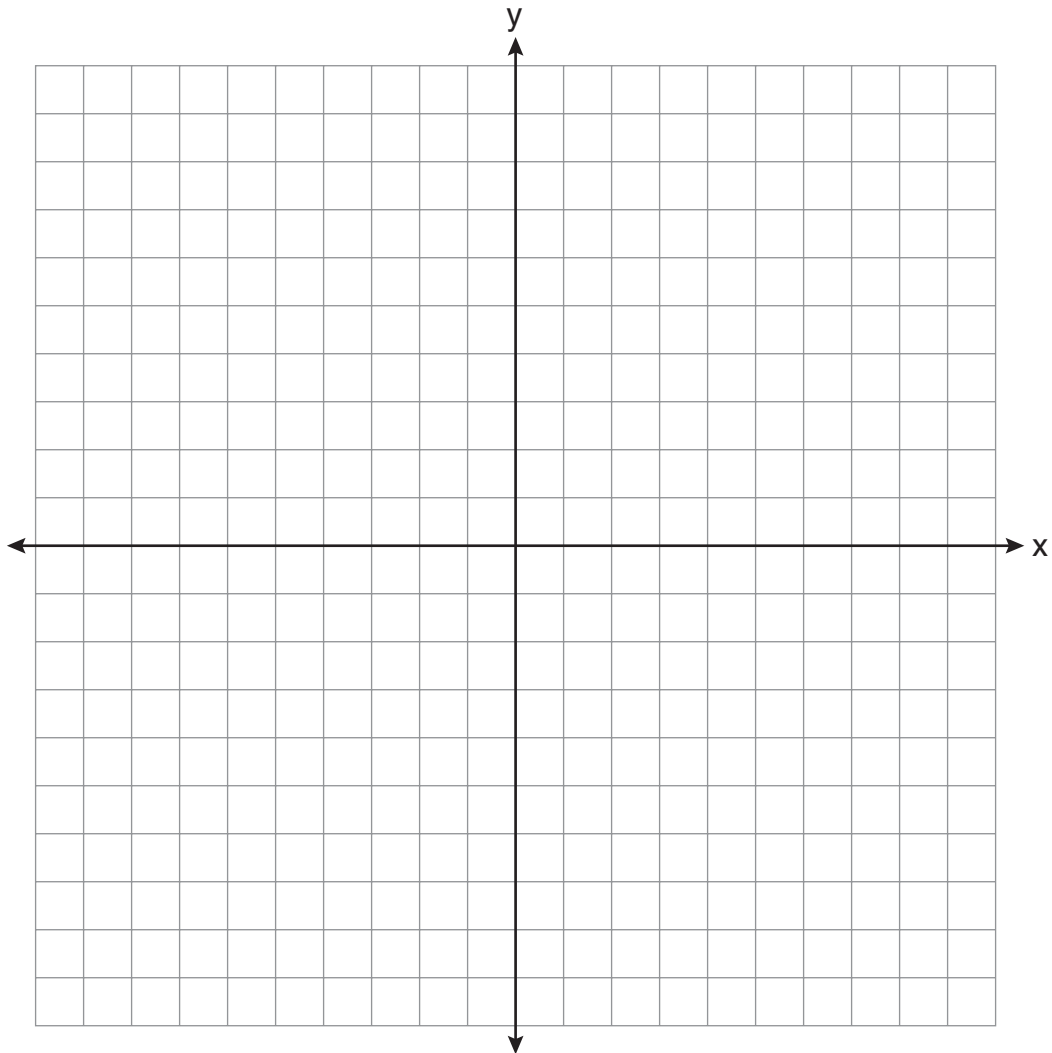
39 Solve for x: $\dfrac{x+1}{x} = \dfrac{-7}{x-12}$

Reference Sheet

Trigonometric Ratios	$\sin A = \dfrac{opposite}{hypotenuse}$
	$\cos A = \dfrac{adjacent}{hypotenuse}$
	$\tan A = \dfrac{opposite}{adjacent}$

| Area | trapezoid | $A = \frac{1}{2}h(b_1 + b_2)$ |

| Volume | cylinder | $V = \pi r^2 h$ |

| Surface Area | rectangular prism | $SA = 2lw + 2hw + 2lh$ |
| | cylinder | $SA = 2\pi r^2 + 2\pi rh$ |

| Coordinate Geometry | $m = \dfrac{\boldsymbol{\Delta}y}{\boldsymbol{\Delta}x} = \dfrac{y_2 - y_1}{x_2 - x_1}$ |
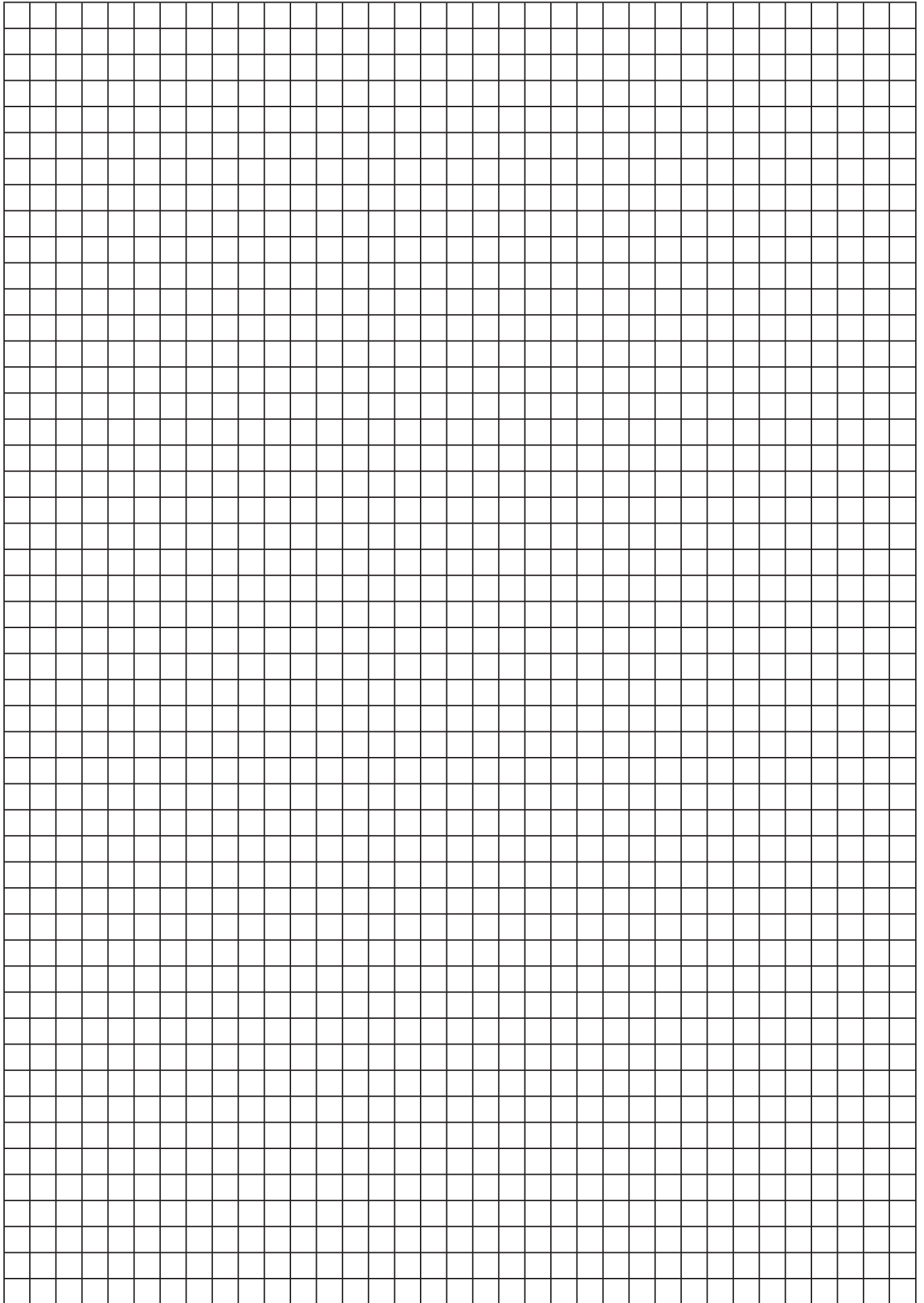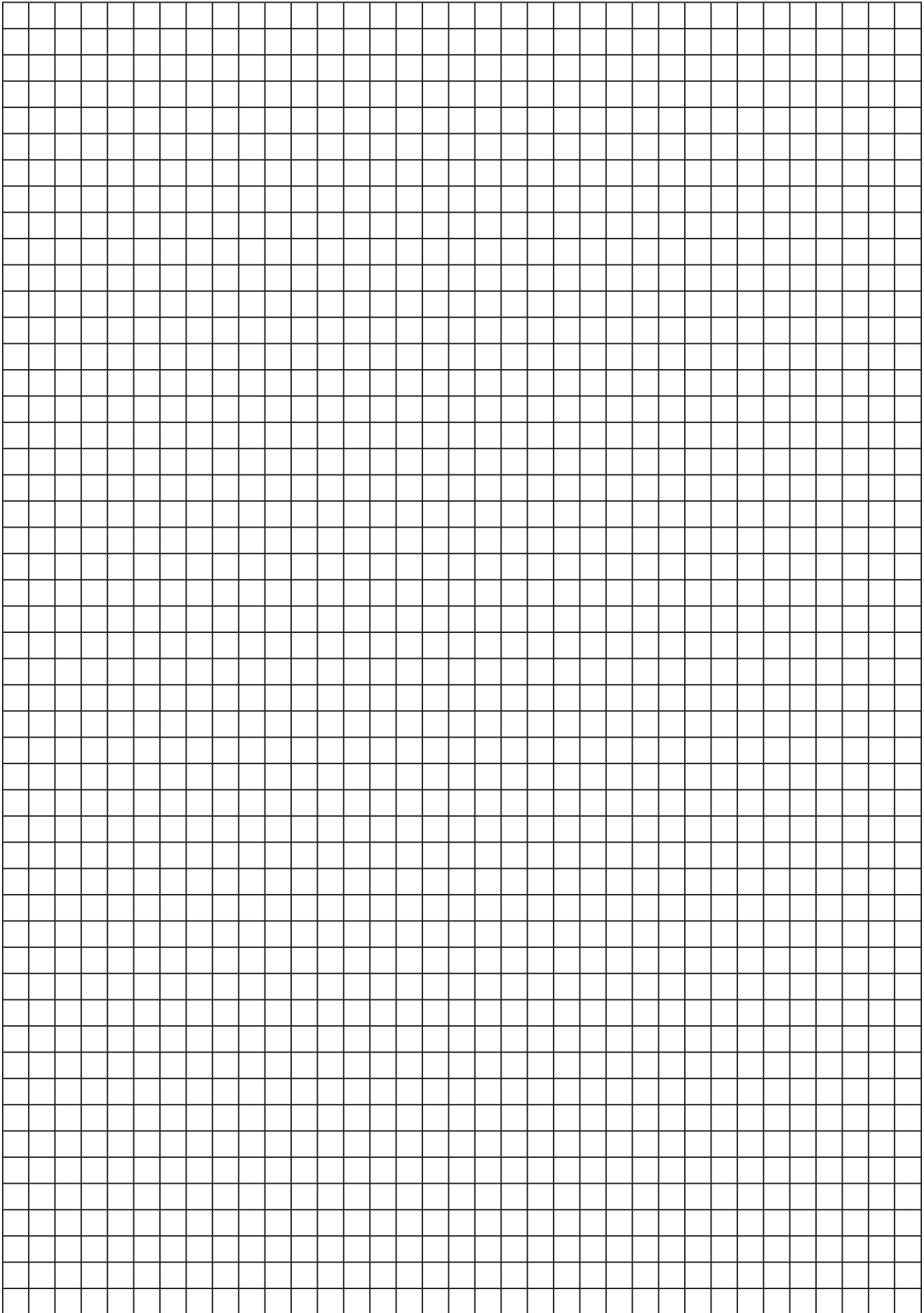
INTEGRATED ALGEBRA TEST SAMPLER

Fall 2007

ANSWER SHEET

Student . . . .   Sex: ❏ Male   ❏ Female   Grade . . . .

Teacher . . . .   School . . . .

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

Part I

Answer all 30 questions in this part.

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

Your answers for Parts II, III, and IV should be written in the test booklet.

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

INTEGRATED ALGEBRA TEST SAMPLER

INTEGRATED ALGEBRA TEST SAMPLER			
Question	**Maximum Credit**	**Credits Earned**	**Rater's/Scorer's Initials**
Part I 1–30	60		
Part II 31	2		
32	2		
33	2		
Part III 34	3		
35	3		
36	3		
Part IV 37	4		
38	4		
39	4		
Maximum Total	87		

Total Raw Score   **Checked by**

Rater's/Scorer's Name (minimum of three)

Scoring Guide for Integrated Algebra Test Sampler

Answers to multiple-choice questions 1 through 30, and the specific rubrics for open-ended questions 31 through 39, are provided on the following pages. A complete and correct student response is provided for each open-ended question. The response shows one example of how to solve the problem. In most cases there are other acceptable solutions. Other student responses are shown for each score level.

The maximum raw score for the Regents Examination in Integrated Algebra is allocated as follows:

Part I	30 two-credit multiple-choice questions	60 credits
Part II	3 two-credit open-ended questions	6 credits
Part III	3 three-credit open-ended questions	9 credits
Part IV	3 four-credit open-ended questions	12 credits

PART I

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

PART II

(31) Express $5\sqrt{72}$ in simplest radical form.

Rubric

[2] $30\sqrt{2}$, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] Appropriate work is shown, but the answer is not in simplest radical form.

or

[1] $30\sqrt{2}$, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response
that was obtained by an obviously incorrect procedure.

Student work – Score 2

Student work for Item 31 – Score 1

$$5\sqrt{72}$$

$$\sqrt{9} \qquad \sqrt{8}$$

$$\sqrt{3} \quad \sqrt{3} \qquad \sqrt{4} \quad \sqrt{2}$$

$$\sqrt{2} \quad \sqrt{2}$$

$$5 \cdot 3\sqrt{2}$$

$$15\sqrt{2} \quad \leftarrow answer$$

Student work – Score 1

$$1, 4, 9, 16, 25, 36, 49$$
$$64, 81, 100$$

$$5\sqrt{72}$$

$$5\sqrt{9 \cdot 8}$$

$$5\sqrt{9}\sqrt{8}$$

$$5 \cdot 3\sqrt{8}$$

$$15\sqrt{8}$$

(32) Solve for *g*: $3 + 2g = 5g - 9$

<div align="center">

Rubric

</div>

[2] 4, and appropriate work is shown.

[1] Appropriate work is shown, but one computational error is made.

<div align="center">

or

</div>

[1] Appropriate work is shown, but one conceptual error is made.

<div align="center">

or

</div>

[1] 4, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

<div align="center">

Student work – Score 2

$$3 + 2g = 5g - 9$$
$$+9 \qquad\qquad +9$$
$$\overline{}$$
$$12 + 2g = 5g$$
$$-2g \quad -2g$$
$$\overline{}$$
$$\frac{12}{3} = \frac{3g}{3}$$
$$4 = g$$

check

$$3 + 2(4) = 5(4) - 9$$
$$3 + 8 = 20 - 9$$
$$11 = 11$$

</div>

Student work for Item 32 – Score 1

$$3 + 2g = 5g - 9$$
$$+9 \qquad\qquad \cancel{9}$$
_____

$$12 + 2\cancel{g} = 5g$$
$$-2\cancel{g} \quad -2g$$
_____

$$\frac{12}{12} = \frac{3g}{12}$$

$$.25 = 1/4$$

Student work – Score 0
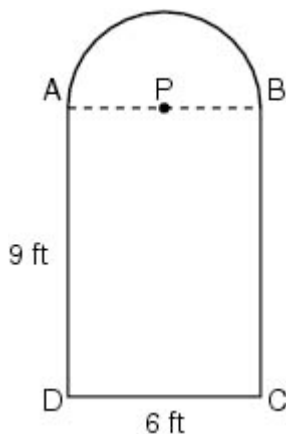
$$3g + 2g = 5g - 9$$

$$3 + 2 = 5$$

$$9 + 9 = 9^2 \qquad \boxed{g=0}$$

$$5g - 9 = 4g$$

(33) Serena's garden is a rectangle joined with a semicircle, as shown in the diagram below. Line segment *AB* is a diameter of semicircle *P*. Serena wants to put a fence around her garden.

Calculate the length of fence Serena needs to the *nearest tenth of a foot.*

Rubric

[2] 33.4, and appropriate work is shown.

[1] Appropriate work is shown, but one computational or rounding error is made.

or

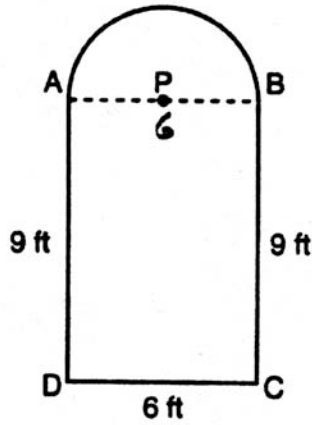**[1]** Appropriate work is shown, but one conceptual error is made.

or

[1] 33.4, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student work for Item 33 – Score 2

3.14
×6
18.84

9.42
2√18.84

9.42
9
.9
.6
33.42 (circled)

Diagram: arched figure with points A, P (6), B along dashed line; sides 9 ft and 9 ft; bottom D to C 6 ft.

33.4 ft (circled)

Student work – Score 1

14.13

Diagram: arched figure with points A, P, B along dashed line; sides 9 ft and 9 ft; bottom D to C 6 ft.

πr²   3.14×9

9 + 9 + 6 + 14.13 = 38.13
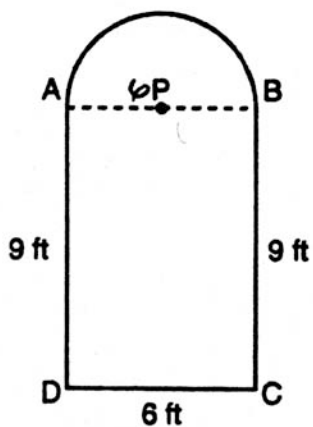
$9 + 9 + 6 + 6 = 30$ ft + Semi circle

A.C = πd
AC. $\sqrt{18.84}$ 2
AC. 9 +2

39.4 ft of fence

PART III

(34) Hannah took a trip to visit her cousin. She drove 120 miles to reach her cousin's house and the same distance back home.

It took her 1.2 hours to get halfway to her cousin's house. What was her average speed, in miles per hour, for the first 1.2 hours of the trip?

Hannah's average speed for the remainder of the trip to her cousin's house was 40 miles per hour. How long, in hours, did it take her to drive the remaining distance?

Traveling home along the same route, Hannah drove at an average rate of 55 miles per hour. After 2 hours her car broke down. How many miles was she from home?

Rubric for Item 34

[3] 50, 1.5, and 10, and appropriate work is shown.

[2] Appropriate work is shown, but one computational error is made.

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] Appropriate work is shown, but two or more computational errors are made.

or

[1] 50, and appropriate work is shown, but no further correct work is shown.

or

[1] 1.5, and appropriate work is shown, but no further correct work is shown.

or

[1] 10, and appropriate work is shown, but no further correct work is shown.

or

[1] 50, 1.5, and 10, but no work is shown.

[0] 50 or 1.5 or 10, but no work is shown.

or

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

50 miles an hr   2.4 hrs For the whole   1.2)120

X 2.4   trip
‾‾‾‾‾   1.2 hrs halfway
200
+1000
‾‾‾‾‾‾
120.0 miles

                          50
                    1.2)60
                        -6↓
                        ‾‾‾
                        00

[50 miles]

1.2 hrs = 60 mi
2.4 hrs = 120 mil

50 miles
x1.2 hrs
‾‾‾‾‾‾
60 miles

[1.5 hrs]

40 miles /3 hr trip

1.5 hr trip

                    40
1.2 = 50   x 3
    +40   ‾‾‾‾‾‾
                120 miles

                    40
                  x1.2
                  ‾‾‾‾
                   8.0
                 +40.0
                 ‾‾‾‾‾
                  48.0

120 miles Total
40 miles
x1.5
‾‾‾‾
200
+400
‾‾‾‾
60.0

[10 miles]

55
x 2
‾‾‾‾‾
110 miles

120
-110
‾‾‾‾
10 miles

1.2 hrs = 80 min.

$\dfrac{\cancel{12}}{2.4} = 160$ min.

120

$\begin{array}{r} 120 \\ -\ 2.4 \\ \hline \textcircled{50} \end{array}$

$\boxed{50 \text{ mph}}$

60 remaining distance.
$\div 40$ mph
$\boxed{1.5 \text{ hrs}}$

55 ÷ 2 = ⬭ 110 miles from home⬭

$$\overset{\overset{60}{\frown}}{120}\overline{)2}$$

$$\underset{1.2}{60}\text{....}\qquad 20$$

60 mpn

1.12

2.7 hars

40        $\overset{60}{\underset{40}{\cancel{60}}}$

$$\underset{1.5}{1.2+}$$

$$\overline{}$$

2.7   60 $\dfrac{100}{20}$

12

10 miles

$$\begin{array}{r}1\\55\\\times\ 2\\\hline 110\end{array}$$

$$\begin{array}{r}120\\-110\\\hline 10\end{array}$$

$$\frac{120}{2} = \frac{60}{1:2} = 30 \text{ mph}$$

$1\frac{1}{2}$ hours

10 miles

(35) A prom ticket at Smith High School is $120. Tom is going to save money for the ticket by walking his neighbor's dog for $15 per week. If Tom already has saved $22, what is the minimum number of weeks Tom must walk the dog to earn enough to pay for the prom ticket?

Rubric

[3] 7, and appropriate work is shown, such as solving the inequality $15x + 22 \geq 120$, solving an equation, or trial and error with at least three trials and appropriate checks.

[2] Appropriate work is shown, but one computational or rounding error is made.

or

[2] The trial-and-error method is used to find a correct solution, but only two trials and appropriate checks are shown.

[1] Appropriate work is shown, but two or more computational or rounding errors are made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] An incorrect equation of equal difficulty is solved appropriately.

or

[1] A correct inequality or equation is written, but no further correct work is shown.

or

[1] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.

or

[1] 7, but no work or only one trial with an appropriate check is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student work for Item 35 – Score 3

$22 - start
37 - week 1
52 - 2
67 - 3
82 - 4
97 - 5

112 - 6
$127 - 7

good
↓
$120

7 weeks minimum

Student work – Score 2

Let x = # of weeks

$$15x + 22 \geq 120$$
$$-22 \qquad -22$$

$$\frac{15x}{15} \geq \frac{88}{15}$$

$$x \geq 5.8\overline{6}$$

5 weeks would not be enough.

$$15(5) + 22 =$$
$$75 + 22 = \$97$$

He would have to walk the dog for 6 weeks

Student work for Item 35 – Score 1

$15 p/w

$120 – 8 weeks
$005 – 7 weeks
$ 90 – 6 weeks

he already had $22

$$\begin{array}{r} 1\overset{..}{2}0 \\ -22 \\ \hline 88 \end{array}$$

About 6 wks

Student work – Score 1

76

7 weeks

22

(36) Mr. Laub has three children: two girls (Sue and Karen) and one boy (David). After each meal, one child is chosen at random to wash dishes.

If the same child can be chosen for both lunch and dinner, construct a tree diagram or list a sample space of all the possible outcomes of who will wash dishes after lunch and dinner on Saturday.

Determine the probability that one boy and one girl will wash dishes after lunch and dinner on Saturday.

Rubric

[3] $\frac{4}{9}$, and a correct tree diagram or sample space is shown.

[2] A correct tree diagram or sample space is shown, but no probability or an incorrect probability is given.

or

[2] An incorrect tree diagram or sample space is shown, but an appropriate probability is found.

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] $\frac{4}{9}$, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.
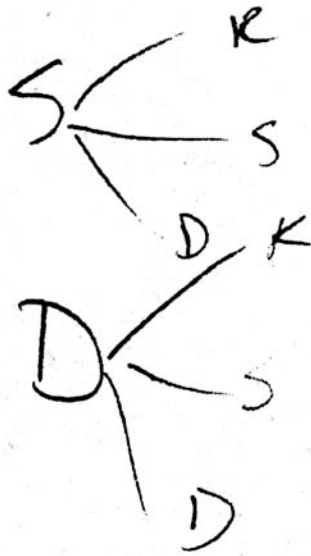
4/9

SK   KS   DS
SD   KD   DK
SS   KK   DD

9 different out
comes

4/9

Student work for Item 36 – Score 2

K < K
    S
    D

S < K
    S
    D

D < K
    S
    D

1/2

Student work – Score 1

4/9

PART IV

(37) The values of 11 houses on Washington St. are shown in the table below.

Value per House	Number of Houses
$100,000	1
$175,000	5
$200,000	4
$700,000	1

Find the mean value of these houses in dollars.

Find the median value of these houses in dollars.

State which measure of central tendency, the mean or the median, *best* represents the values of these 11 houses. Justify your answer.

Rubric for Item 37

[4] Mean = 225,000, median = 175,000, and the median is stated to be the best measure of central tendency, an appropriate justification is given, and appropriate work is shown.

[3] Appropriate work is shown, but one computational error is made, but an appropriate measure of central tendency is stated, and an appropriate justification is given.

or

[3] Mean = 225,000, median = 175,000, and the median is stated to be the best measure of central tendency, but no justification is given.

[2] Appropriate work is shown, but two or more computational errors are made, but an appropriate measure of central tendency is stated, and an appropriate justification is given.

or

[2] Appropriate work is shown, but one conceptual error is made.

or

[2] Appropriate work is shown to find mean = 225,000 and median = 175,000, but no further correct work is shown.

[1] Appropriate work is shown, but one computational error and one conceptual error are made.

or

[1] Mean = 225,000 and median = 175,000, but no further work is shown.

[0] Mean = 225,000 or median = 175,000, but no further work is shown.

or

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student work for Item 37 – Score 4

$$\frac{2475000}{11} = \$225,000 \quad \text{MEAN}$$

$\text{Loo}, 175, 175, 175, 175, (175), 200, 200, 200, 200, 700$

MEDIAN $175,000

MEDIAN IS BEST BECAUSE ONLY 1 HOUSE
IS HIGHER THAN THE MEAN!

Student work – Score 3

$$11\overline{)3475,000} \quad \frac{225000}{}$$

$225,000

1.222233334

$175,000

175,000 because its inbetween
the prices

100   +200
+ 175   +100
                2475
$$\overline{24475}$$

225000
11 $\overline{)2475\,000}$

$225\,000$

$175,000$

The average or the mean best represents the values of these 11 houses because it shows the exact price of the average price, on the other hand the median just takes an estimate.

100,000
875,000
800,000
700,000

mean- average
median- middle   mode- most accuring

293750   5c 18,750

The mean value of these houses in dollars
is 293,750 $618,750.$

175,000
~~300~~ is the median value of these houses.

?

The reacurring central tendency of those
11 houses is 175,000. ?
~~100,000, 175,000, 175,000, 17.~~

100,000, 175,000; 175,000; 175,000, 175,000, 175,000, 200,000, 200,000, 200,000, 200,000
700,000

100,000 / 125,000 / 175,000 / 125,000 /
175,000 / 175,000 / 200,000 /
200,000 / 200,000 / 200,000 /
700,000

$225000

$175,000

(38) Solve the following systems of equations graphically, on the set of axes below, and state the coordinates of the point(s) in the solution set.

$$y = x^2 - 6x + 5$$
$$2x + y = 5$$
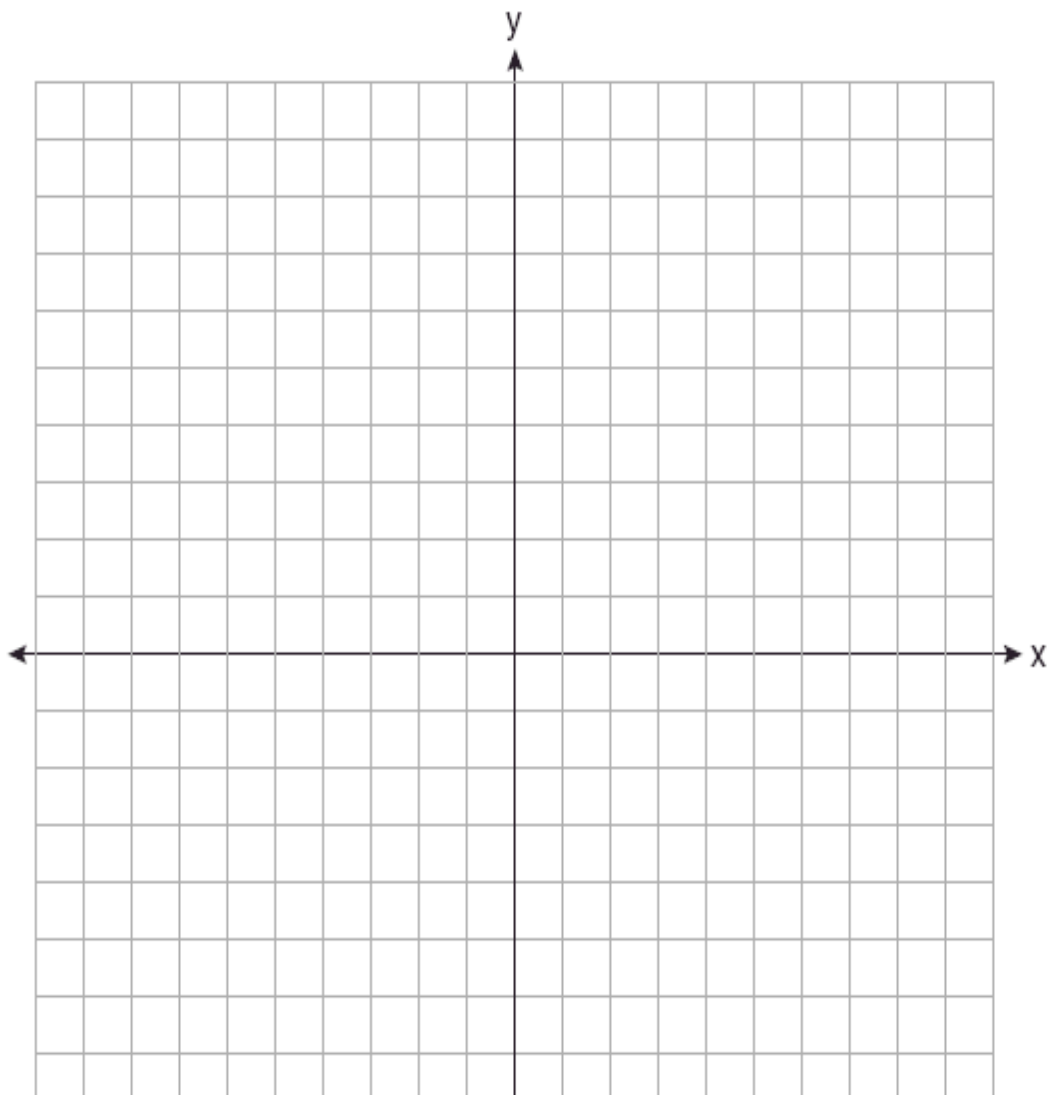
Rubric for Item 38

[4] Correct graphs are drawn, and (0,5) and (4,–3) are stated.

[3] Both equations are graphed, but one graphing error is made, but appropriate solutions are stated.

or

[3] Both graphs are drawn correctly, but only one solution is stated.

[2] Both graphs are drawn correctly, but no solutions are stated.

or

[2] Both equations are graphed, but two or more graphing errors are made, but appropriate solutions are stated.

or

[2] Appropriate work is shown to find (0,5) and (4,–3), but a method other than graphing is used.

or

[2] Both equations are graphed, but one conceptual error is made.

[1] Both equations are graphed, but one conceptual error and one graphing error are made.

or

[1] (0,5) and (4,–3) are stated, but no work is shown.

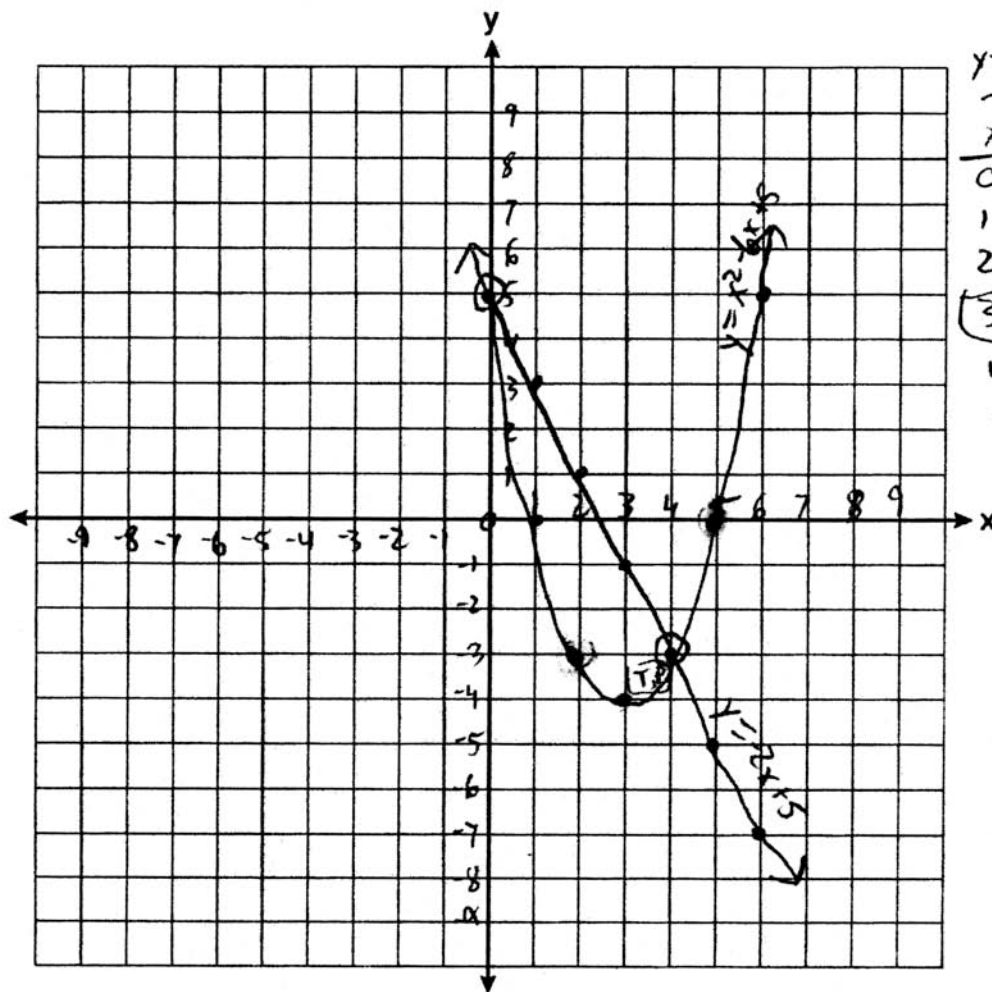**[0]** (0,5) or (4,–3) is stated, but no work is shown.

or

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Solution

x	y
0	5
4	-3

$y = x^2 - 6x + 5$

$2x + y = 5$

$-2x \qquad -2x$

$y = -2x + 5$

$y = x^2 - 6x + 5$

x	y
0	5
1	0
2	-3
3	-4	TP
4	-3
5	0
6	5

$y = -2x + 5$

x	y
0	5
1	3
2	1
3	-1
4	-3
5	-5
6	-7

Student work for Item 38 – Score 3

$$y = x^2 - 6x + 5$$
$$2x + y = 5$$
$$-2x \qquad -2x$$
$$y = 5 - 2x$$

SOlUtiON =
$(5,0)$; $(4,-3)$

$y = x^2 - 6x + 5$

$2x + y = 5$

$$2x + y = 5$$
$$-2x \qquad 2x$$
$$y = 5 - 2x$$

$y = x^2 - 6x + 5$
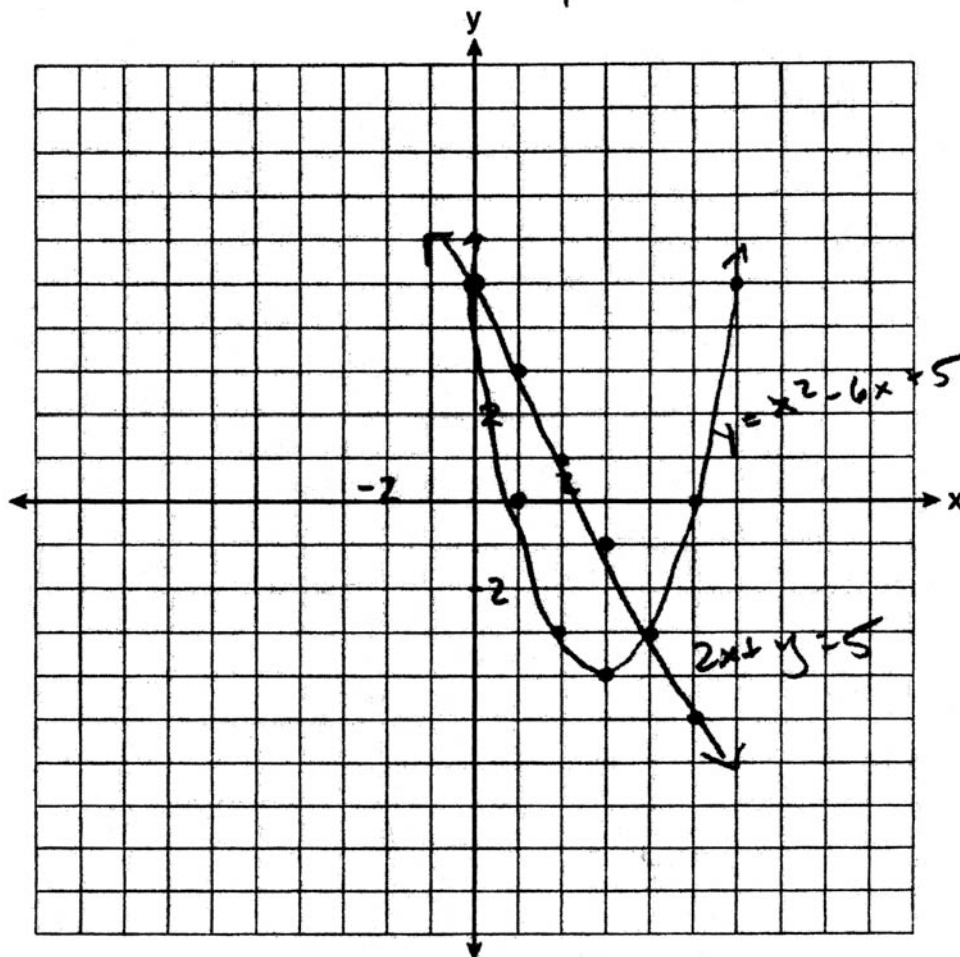
$y = 5 - 2x$

X	Y₁	Y₂
0	5	5
1	0	3
2	-3	1
3	-4	-1
4	-3	-3
5	0	-5
6	5	-7
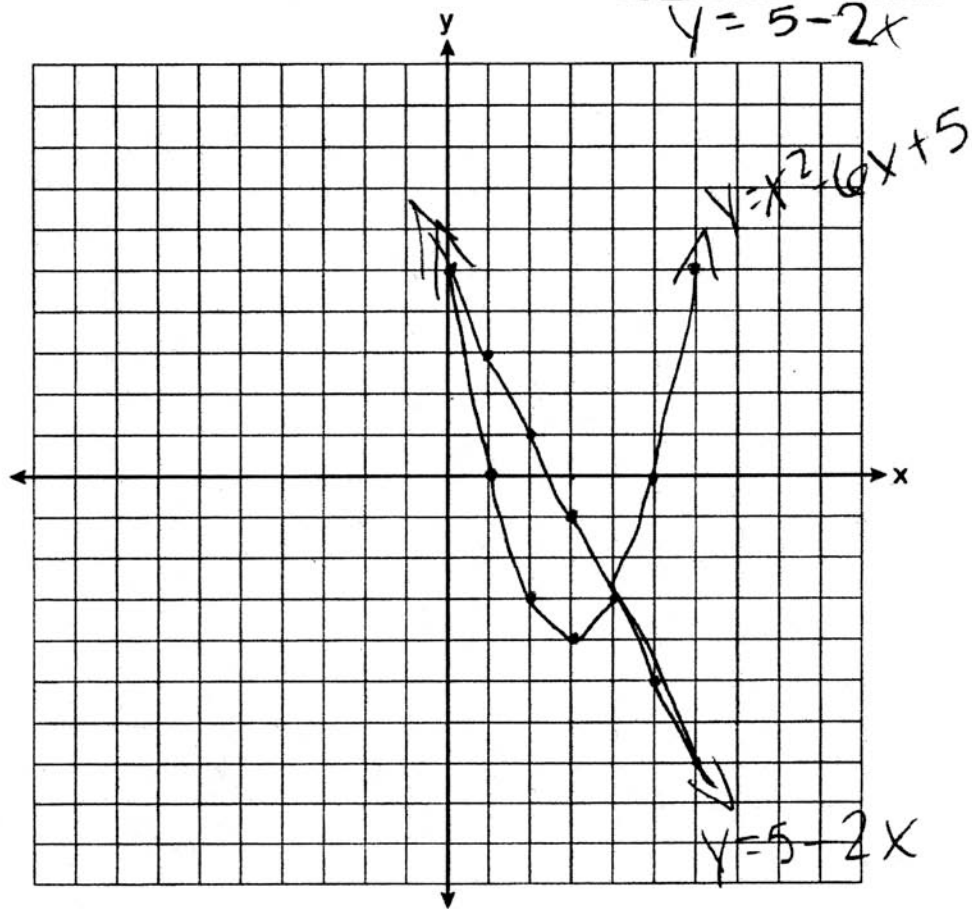
Student work for Item 38 – Score 1

$y = 5 - 2x$
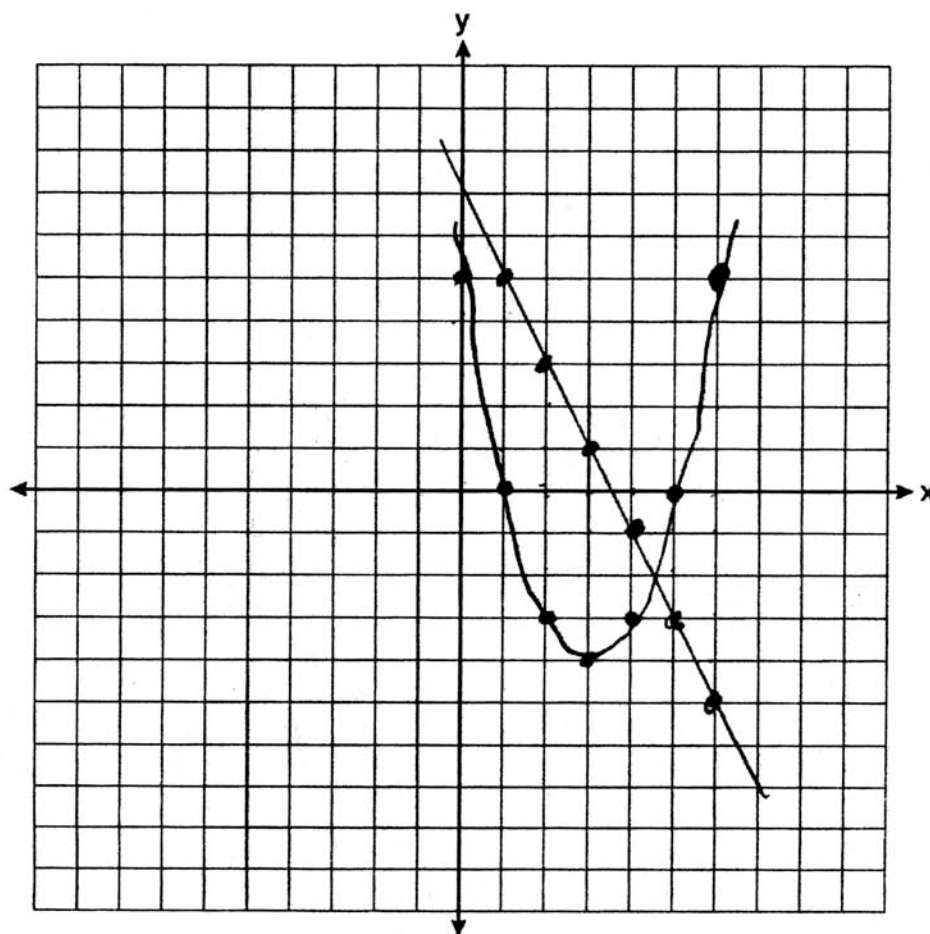
(39) Solve for x: $\dfrac{x+1}{x} = \dfrac{-7}{x-12}$

Rubric for Item 39

[4] 6 and –2, and appropriate work is shown, such as an algebraic solution or trial and error with at least three trials and appropriate checks.

[3] Appropriate work is shown, but one computational or factoring error is made.

or

[3] Appropriate work is shown, but only one solution is found.

[2] The correct quadratic equation is written in standard form.

or

[2] Appropriate work is shown, but two or more computational or factoring errors are made.

or

[2] Appropriate work is shown, but one conceptual error is made.

or

[2] The trial-and-error method is used to find at least one solution, but only two trials and appropriate checks are shown.

or

[2] The trial-and-error method is attempted and at least six systematic trials and appropriate checks are shown, but no solution is found.

or

[2] An incorrect quadratic equation of equal difficulty is solved appropriately.

[1] $x^2 – 11x – 12 = –7x$, but no further correct work is shown.

or

[1] 6 and −2, but no work or only one trial with an appropriate check is shown.

or

[1] An incorrect equation of a lesser degree of difficulty is solved appropriately.

or

[1] Appropriate work is shown, but one conceptual error and one computational or factoring error are made.

[0] 6 or –2, but no work is shown.

or

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

$(x-4)(x+2) = -7x$

$x^2 - 12x + x - 12 = -7x$

$x^2 - 11x - 12 = -7x$

$x^2 - 4x - 12 = 0$

$$x = \frac{4 \pm \sqrt{(-4)^2 - 4(1)(-12)}}{2}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4(a)(c)}}{2(a)}$$

$$x = \frac{4 \pm \sqrt{64}}{2}$$

$x = 6 \qquad x = -2$

$$\frac{x+1}{x} \cancel{=} \frac{-7}{x-12}$$

$$x+1 \cdot x - 12 = x \cdot -7$$

$$x^2 + 1x + -12x + -12 = -7x$$

$$x^2 + -11x - 12 = -7x$$
$$+7x \qquad\qquad +7x$$

$$x^2 - 4x - 12 = 0$$

$$(x-6)(x+2) = 0$$

$$x - 6 = 0 \qquad x - 2 = 0$$
$$+6 \ +6 \qquad\quad +2 \ +2$$

$$\boxed{x = 6} \qquad \boxed{x = 2}$$

Student work for Item 39 – Score 2

$$(x+1)(x-12) = -7x$$

$$x^2 - 11x - 12 = -7x$$

$$\underline{+7x} \qquad\qquad \underline{+7x}$$

$$x^2 - 4x - 12 = 0$$

$$(x - 4)(x + 3) = 0$$

$$x = 4 \quad\text{or}\quad x = -3$$

Student work – Score 1

$$x - 7 = x + 1 + x - 12$$

$$-x - 7 = 2x - 11$$
$$\underline{\; -x}$$

$$-7 = x - 11$$
$$\underline{+11 \qquad\qquad +11}$$

$$x = 4$$

APPENDICES

Appendix A

Specifications for the Regents Examination in Integrated Algebra
(First Administration–June 2008)

The questions on the Regents Examination in Integrated Algebra will assess both the content and the process strands of New York State Mathematics Standard 3. Each question will be aligned to one content performance indicator but will also be aligned to one or more process performance indicators, as appropriate for the concepts embodied in the task. As a result of the alignment to both content and process strands, the examination will assess students' conceptual understanding, procedural fluency, and problem-solving abilities rather than assessing knowledge of isolated skills and facts.

There will be 39 questions on the Regents Examination in Integrated Algebra. The table below shows the percentage of total credits that will be aligned with each content strand.

Content Strand	% of Total Credits
1 Number Sense and Operations	6–10%
2 Algebra	50–55%
3 Geometry	14–19%
4 Measurement	3–8%
5 Probability and Statistics	14–19%

Question Types

The Regents Examination in Integrated Algebra will include the following types and numbers of questions:

Question Type	Number of Questions
Multiple choice	30
2-credit open ended	3
3-credit open ended	3
4-credit open ended	3

Calculators

Schools must make a graphing calculator available for the exclusive use of each student while that student takes the Regents Examination in Integrated Algebra.

Appendix B

Map to Learning Standards

The table below shows which content strand each item is aligned to. The numbers in the table represent the question numbers on the test.

Content Strand	Multiple-Choice Item Number	2-Credit Item Number	3-Credit Item Number	4-Credit Item Number
Number Sense and Operations	5, 25	31		
Algebra	3, 4, 6, 8, 10, 11, 13, 15, 16, 18, 19, 21, 24, 26, 27, 28, 29	32	35	39
Geometry	12, 17, 20, 22, 30	33		38
Measurement	23		34	
Probability and Statistics	1, 2, 7, 9, 14		36	37