

## 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

Handwritten student work for simplifying  $5\sqrt{72}$ . The student shows a prime factorization tree for 72, identifying factors of 2, 3, and 3. The final answer,  $30\sqrt{2}$ , is circled.

The work shows the expression  $5\sqrt{72}$  being broken down into  $5\sqrt{2 \cdot 36}$ . The 36 is further broken down into  $2 \cdot 18$ , and the 18 into  $2 \cdot 9$ . The 9 is broken down into  $3 \cdot 3$ . The final answer,  $30\sqrt{2}$ , is circled.

Student work for Item 31 – Score 1

$$\begin{array}{c} 5\sqrt{72} \\ \swarrow \quad \searrow \\ \sqrt{9} \quad \sqrt{8} \\ \swarrow \quad \searrow \quad \swarrow \quad \searrow \\ \sqrt{3} \quad \sqrt{3} \quad \sqrt{4} \quad \sqrt{2} \\ \quad \quad \quad \swarrow \quad \searrow \\ \quad \quad \quad \sqrt{2} \quad \sqrt{2} \end{array}$$

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

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

Student work – Score 1

$$5\sqrt{72}$$

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

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

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

$$15\sqrt{8}$$

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

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

**Rubric**

[2] 4, 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] 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 – Score 2**

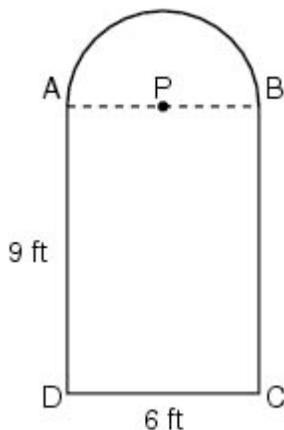
$$\begin{array}{r} 3 + 2g = 5g - 9 \\ +9 \qquad \qquad +9 \\ \hline 12 + 2g = 5g \\ \quad -2g \quad -2g \\ \hline 12 = 3g \\ \frac{12}{3} = \frac{3g}{3} \\ 4 = g \end{array}$$

check

$$\begin{aligned} 3 + 2(4) &= 5(4) - 9 \\ 3 + 8 &= 20 - 9 \\ 11 &= 11 \end{aligned}$$



- (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.

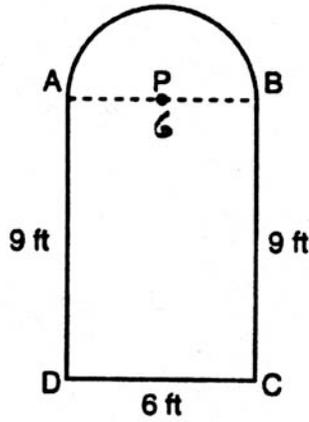
*or*

[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

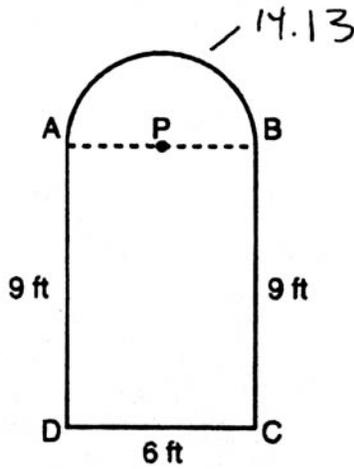
$$\begin{array}{r} 3.14 \\ + 6 \\ \hline 18.84 \\ 2 \sqrt{18.84} \\ \hline 9.42 \end{array}$$



$$\begin{array}{r} 9.42 \\ 9 \\ 9 \\ + 6 \\ \hline 33.42 \end{array}$$

33.4 ft

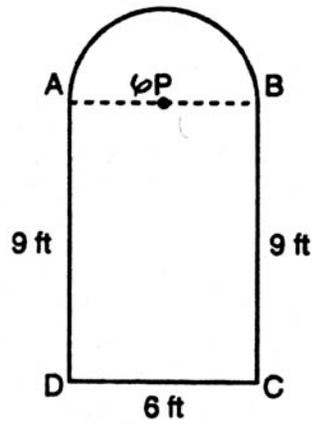
Student work – Score 1



$$\pi r^2 \quad 3.14 \times 9$$

$$9 + 9 + 6 + 14.13 = 38.13$$

Student work for Item 33 – Score 1



$$9 + 9 + 6 + 6 = 30 \text{ ft} + \text{Semi-circle}$$

$$A.C = \pi d$$

$$A.C = \sqrt{8.84^2}$$

$$A.C = 9.42$$

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.

Student work for Item 34 – Score 3

50 miles an hr  

$$\begin{array}{r} 50 \\ \times 2.4 \\ \hline 200 \\ +1000 \\ \hline 120.0 \end{array}$$
 miles

2.4 hrs For the whole trip  
 1.2 hrs for half way

$$1.2 \overline{) 120}$$

$$\begin{array}{r} 50 \\ 1.2 \overline{) 60} \\ \underline{-60} \\ 00 \end{array}$$

50 miles

1.2 hrs = 60 miles  
 2.4 hrs = 120 miles

50 miles  

$$\begin{array}{r} 50 \\ \times 1.2 \\ \hline 60 \end{array}$$
 miles

$$\begin{array}{r} 1.2 = 50 \\ +40 \end{array}$$

$$\begin{array}{r} 40 \\ \times 3 \\ \hline 120 \end{array}$$
 miles

1.5 hrs

40 miles / 3 hr trip  
 1.5 hr trip

$$\begin{array}{r} 40 \\ \times 1.2 \\ \hline 8.0 \\ +40.0 \\ \hline 48.0 \end{array}$$

120 miles Total

40 miles

$$\begin{array}{r} 40 \\ \times 1.5 \\ \hline 200 \\ +400 \\ \hline 20.0 \end{array}$$

10 miles

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

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

Student work for Item 34 – Score 2

$$1.2 \text{ hrs} = 80 \text{ mi.}$$

$$\frac{62}{2.4} = 160 \text{ min.}$$

120

$$\begin{array}{r} 120 \\ - 2.4 \\ \hline 60 \end{array}$$

50 mph

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

55 + 2 = 110 miles from home

Student work for Item 34 – Score 1

60 mph

$$\begin{array}{r} 120 \overline{) 60} \\ \underline{120} \\ 0 \end{array}$$

60  
1.2      20  
1.2

2.7 hours

$$\begin{array}{r} 1.2 + \\ 1.5 \\ \hline 2.7 \end{array}$$

40      60

$$\begin{array}{r} 40 \\ \underline{100} \\ 20 \end{array}$$

60

10 miles

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

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

Student work for Item 34 – Score 1

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

$1\frac{1}{2}$  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

goal  
 $\downarrow$   
 $\$120$

7 weeks minimum

Student work – Score 2

Let  $x = \#$  of weeks

$$15x + 22 \geq 120$$

$$\underline{-22} \quad \underline{-22}$$

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

$$x \geq 5.\overline{86}$$

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

$$\begin{array}{r} 120 \\ - 22 \\ \hline 88 \end{array}$$

\$120 - 8 weeks

\$105 - 7 weeks

\$90 - 6 weeks

he already had \$22

About 6 wks

Student work – Score 1

176

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.

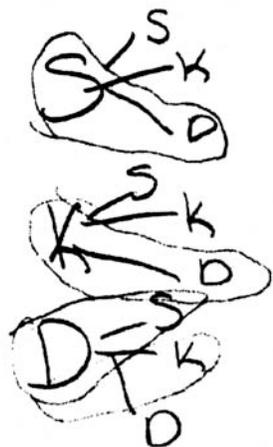
[1] Appropriate work is shown, but one conceptual error is made.

*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.

Student work for Item 36 – Score 3



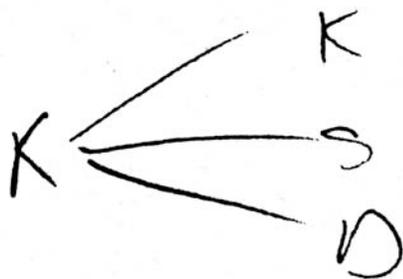
4/9

Student work for Item 36 – Score 3

SK KS DS  
SD KD DK  
SS KK DD  
9 different out  
comes

$\frac{4}{9}$

Student work for Item 36 – Score 2



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

Student work – Score 1

$$\frac{4}{9}$$

## 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

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

100, 175, 175, 175, 175, 175, 200, 200, 200, 200, 200  
MEDIAN \$175,000

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

Student work – Score 3

$$\boxed{\$225,000} \quad 11 \overline{) 2475,000} \begin{array}{r} 225000 \\ \underline{2475000} \\ 000000 \end{array}$$

1 2 2 2 2 2 3 3 3 3 4

$$\boxed{\$175,000}$$

175,000 because its in between the prices



Student work for Item 37 – Score 1

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

mean - average  
 median - middle      mode - most occurring

~~293,750~~ 50 is .750

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

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

?

The recurring central tendency of these 11 houses is 175,000.

~~100,000, 175,000, 175,000, 175,000, 175,000~~

~~100,000, 175,000, 175,000, 175,000, 175,000, 175,000, 175,000, 200,000, 200,000, 200,000, 200,000~~  
 700,000

Student work for Item 37 – Score 1

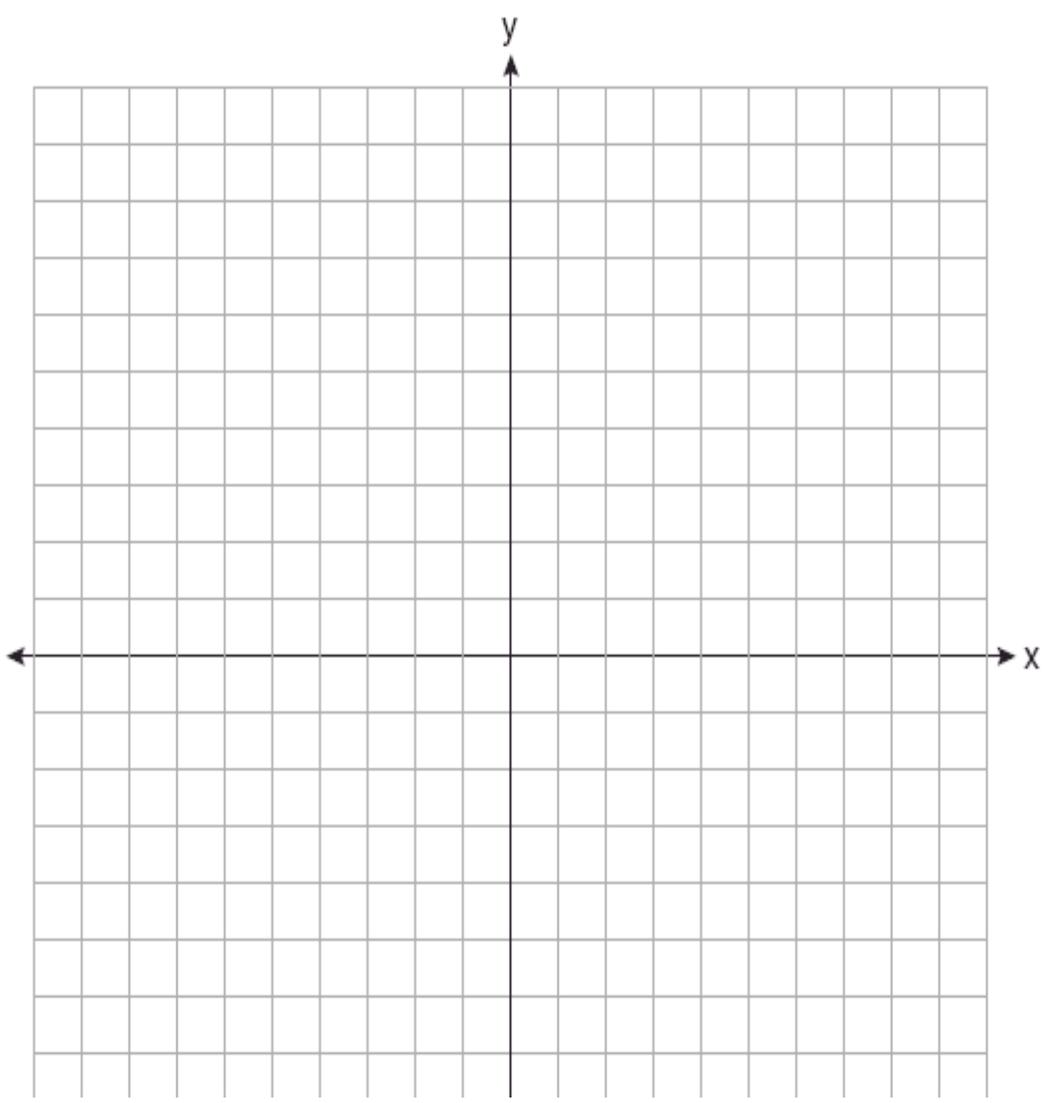
~~100,000~~ / ~~175,000~~ / ~~175,000~~ / ~~175,000~~  
~~175,000~~ / ~~175,000~~ / ~~200,000~~  
~~200,000~~ / ~~200,000~~ / ~~200,000~~ /  
700,000

\$225,000

\$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*

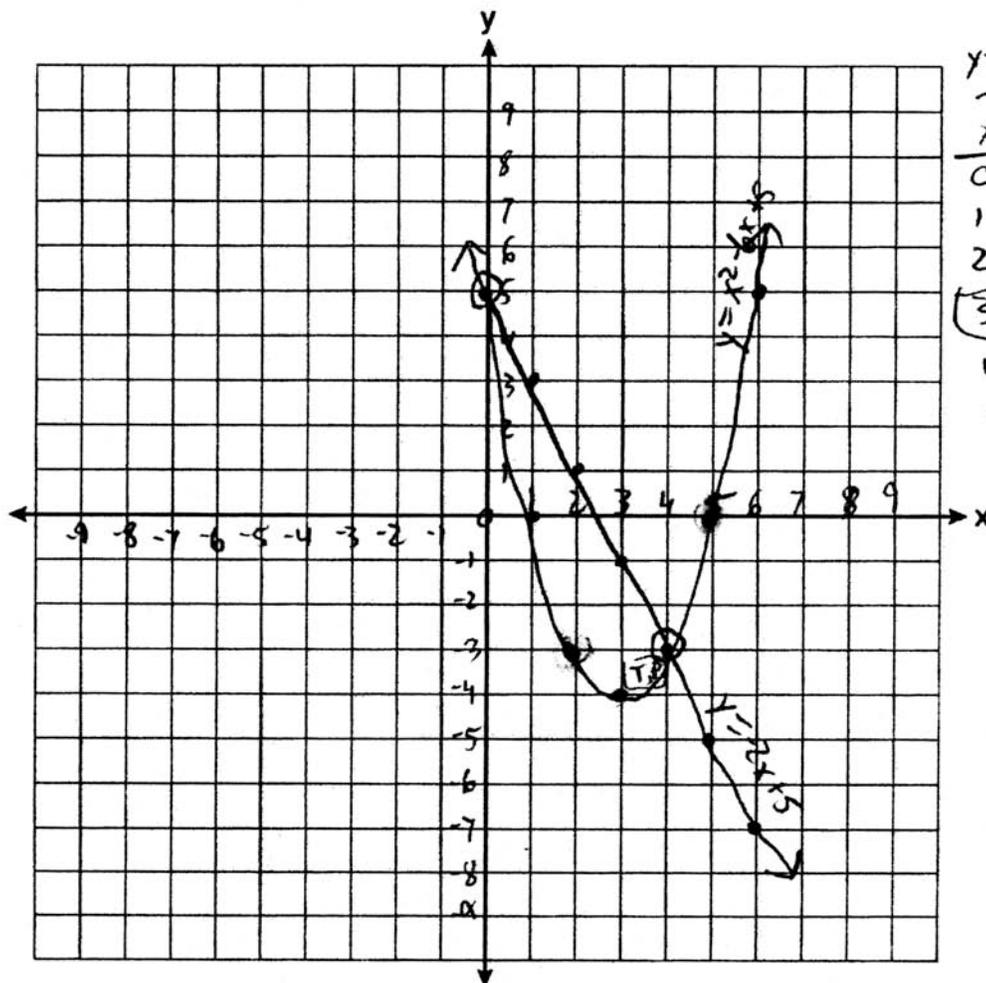
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Student work for Item 38 – Score 4

$$\begin{array}{r}
 y = x^2 - 6x + 5 \\
 2x + y = 5 \\
 \underline{-7x \quad -2x} \\
 y = -2x + 5
 \end{array}$$

Solution

x	y
0	5
4	-3



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

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

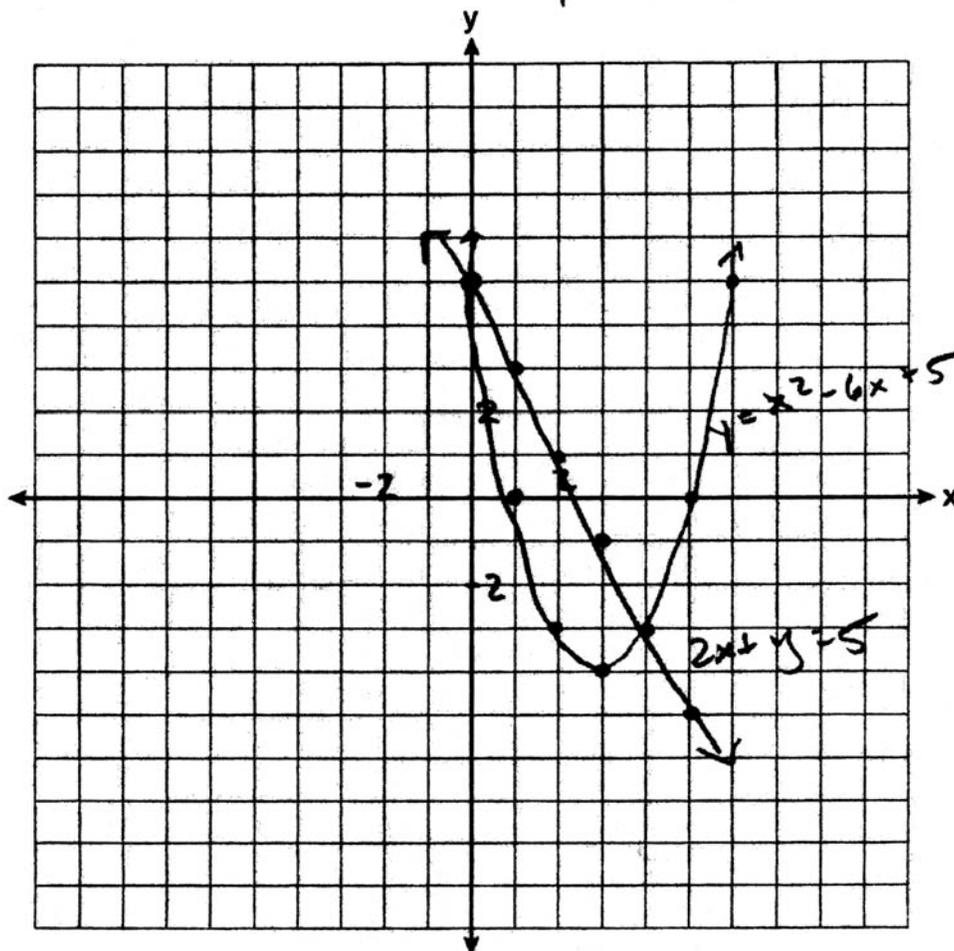
$y = -2x + 5$

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

Student work for Item 38 – Score 3

$$\begin{array}{r} y = x^2 - 6x + 5 \\ 2x + y = 5 \\ -2x \quad -2x \\ \hline y = 5 - 2x \end{array}$$

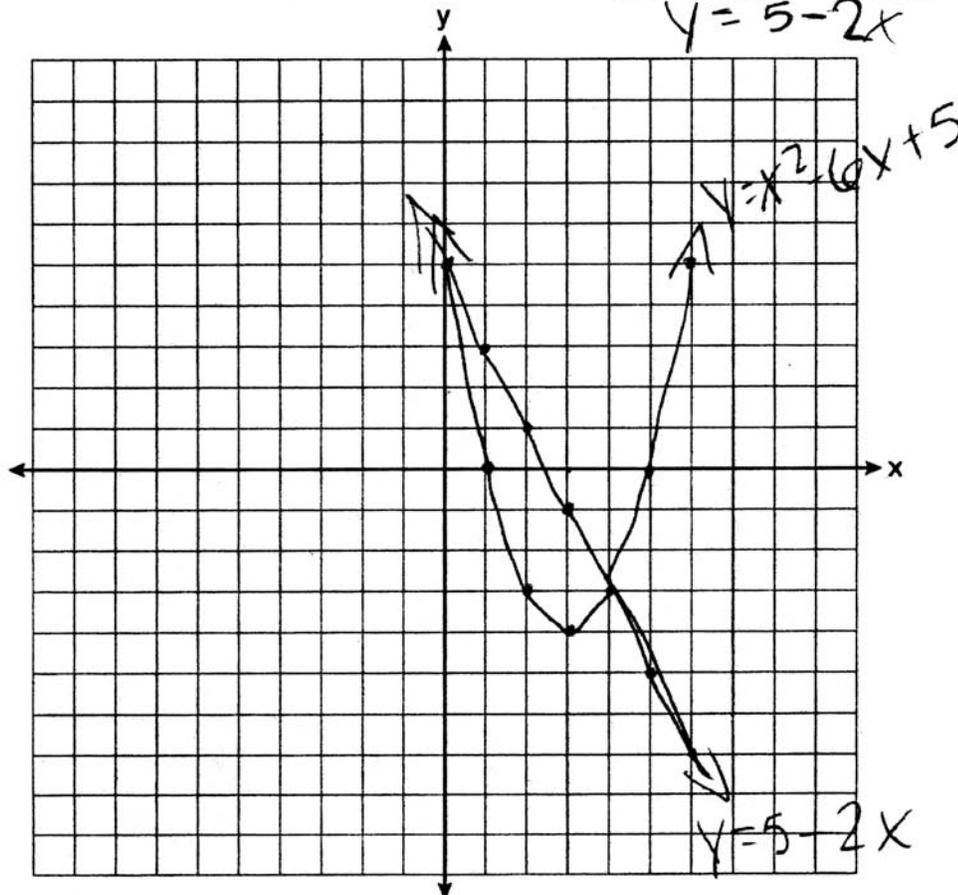
SOLUTION =  
 $(5, 0)$  &  $(4, -3)$



Student work for Item 38 – Score 2

$$\begin{array}{r} 2x + y = 5 \\ -2x \quad 2x \\ \hline y = 5 - 2x \end{array}$$

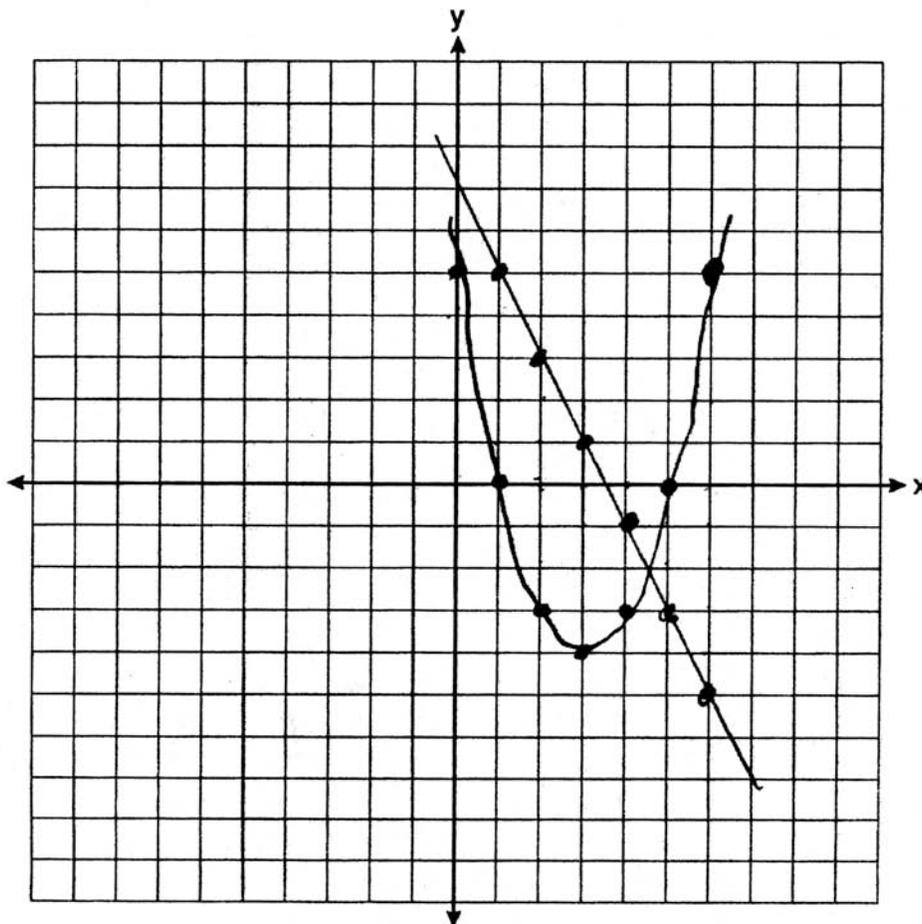
X	Y <sub>1</sub>	Y <sub>2</sub>
0	5	5
1	0	3
2	-3	1
3	-4	-1
4	-3	-3
5	0	-5
6	0	-7



Student work for Item 38 – Score 1

$$y = 5 - 2x$$

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



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

(39) Solve for  $x$ :  $\frac{x+1}{x} = \frac{-7}{x-12}$

### 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.

Student work for Item 39 – Score 4

$$(x+1)(x+2) = -7x$$

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

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

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

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

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

$$x = 6 \quad x = -2$$

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

Student work for Item 39 – Score 3

$$\frac{x+1}{x} \cdot \frac{-7}{x-12}$$

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

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

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

$$\quad +7x \qquad \qquad +7x$$

---


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

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

$$x-6=0$$

$$\quad +6 \quad +6$$

$$x-2=0$$

$$\quad +2 \quad +2$$

---


$$x=6$$

---


$$x=2$$

Student work for Item 39 – Score 2

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

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

$$\begin{array}{r} +7x \\ \hline \end{array} \qquad \begin{array}{r} +7x \\ \hline \end{array}$$

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

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

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

Student work – Score 1

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

$$\begin{array}{r} \cancel{x} - 7 = 2x - 11 \\ \hline \end{array}$$

$$\begin{array}{r} -7 = x - 11 \\ +11 \qquad +11 \end{array}$$

$$x = 4$$

## **APPENDICES**

## Appendix A

The University of the State of New York  
THE STATE EDUCATION DEPARTMENT  
Albany, New York 12234

### 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.

<b>Content Strand</b>	<b>Multiple-Choice Item Number</b>	<b>2-Credit Item Number</b>	<b>3-Credit Item Number</b>	<b>4-Credit Item Number</b>
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