

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

INTEGRATED ALGEBRA

Tuesday, January 22, 2013 — 9:15 a.m.

SAMPLE RESPONSE SET

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Revisions have been made to pages 5, 6, 26, 29, and 46.
Please print and replace these pages.

Thank you for your cooperation.

Practice Papers—Question 31

31 Express $4\sqrt{75}$ in simplest radical form.

$$\begin{array}{c} 4\sqrt{75} \\ \quad \wedge \\ 4\sqrt{25}\sqrt{3} \\ \quad | \quad | \\ 4 \cdot 5 \sqrt{3} \\ \textcircled{20\sqrt{3}} \end{array}$$

Score: 2

The student has a complete and correct response.

The student shows a breakdown of $\sqrt{75}$ in this work.

Practice Papers—Question 31

31 Express $4\sqrt{75}$ in simplest radical form.

$$4\sqrt{25} \sqrt{3}$$
$$20\sqrt{3}$$

Score: 2

The student has a complete and correct response.

It is not necessary for the student to show that $\sqrt{25} = 5$.

Practice Papers—Question 31

31 Express $4\sqrt{75}$ in simplest radical form.

$$\begin{array}{c} 4\sqrt{75} \\ \wedge \\ 25 \ 3 \\ \wedge \\ 5 \ 5 \\ 4 \cdot 5 \sqrt{5} \sqrt{3} \\ 20 \sqrt{15} \end{array}$$

Score: 1

The student makes one conceptual error by writing $\sqrt{25}$ as $5\sqrt{5}$.

Practice Papers—Question 31

31 Express $4\sqrt{75}$ in simplest radical form.

$$4\sqrt{75}$$
$$4 \sqrt{3} 5$$
$$5\sqrt{3}$$
$$9\sqrt{3}$$

Score: 1

The student makes one conceptual error by adding 4 and 5 instead of multiplying them.

Practice Papers—Question 31

31 Express $4\sqrt{75}$ in simplest radical form.

$$\begin{array}{l} 4 \cdot \sqrt{3} \sqrt{25} \\ 4 \cdot 3 \sqrt{25} \\ \hline 12 \sqrt{25} \\ \hline 12 \sqrt{5} \end{array}$$

Score: 0

The student makes two conceptual errors by writing $\sqrt{3} = 3$ and $\sqrt{25} = \sqrt{5}$.

Practice Papers—Question 31

31 Express $4\sqrt{75}$ in simplest radical form.

$$4\sqrt{75} = 34.641$$

Score: 0

The student writes the answer as a decimal.

Practice Papers—Question 32

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$\begin{aligned} & x(5x^2 - 20x - 60) \\ & 5x(x^2 - 4x - 12) \\ & 5x(x - 6)(x + 2) \end{aligned}$$

Score: 2

The student has a complete and correct response.

Practice Papers—Question 32

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$\begin{aligned} & x(5x^2 - 20x - 60) \quad \begin{array}{l} -12 \\ -6 \quad / \quad 2 \end{array} \\ & 5x(x^2 - 4x - 12) \\ & \quad (x^2 + 2x - 6x - 12) \\ & \quad x(x+2x) + (-6x-12) \\ & 5x^2(x-6)(x+2) \end{aligned}$$

Score: 2

The student has a complete and correct response.

The student factors the trinomial by grouping.

Practice Papers—Question 32

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$5x(x^2 - 4x - 12)$$

Score: 1

The student takes out the greatest common factor, but no further correct work is shown.

Practice Papers—Question 32

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$\begin{array}{l} 5x(x^2 - 4x - 12) \\ -5x \quad -5x \\ (x-6)(x+2) \\ x-6=0 \quad x+2=0 \\ \textcircled{x=6} \quad \cancel{x=-2} \end{array}$$

Score: 1

The student takes out the greatest common factor correctly, but then attempts to solve for roots.

Practice Papers—Question 32

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$5 \left(\frac{5x^2}{x^3} - 4x^2 - \frac{12x}{x} \right)$$

$$5x(x^2 - 4x - 12)$$

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

Score: 1

The student takes out greatest factor correctly, but then makes a factoring error.

Practice Papers—Question 32

32 Factor completely: $5x^3 - 20x^2 - 60x$

$$\begin{array}{l} 5x(\cancel{5} - 4x - 60) \quad \begin{array}{l} -60 \\ 10 - 6 \end{array} \\ 5x(x + 10x | -6x - 60) \\ 5x((x + 10)x | -6(x + 10)) \\ \text{5, } \circlearrowleft 5x(x + 10)(x - 6) \end{array}$$

Score: 0

The student makes an error in taking out the greatest common factor and makes an error in factoring the trinomial.

Practice Papers—Question 32

32 Factor completely: $5x^3 - 20x^2 - 60x$

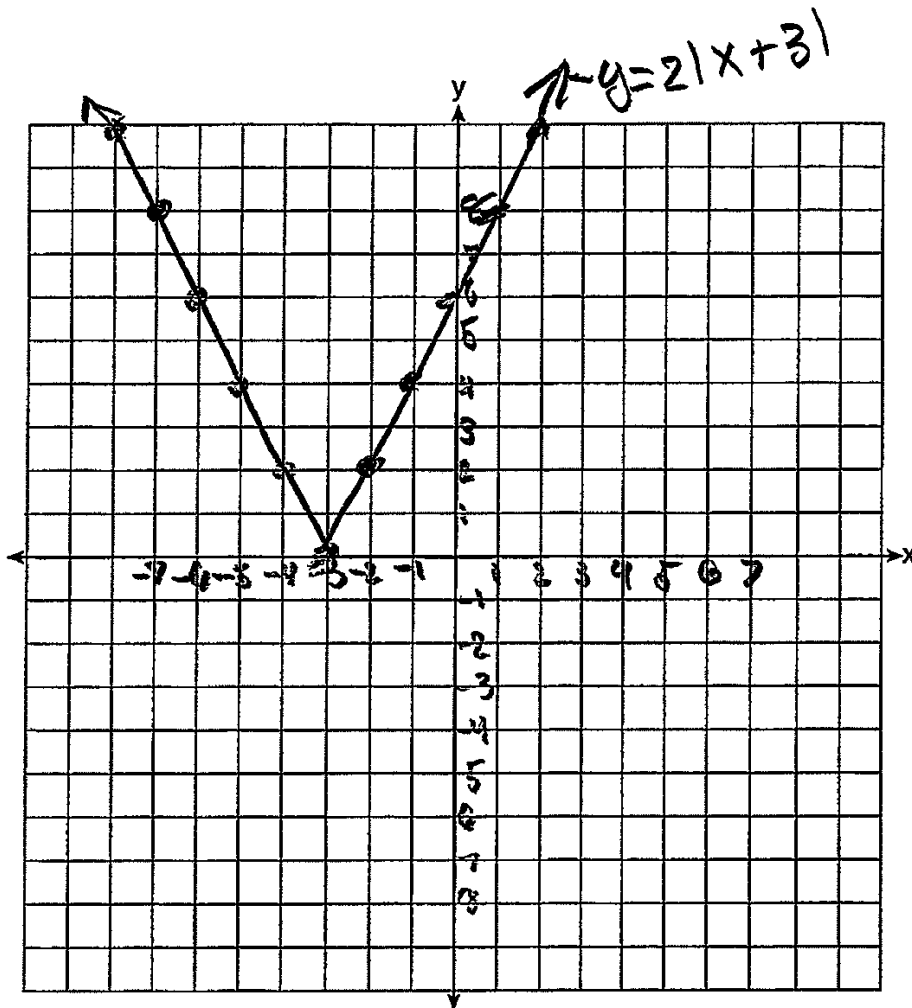
$$\begin{array}{l} 25x - 60x \\ \vdots \\ 85x \end{array}$$

Score: 0

No correct work is shown.

Practice Papers—Question 33

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.

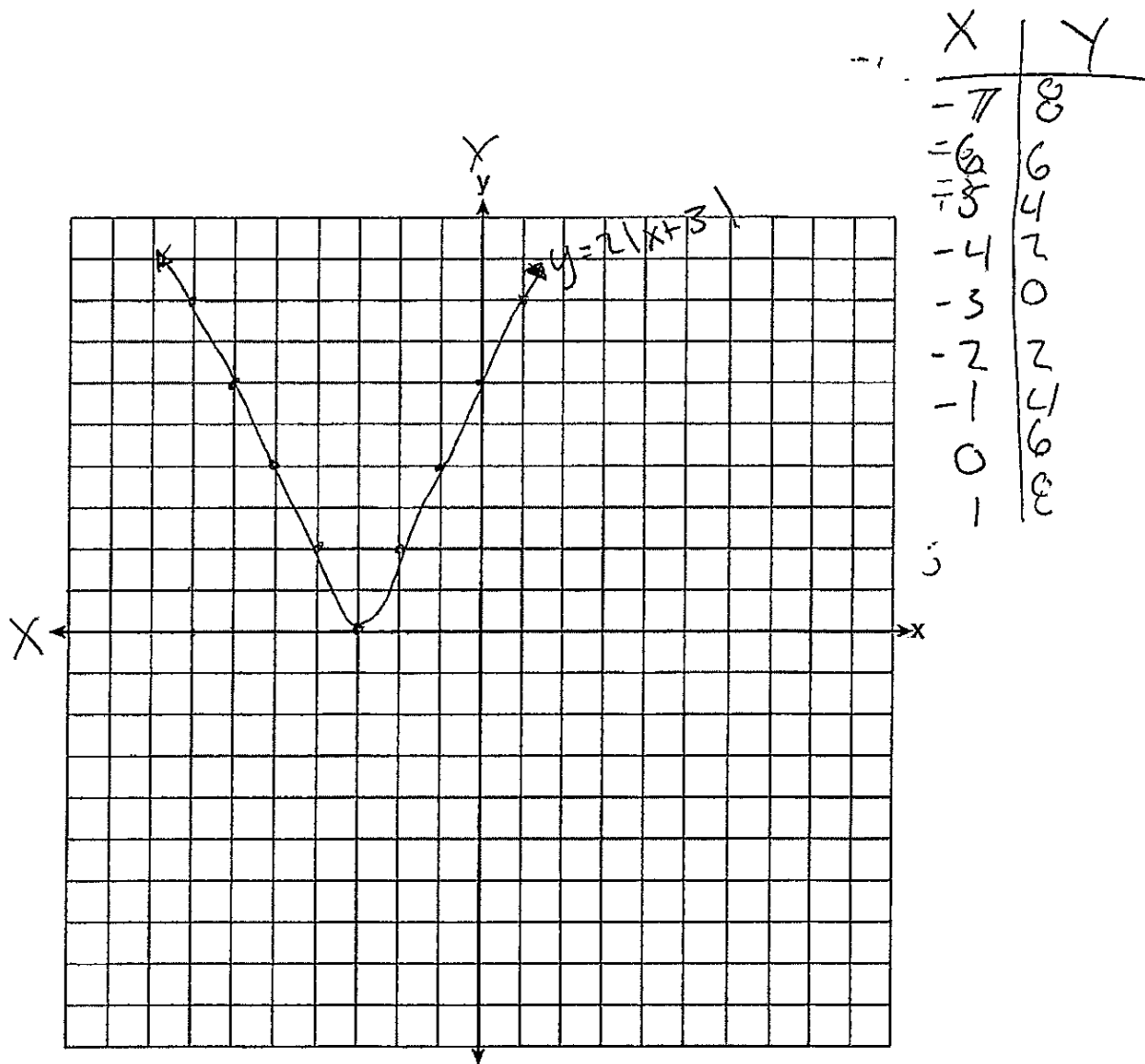


Score: 2

The student has a complete and correct response.

Practice Papers—Question 33

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.



Score: 2

The student has a complete and correct response.

Since a table of values is given, it is not necessary to deduct credit for lines that are not straight.

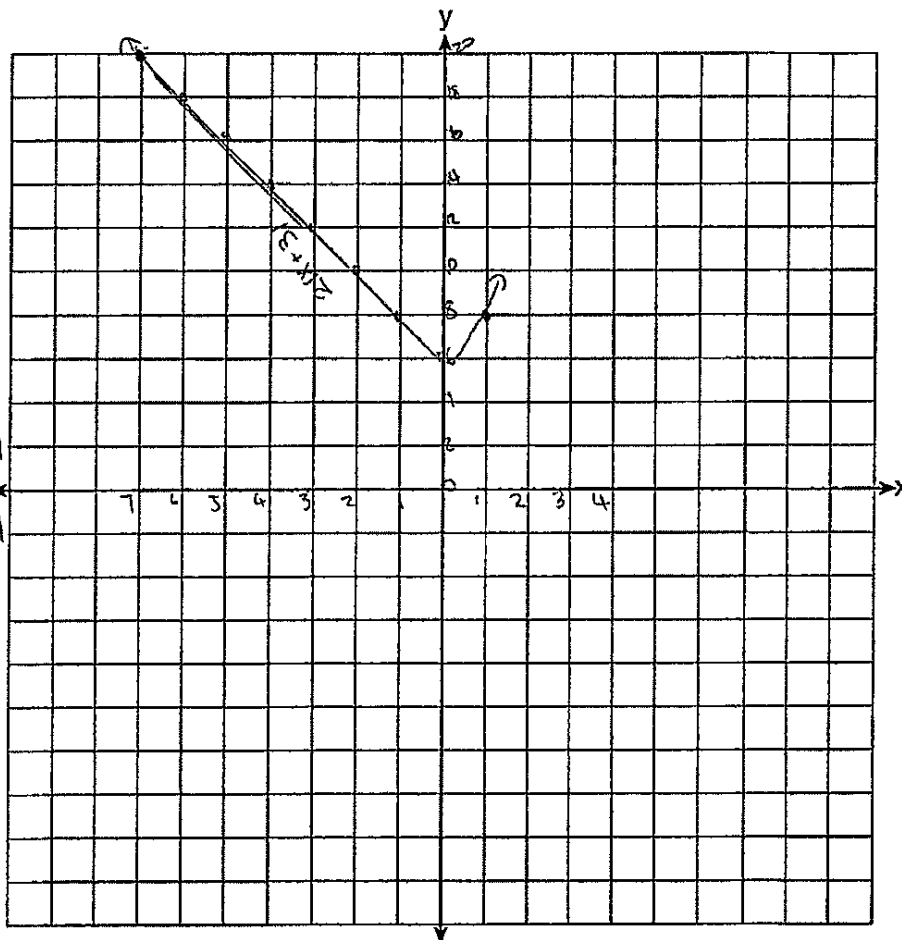
Practice Papers—Question 33

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.

$2|x + 3|$

$-7 \leq x \leq 1$
 \uparrow
 -7 to 1

y	x
20	$2(7+3)$
18	$2(6+3)$
16	$2(5+3)$
14	$2(4+3)$
12	$2(3+3)$
10	$2(2+3)$
8	$2(1+3)$
6	$2(0+3)$
8	$2(1+3)$



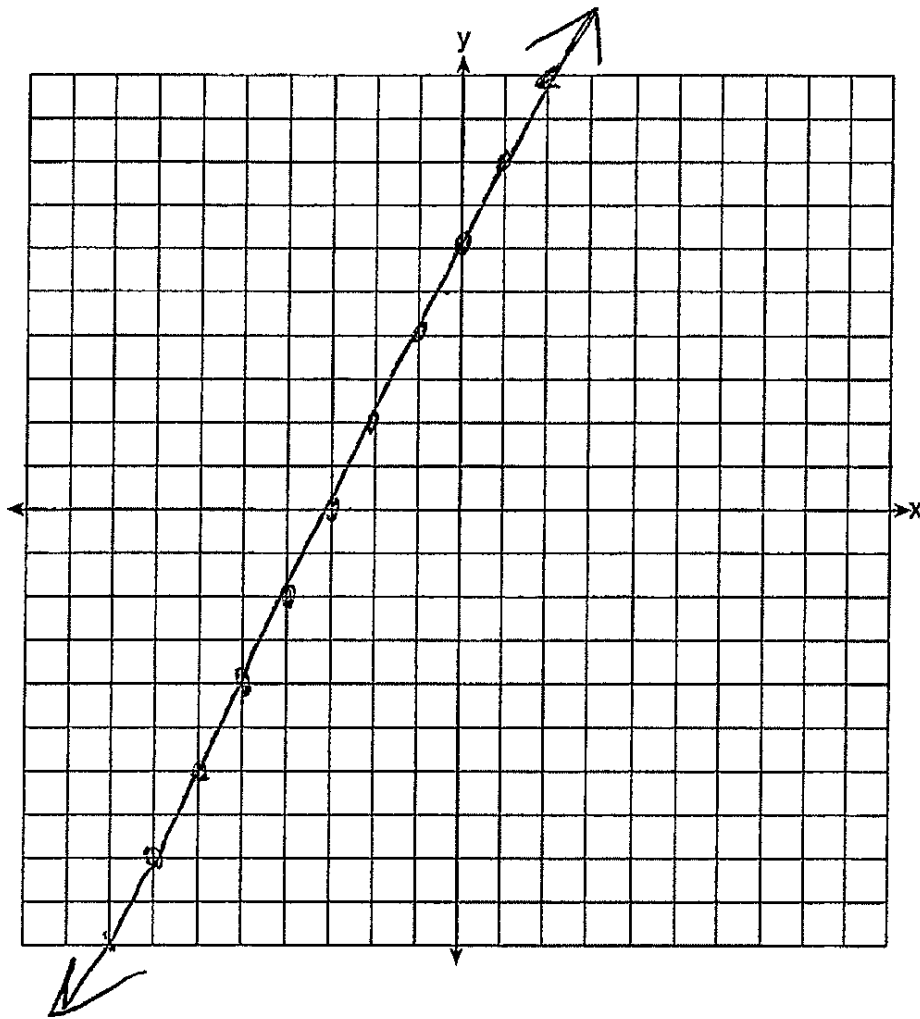
Score: 1

The student makes a conceptual error by taking the absolute value of each number in the absolute value symbol instead of combining them first.

Practice Papers—Question 33

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.

$y = 2x + 6$

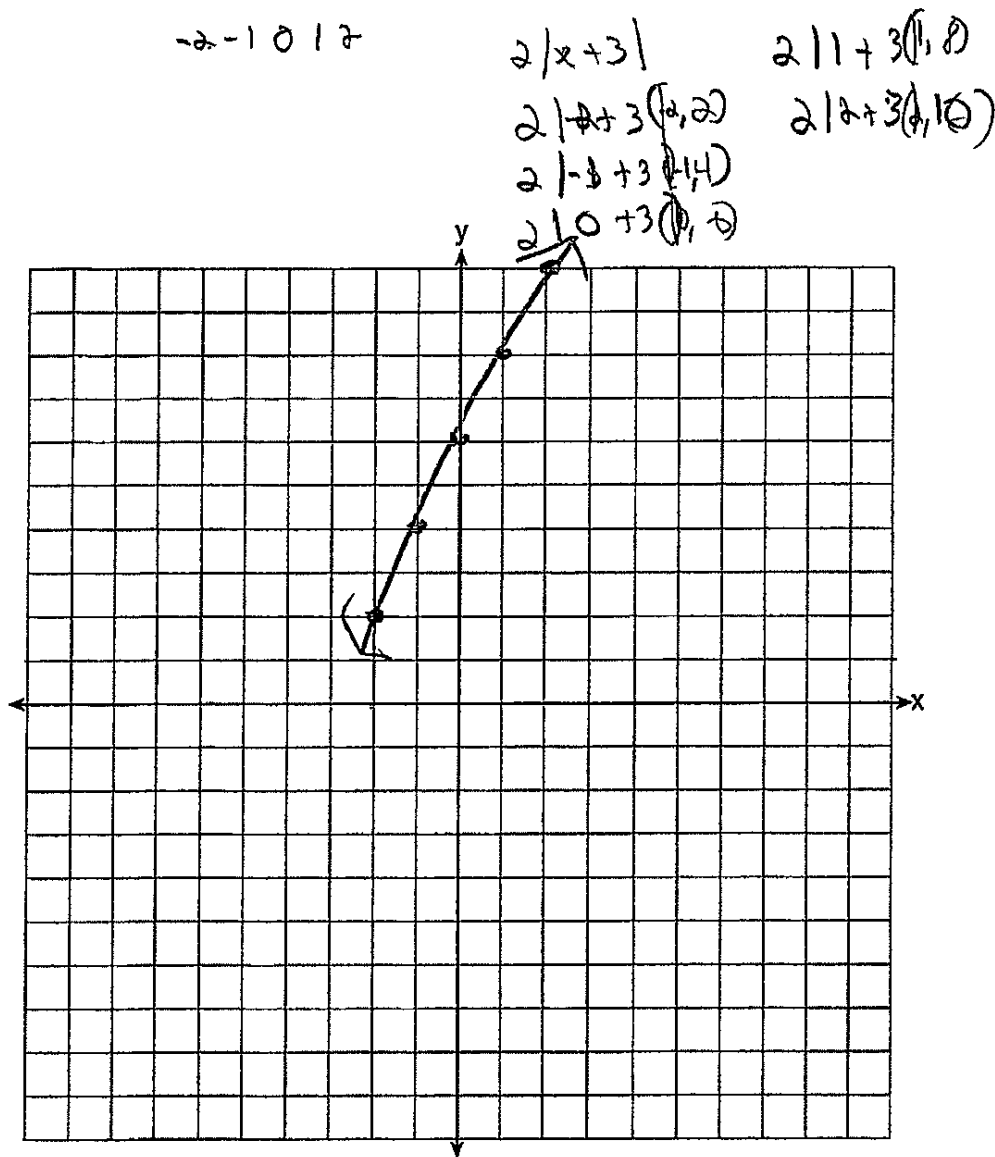


Score: 1

The student makes a conceptual error by treating the absolute value symbol as parentheses.

Practice Papers—Question 33

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.

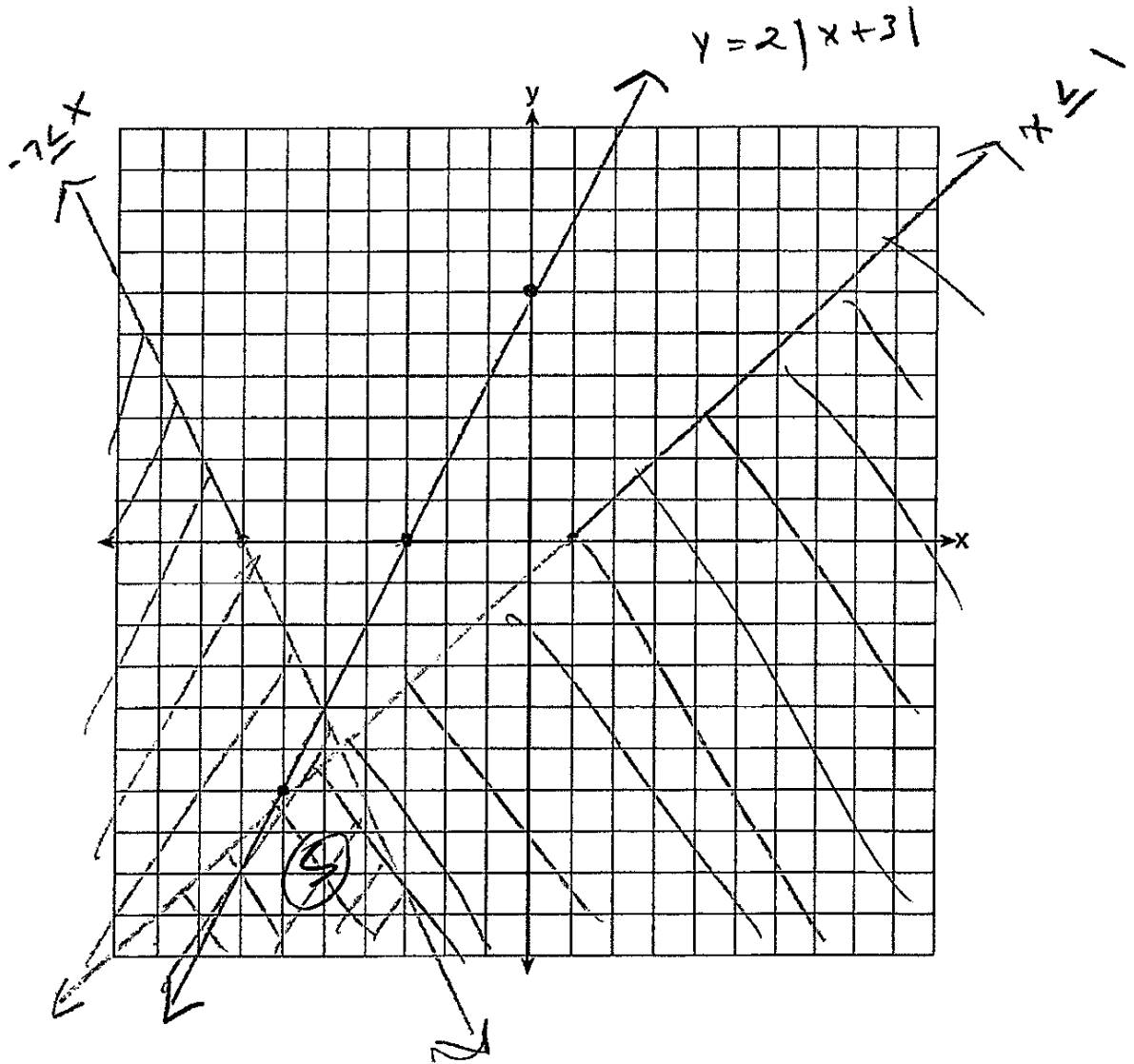


Score: 1

The student makes one conceptual error. The student uses an incorrect interval in the table, but calculates those points correctly.

Practice Papers—Question 33

33 On the set of axes below, graph $y = 2|x + 3|$. Include the interval $-7 \leq x \leq 1$.

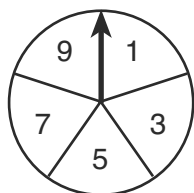


Score: 0

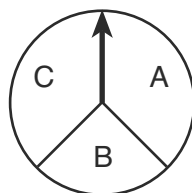
The student makes two conceptual errors.

Practice Papers—Question 34

34 In a game, a player must spin each spinner shown in the diagram below once.



Spinner 1



Spinner 2

Draw a tree diagram or list a sample space showing all possible outcomes.

$C, 1$ $A, 1$ $B, 1$
 $C, 3$ $A, 3$ $B, 3$
 $C, 5$ $A, 5$ $B, 5$
 $C, 7$ $A, 7$ $B, 7$
 $C, 9$ $A, 9$ $B, 9$

$3 \cdot 5 = 15$ outcomes

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

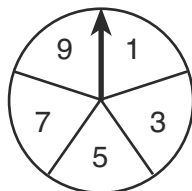
C or A 2
 $3, 5, 7$ 3 6

Score: 3

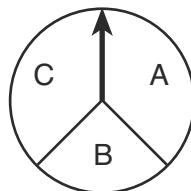
The student has a complete and correct response.

Practice Papers—Question 34

34 In a game, a player must spin each spinner shown in the diagram below once.

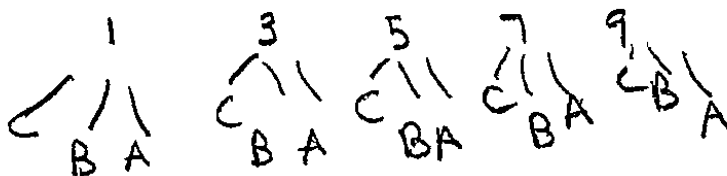


Spinner 1

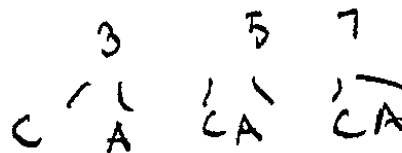


Spinner 2

Draw a tree diagram or list a sample space showing all possible outcomes.



Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."



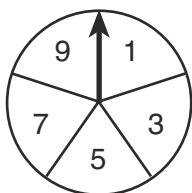
6 outcomes

Score: 3

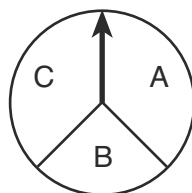
The student has a complete and correct response.

Practice Papers—Question 34

34 In a game, a player must spin each spinner shown in the diagram below once.



Spinner 1

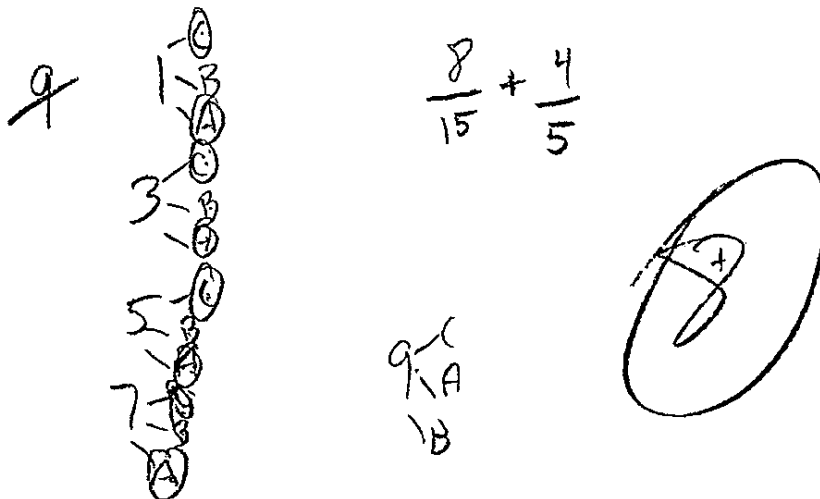


Spinner 2

Draw a tree diagram or list a sample space showing all possible outcomes.



Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

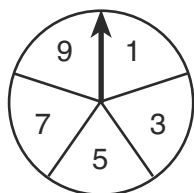


Score: 2

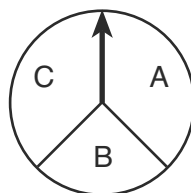
The student has a correct tree diagram, but the number of outcomes is incorrect.

Practice Papers—Question 34

34 In a game, a player must spin each spinner shown in the diagram below once.

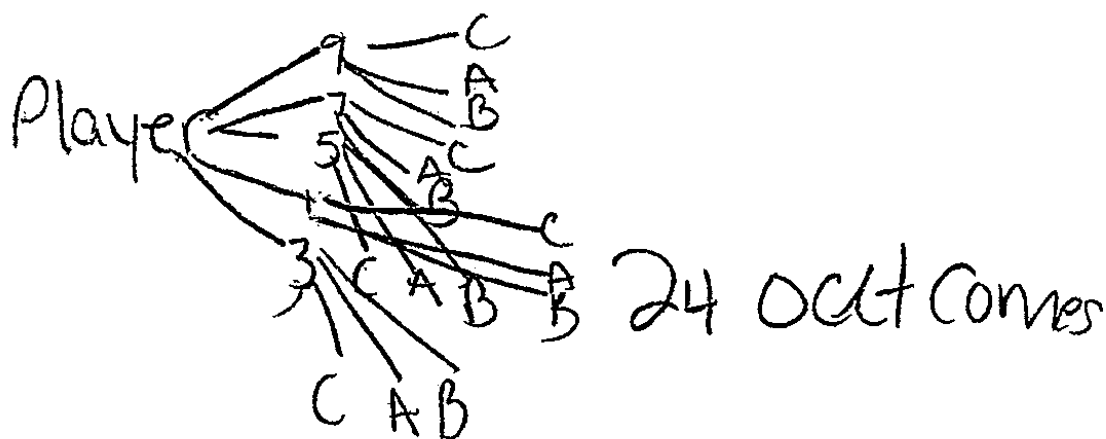


Spinner 1



Spinner 2

Draw a tree diagram or list a sample space showing all possible outcomes.



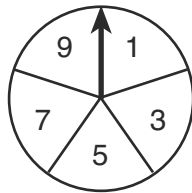
Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

Score: 2

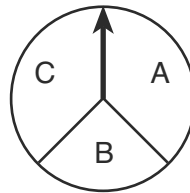
Although sloppy, the student's tree diagram is correct, but no further correct work is shown.

Practice Papers—Question 34

34 In a game, a player must spin each spinner shown in the diagram below once.



Spinner 1



Spinner 2

Draw a tree diagram or list a sample space showing all possible outcomes.

$(A, 1), (A, 3), (A, 5), (A, 7), (A, 9)$
 $(B, 1), (B, 3), (B, 5), (B, 7), (B, 9)$
 $(C, 1), (C, 3), (C, 5), (C, 7), (C, 9)$

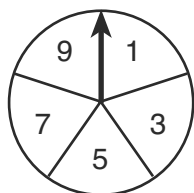
Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

Score: 2

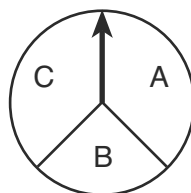
The student has a correct sample space with no further correct work.

Practice Papers—Question 34

34 In a game, a player must spin each spinner shown in the diagram below once.



Spinner 1



Spinner 2

Draw a tree diagram or list a sample space showing all possible outcomes.

1. 1-A Spinner 1
 1-B 1-3, 1-5, 1-7, 1-9
 1-C 3-7, 3-5, 3-7, 3-9
 3-A 5-1, 5-3, 5-7, 5-9
 3-B 7-1, 7-3, 7-5, 7-9
 3-C 9-1, 9-3, 9-5, 9-7
 5-A
 5-B
 5-C
 7-A
 7-B
 7-C

Spinner 2
 A-B, AC
 B-A, BC
 C-A, CB

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

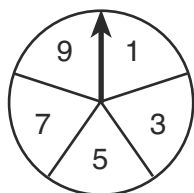
Prime number - $\frac{3}{5}$
 cat - $\frac{2}{3}$

Score: 1

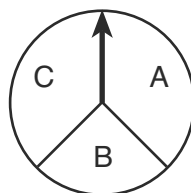
The student has a partially correct sample space (9A, 9B, and 9C are missing), but no further correct work is shown.

Practice Papers—Question 34

34 In a game, a player must spin each spinner shown in the diagram below once.

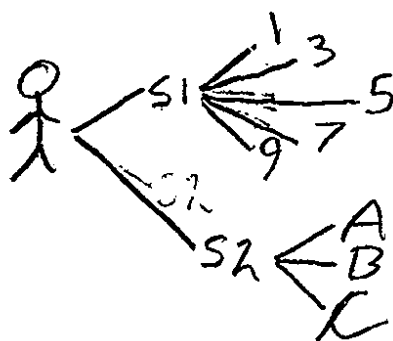


Spinner 1

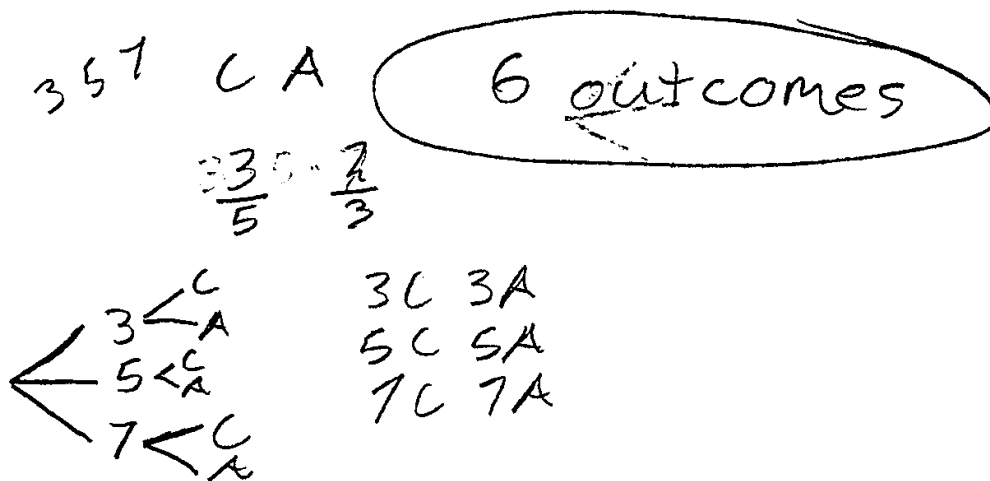


Spinner 2

Draw a tree diagram or list a sample space showing all possible outcomes.



Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

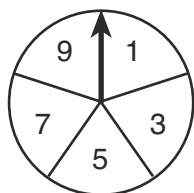


Score: 1

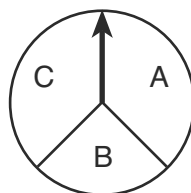
The student shows appropriate work to find 6.

Practice Papers—Question 34

34 In a game, a player must spin each spinner shown in the diagram below once.

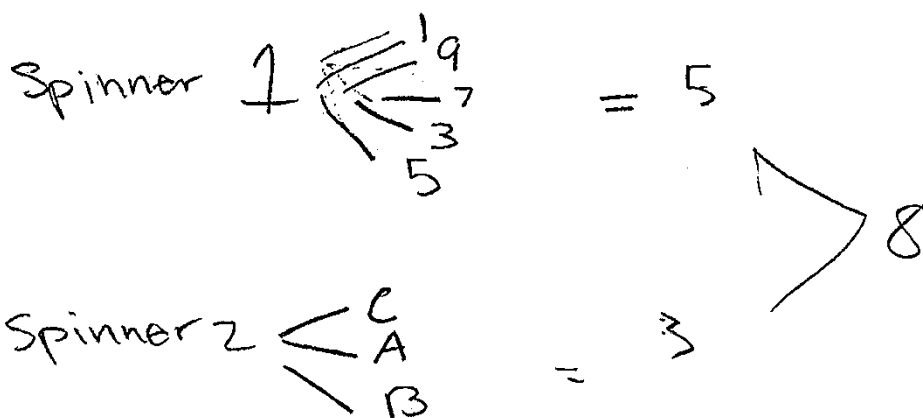


Spinner 1

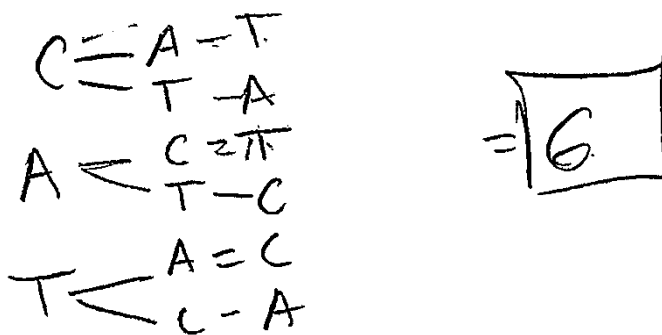


Spinner 2

Draw a tree diagram or list a sample space showing all possible outcomes.



Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

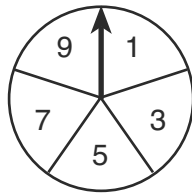


Score: 0

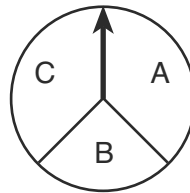
The student has an incorrect tree diagram and incorrect work to find 6.

Practice Papers—Question 34

34 In a game, a player must spin each spinner shown in the diagram below once.



Spinner 1



Spinner 2

Draw a tree diagram or list a sample space showing all possible outcomes.

Spinner 1
1, 3, 5, 7, 9
15

Spinner 2
A, B, C

15

Determine the number of outcomes that consist of a prime number and a letter in the word "CAT."

CAT
 $\frac{2}{3}$

Score: 0

The student has no correct tree diagram and no correct work to find the answer.

Practice Papers—Question 35

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$n = \text{notebook}$ $p = \text{pencil}$	$3n + 4p = 8.50$ $5n + 8p = 14.50$ $15n + 20p = 42.50$ $-15n - 24p = -45.80$ $-4p = -1$ $p = .25$	$3n + 4(2.5) = 8.50$ $3n + 10 = 8.50$ $3n = 2.50$ $n = 2.50$	$p = .25$ $n = 2.50$
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Score: 3

The student has a complete and correct response.

Practice Papers—Question 35

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

$$3n + 4p = 8.50$$

[Only an algebraic solution can receive full credit.]

$n = \text{notebook}$
 $p = \text{pencil}$

$$\begin{array}{r} 3n + 4p = 8.50 \\ 5n + 8p = 14.50 \end{array}$$

$$\begin{array}{r} -6n - 8p = -17 \\ + 5n + 8p = 14.50 \\ \hline \end{array}$$

$$\frac{-n}{-1} = \frac{-2.5}{-1}$$

$$n = 2.50$$

$$\begin{array}{r} 3(2.5) + 4p = 8.50 \\ 7.5 + 4p = 8.50 \\ -7.5 \quad -7.5 \\ \hline 4p = 1 \\ \frac{4p}{4} = \frac{1}{4} \\ p = .25 \end{array}$$

$$\begin{array}{r} 5(2.50) + 8(.25) = 14.50 \\ 12.5 + 2 = 14.50 \\ 14.50 = 14.50 \checkmark \end{array}$$

notebook = \$ 2.50
pencil = \$.25

Score: 3

The student has a complete and correct response.

Practice Papers—Question 35

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$$\begin{array}{r} 5n + 8p = 14.50 \\ 2(-3n + 4p = 8.50) \end{array}$$

$$\begin{array}{r} 6n + 8p = 17.00 \\ -5n + 8p = 14.50 \\ \hline \end{array}$$

$$\underline{1n = 2.50}$$

$$\begin{array}{r} 1 \\ 1 \end{array}$$

$$n = 2.50$$

1 notebook costs 2.50

$$\begin{array}{r} 5n + 8p = 14.50 \\ 3n + 4p = 8.50 \end{array}$$

Score: 2

The student shows correct work to find only the cost of a notebook.

Practice Papers—Question 35

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$$\begin{aligned} 3(3n + 4p &= \$8.50) \\ 3(5n + 8p &= \$14.50) \end{aligned}$$

- 29

$$1n + 1p$$

n = notebook

p = pencil.

$$\begin{aligned} 15n + 20p &= 42.5 \\ + -15n + 24p &= 43.5 \end{aligned}$$

$$\hline -4p = -1$$

$$1n + 1p =$$

$$1n = .29$$

$$1p = \cancel{.25}$$

Score: 2

The student shows correct work to find only the cost of a pencil.

Practice Papers—Question 35

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$$\begin{aligned} -2(3n + 4p &= 8.50) \\ 5n + 8p &= 14.50 \end{aligned}$$

$$\begin{aligned} -6n + 8p &= -17.00 \\ \times 5n + 8p &= 14.50 \end{aligned}$$

$$\begin{array}{r} -n = -3.50 \\ \hline -1 \quad \quad -1 \end{array}$$

$$\text{notebook} = \$3.50$$

$$\begin{aligned} 3(3.50) + 4p &= 8.50 \\ 10.50 + 4p &= 8.50 \\ -10.50 \quad -10.50 & \\ \hline -4p &= 2.00 \\ \hline -4 \quad \quad -4 & \end{aligned}$$

$$\text{Pencil} = \$0.50$$

Score: 1

The student makes two computational errors.

Practice Papers—Question 35

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$$3n + 4p = 8.50$$

$$5n + 8p = 14.50$$

$$5n + 8p = 14.50$$

$$(3n + 4p = 8.50)$$

$$\begin{array}{r} 2n + 4p = 6.00 \\ - 2n = -1.2n \end{array}$$

$$\begin{array}{r} 2n + 4p = 6.00 \\ 2n + 4p = 6.00 - 4p \end{array}$$

$$\frac{4p}{4} = \frac{6}{4} - \frac{2n}{4}$$

$$\frac{2n}{2} = \frac{6n}{2} - \frac{4p}{2}$$

$$p = 1.50.$$

A Pencil is \$1.50,
A Notebook is \$3.00

Score: 1

The student writes a correct system of equations, but no further correct work is shown.

Practice Papers—Question 35

35 The cost of three notebooks and four pencils is \$8.50. The cost of five notebooks and eight pencils is \$14.50. Determine the cost of one notebook and the cost of one pencil.

[Only an algebraic solution can receive full credit.]

$$\begin{array}{r} 2.5 \times 3 = 7.50 \\ .75 \times 4 = 1.00 \\ \hline 8.50 \end{array}$$

$$\begin{array}{r} 2.50 \times 5 = 12.5 \\ + .75 \times 8 = 2.00 \\ \hline 14.50 \end{array}$$

Score: 0

No correct work is shown.

Practice Papers—Question 36

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

$$25.14 = 336\text{ft}$$

$$24.2 \cdot 14.1 = 341.22$$

$$\frac{341.22 - 336}{341.22}$$

$$\boxed{0.015}$$

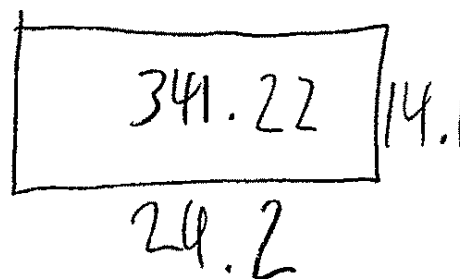
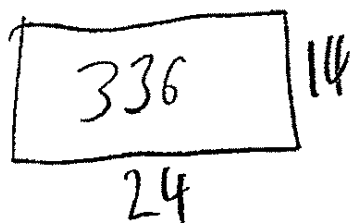
Score: 3

The student has a complete and correct response.

Practice Papers—Question 36

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.



$$\text{Error} = \frac{\text{Wrong} - \text{Real}}{\text{Real Answer}} = E = \frac{336 - 341.22}{341.22}$$

$$\text{Error} = 0.015$$

Score: 3

The student has a complete and correct response.

Practice Papers—Question 36

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

area | $\frac{336 - 341.22}{341.22}$ |

~~0.75~~

.02

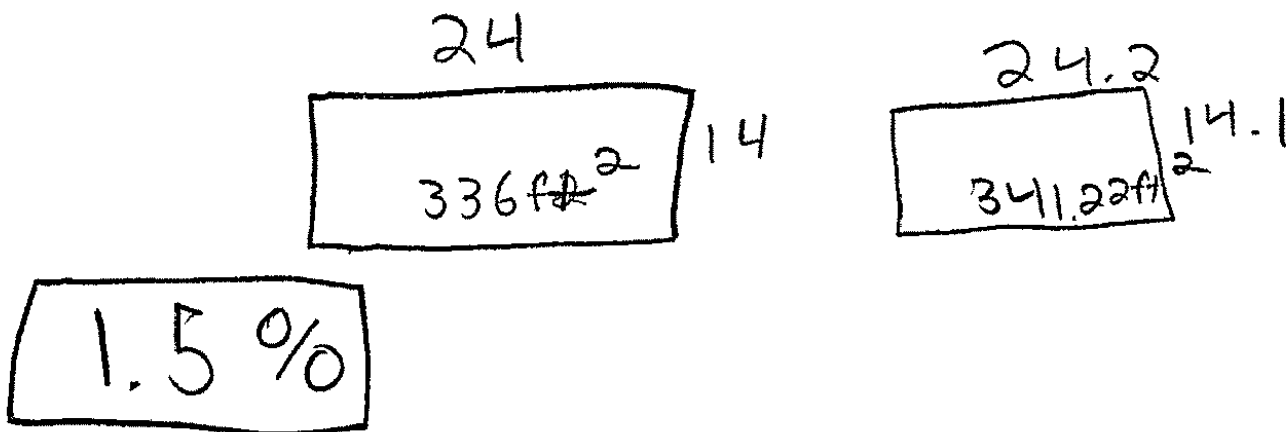
Score: 2

The student makes a rounding error.

Practice Papers—Question 36

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the nearest thousandth.



$$\%E = \frac{A - m}{A}$$

$$\frac{341.22 - 336}{341.22}$$

Score: 2

The student does not express the answer as a decimal to the nearest thousandth.

Practice Papers—Question 36

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

$$\frac{\cancel{(24)}(24.2)}{\cancel{(24)}} =$$

$$\frac{(24.2)(14.1)}{(24.2)(14.1) - (24)(14)} = \frac{341.22}{341.22 - 336}$$

$$\frac{341.22}{5.22} = 65.3678$$
$$\approx 65.368$$

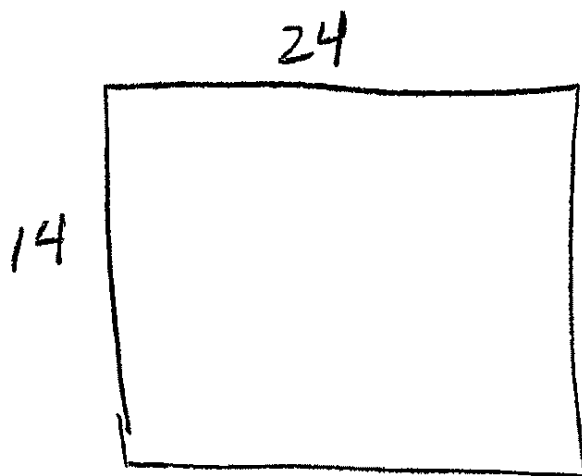
Score: 1

The student makes a conceptual error in writing the fraction.

Practice Papers—Question 36

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.



$$24 \times 14 = 336$$

$$24.2 \times 14.1 = 341.22$$

$$\frac{|336 - 341.22|}{341}$$

$$\frac{5.22}{341}$$

0.015

Score: 1

The student makes multiple rounding errors.

Practice Papers—Question 36

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.

$$\begin{array}{r} 24 \times 14 \\ 288 \end{array}$$

$$\begin{array}{r} 24.2 \times 14.1 \\ 341.22 \end{array}$$

$$\begin{array}{r} 341.22 \\ -288.00 \\ \hline \text{Difference in Error } 53.22 \end{array}$$

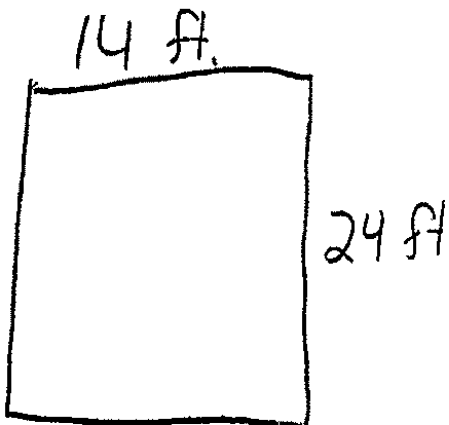
Score: 0

The student finds only one area correctly.

Practice Papers—Question 36

36 Wendy measures the floor in her rectangular bedroom for new carpeting. Her measurements are 24 feet by 14 feet. The actual measurements are 24.2 feet by 14.1 feet.

Determine the relative error in calculating the area of her bedroom. Express your answer as a decimal to the *nearest thousandth*.



$$\frac{24.2-24}{24} + \frac{14.1-14}{14}$$

$$0.0083 + 0.0071$$

$$0.015$$

Score: 0

The student obtains a correct answer by a completely incorrect method.

Practice Papers—Question 37

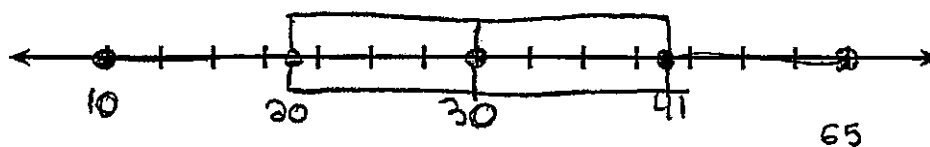
37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

10, 16, 19, 21, 26, 28, 30, 38, 40, 42, 57, 65
~~26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10~~

Max: 65

Min: 10

Median: 30



Determine the number of scores that lie above the 75th percentile.

3 numbers

Score: 3

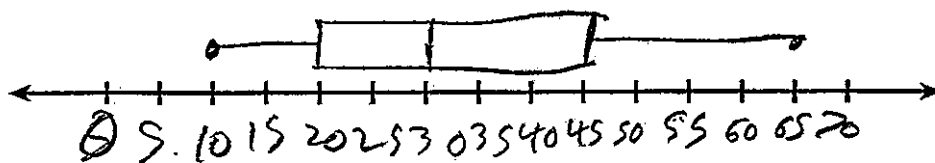
The student's scale is incorrect.

Practice Papers—Question 37

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

~~26, 32, 19, 65, 57, 18, 28, 42, 40, 21, 38, 10~~

10, 16, 17, 21, 26, 28 | 32, 38, 40, 42, 57, 65



Determine the number of scores that lie above the 75th percentile.

2 scores above the 75th percentile

Score: 3

The student makes a computational error in finding the 3rd quartile, but the rest of the work is appropriate based upon the error.

Practice Papers—Question 37

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

Handwritten calculations for the sum of the scores:

$$\begin{array}{r} 28 \\ + 32 \\ \hline 60 \end{array}$$

$$\begin{array}{r} 30 \\ + 19 \\ \hline 49 \end{array}$$

$$\begin{array}{r} 20 \\ + 21 \\ \hline 41 \end{array}$$

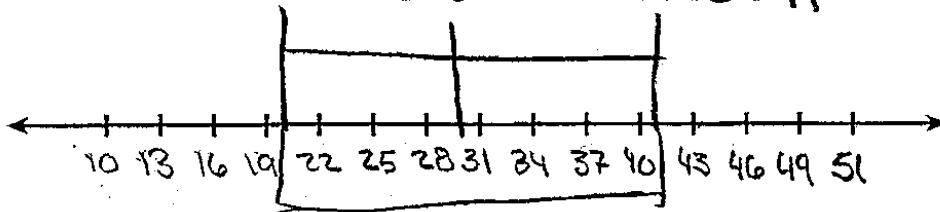
$$\begin{array}{r} 40 \\ + 42 \\ \hline 82 \end{array}$$

$$\begin{array}{r} 41 \\ + 41 \\ \hline 82 \end{array}$$

Handwritten calculations for percentiles and median:

$$25\% = 20 \quad \text{median} = 30 \quad 75\% = 41$$

$$25\% = 20 \quad 50\% = 30 \quad 75\% = 41$$



Determine the number of scores that lie above the 75th percentile.

3 scores lie above the 75th percentile

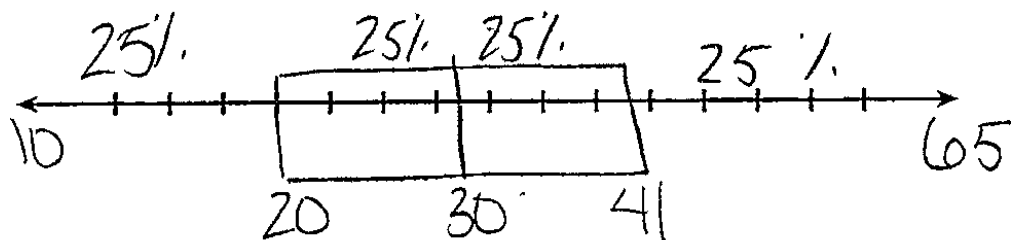
Score: 2

The student makes two or more graphing errors (max and min are missing and the number line passes through the box), but an appropriate number is stated.

Practice Papers—Question 37

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10



Determine the number of scores that lie above the 75th percentile.

$$41 - 65$$

Score: 1

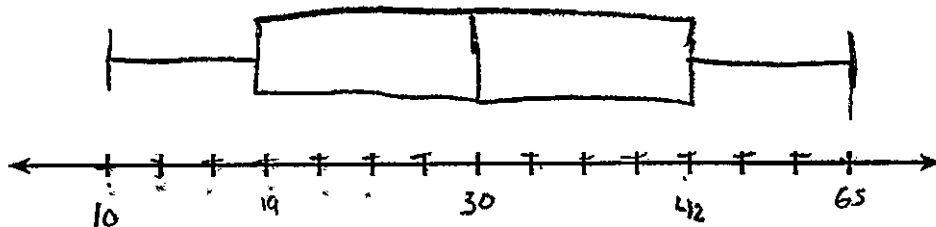
The student finds the five statistical measures correctly, but no further correct work is shown.

Practice Papers—Question 37

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

26, 32, 19, 65, 57, 16, 28, 42, 40, 21, 38, 10

10, 16, 19, 21, 26, 28, 32, 38, 40, 42, 57, 65



Determine the number of scores that lie above the 75th percentile.

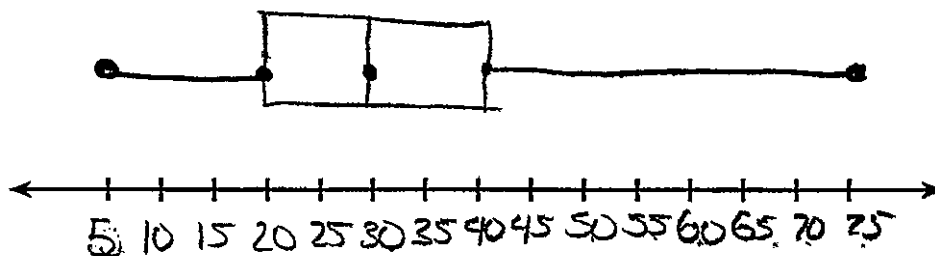
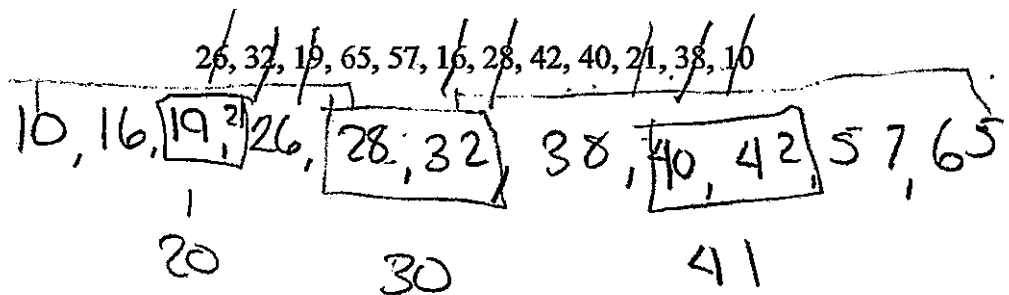
There are 2 scores that lies above the 75th percentile.

Score: 1

The student finds the first and third quartile incorrectly and has an incorrect scale on the number line, but an appropriate number of scores is found.

Practice Papers—Question 37

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.



Determine the number of scores that lie above the 75th percentile.

50

Score: 1

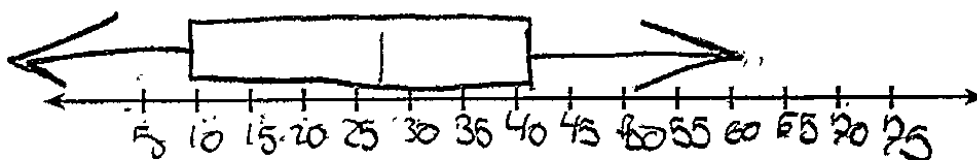
The student identifies the five statistical measures correctly but makes a conceptual error in making the graph, and the number of scores is incorrect.

Practice Papers—Question 37

37 Using the line provided, construct a box-and-whisker plot for the 12 scores below.

~~26, 32, 19, 65, 57, 16, 28, 42, 40, 71, 38, 10~~
10, 16, 19, 21, 26, 28, 32, 38, 40, 42

mean
m.



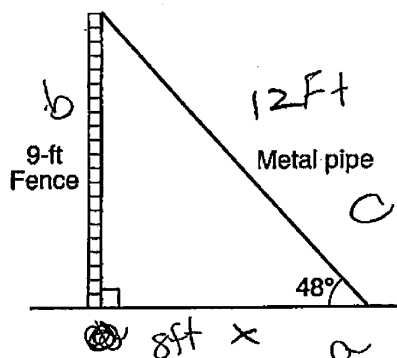
Determine the number of scores that lie above the 75th percentile.

Score: 0

No correct work is shown.

Practice Papers—Question 38

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.



$$\frac{\sin}{h} \quad \frac{\cos}{h} \quad \frac{\tan}{a}$$

Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\begin{aligned} \tan 48 &= \frac{9}{a} \\ \tan 48 &= \frac{9}{x} \\ \frac{9}{\tan 48} &= \frac{\tan 48 x}{\tan 48} & x &= 8 \text{ feet} \end{aligned}$$

Determine, to the *nearest foot*, the length of the metal pipe.

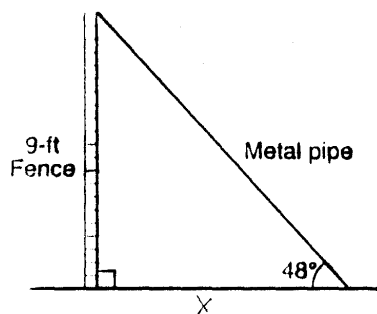
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 8^2 + 9^2 &= c^2 \\ 64 + 81 &= c^2 \\ \sqrt{145} &= \sqrt{c^2} \\ c &= 12 \text{ feet} \end{aligned}$$

Score: 4

The student uses trigonometric function/formula to find the solution and the Pythagoras Theorem to find the other.

Practice Papers—Question 38

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.



Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\tan 48 = \frac{9}{x}$$

$$| \tan | = \frac{9}{x}$$

$$\frac{1}{1} x = \frac{9}{1} \quad x = 9$$

Determine, to the *nearest foot*, the length of the metal pipe.

$$\sqrt{9^2 + 9^2} = \sqrt{162} = 12.727 \dots$$

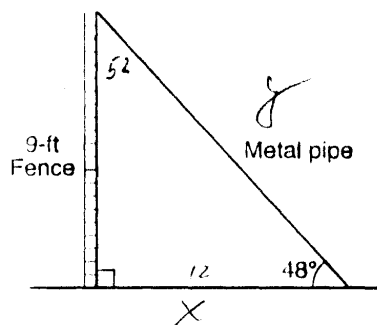
$$\approx 13$$

Score: 3

The student writes a correct equation for the first part, but rounds the tangent to the nearest integer. The solutions are appropriate based on this error.

Practice Papers—Question 38

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.



Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\tan 52 = \frac{x}{9}$$

$$x = 11.5$$

$$x = 12$$

Determine, to the *nearest foot*, the length of the metal pipe.

$$9^2 + 12^2 = y^2$$

$$81 + 144 = y^2$$

$$225 = y^2$$

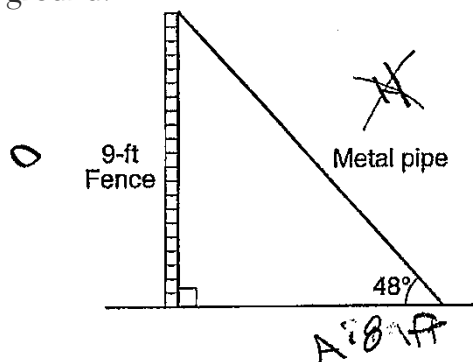
$$15 = y$$

Score: 3

The student makes a computational error in finding the third angle of the triangle. The solutions are appropriate based on this error.

Practice Papers—Question 38

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.



Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\begin{aligned} \tan \theta &= \frac{O}{A} \\ \tan 48 &= \frac{9}{x} \\ x \tan 48 &= 9 \\ 1.11x &= 9 \\ -1.11 \quad -1.11 \\ \boxed{x = 7.89 \text{ ft}} \\ \boxed{x = 8 \text{ ft}} \end{aligned}$$

Determine, to the *nearest foot*, the length of the metal pipe.

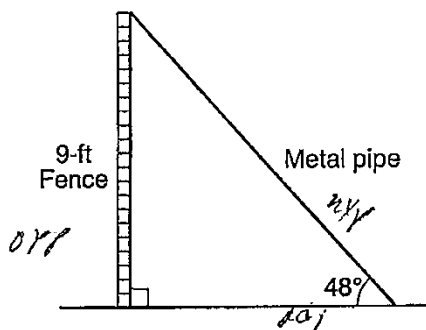
$$\begin{aligned} \cos \theta &= \frac{A}{H} \\ \cos 48 &= \frac{9}{x} \\ 8 \cos 48 &= x \\ \boxed{x = 5.35 \text{ ft}} \\ \boxed{x = 5 \text{ ft}} \end{aligned}$$

Score: 2

The student writes a correct formula in each part but makes errors in the solution of the equations in each part.

Practice Papers—Question 38

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.



Determine, to the nearest foot, how far the bottom of the pipe is from the base of the fence.

SOH CAH TOA

$$(x) \tan(48) = \frac{9}{x} (x)$$

$$\tan(48) = \frac{9}{x}$$

110 FT

Determine, to the nearest foot, the length of the metal pipe.

$$a^2 + b^2 = c^2$$

$$9^2 + 10^2 = c^2$$

$$81 + 100 = c^2$$

$$\sqrt{181} = c$$

13.45

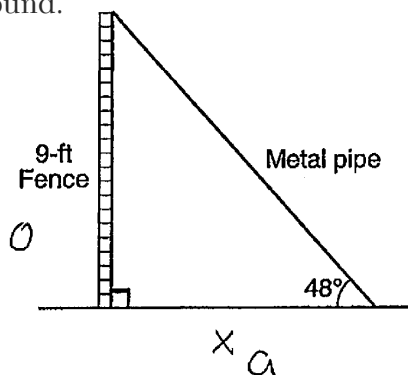
13 FT

Score: 2

The student's work in the first part is completely incorrect, but the student uses a correct method in the second part to find an appropriate solution.

Practice Papers—Question 38

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.



Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\tan 48 = \frac{9}{x}$$

$$\tan 48 x = 9$$

$$48$$

• 1875

Determine, to the *nearest foot*, the length of the metal pipe.

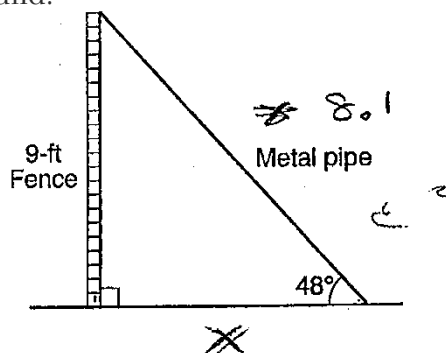
$$\frac{\tan 48}{9} = 5.$$

Score: 1

The student writes one correct trigonometric equation for the first part, but no further correct work is shown.

Practice Papers—Question 38

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.



Determine, to the nearest foot, how far the bottom of the pipe is from the base of the fence.

Tan = $\tan 48 = \frac{9}{x}$

$\tan = 1.11$

$\frac{1.11}{1} \times \frac{9}{x}$

$\frac{1.11x}{1.11} = \frac{9}{1.11} = x = 8.1$

Determine, to the nearest foot, the length of the metal pipe.

$A^2 + B^2 = C^2$

$9^2 + b^2 = 8.1^2$

$81 + b^2 = 65.61$

$- 81 \quad - 81$

$1 b^2 \quad 1 - 15.89$

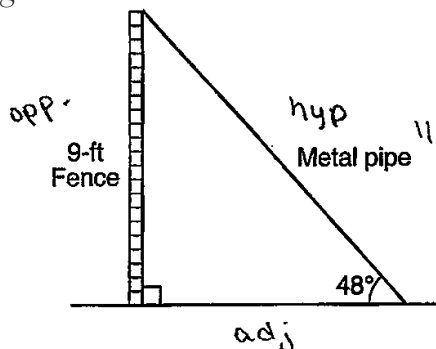
$b = 3.9$
or 4

Score: 1

The student has one correct equation.

Practice Papers—Question 38

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.



Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\tan 48 = \frac{9}{x}$$

$$(a) 1.2001 = \frac{9}{x}$$

$$x = 10.8$$

$$x = 11 \text{ feet}$$

Determine, to the *nearest foot*, the length of the metal pipe.

$$\sin 48 = \frac{9}{x}$$

$$-0.7682 = \frac{9}{x}$$

$$+0.7682 \quad +0.7682$$

$$1.5863$$

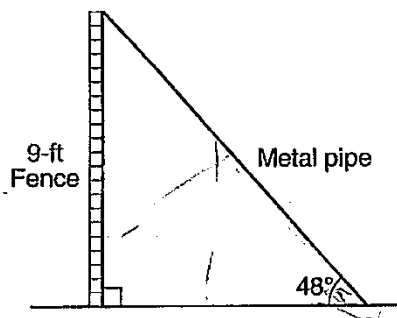
$$x = 2 \text{ ft}$$

Score: 1

In the first part, the student indicates that $\tan 48 = \frac{9}{x}$.

Practice Papers—Question 38

38 A metal pipe is used to hold up a 9-foot fence, as shown in the diagram below. The pipe makes an angle of 48° with the ground.



Determine, to the *nearest foot*, how far the bottom of the pipe is from the base of the fence.

$$\frac{9}{48} = 0.18 \text{ feet}$$

Determine, to the *nearest foot*, the length of the metal pipe.

$$12 \text{ feet}$$

Score: 0

The student's work is incorrect. In order to receive 1 point, the student would need both correct answers with no work.

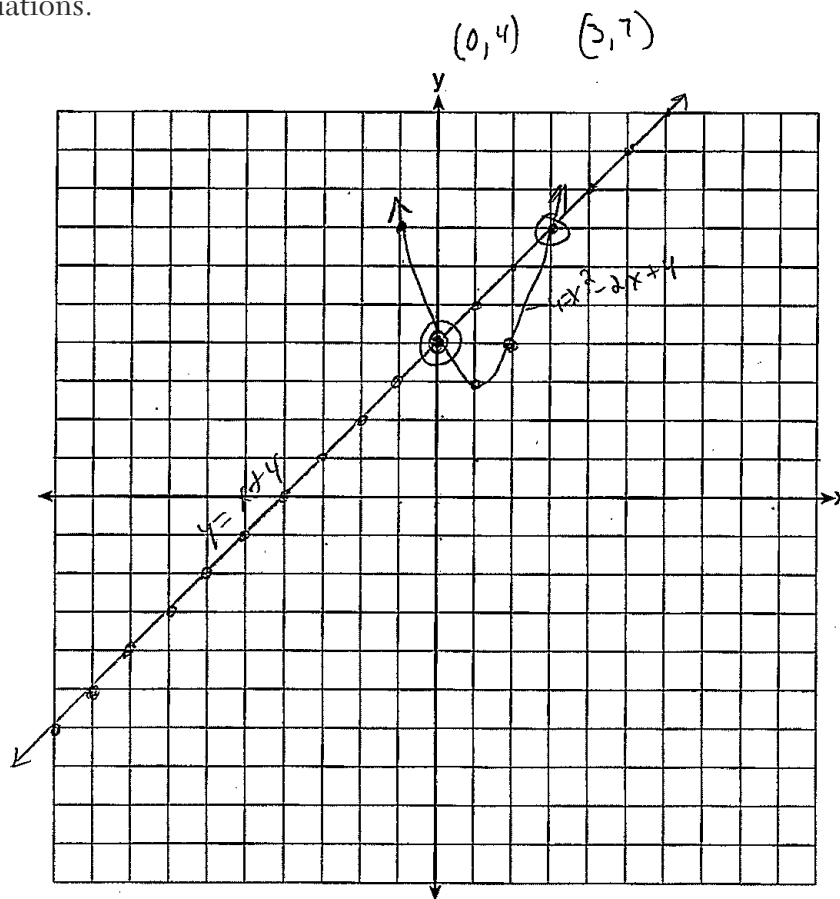
Practice Papers—Question 39

39 On the set of axes below, graph the following system of equations.

$$\begin{aligned}
 y + 2x &= x^2 + 4 \\
 -2x & \\
 \hline
 y - x &= 4 \\
 +x & \\
 \hline
 y &= x^2 - 2x + 4
 \end{aligned}$$

X	Y
-2	12
-1	7
0	4
1	3
2	4
3	7
4	12

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.



Score: 4

The student has a complete and correct response.

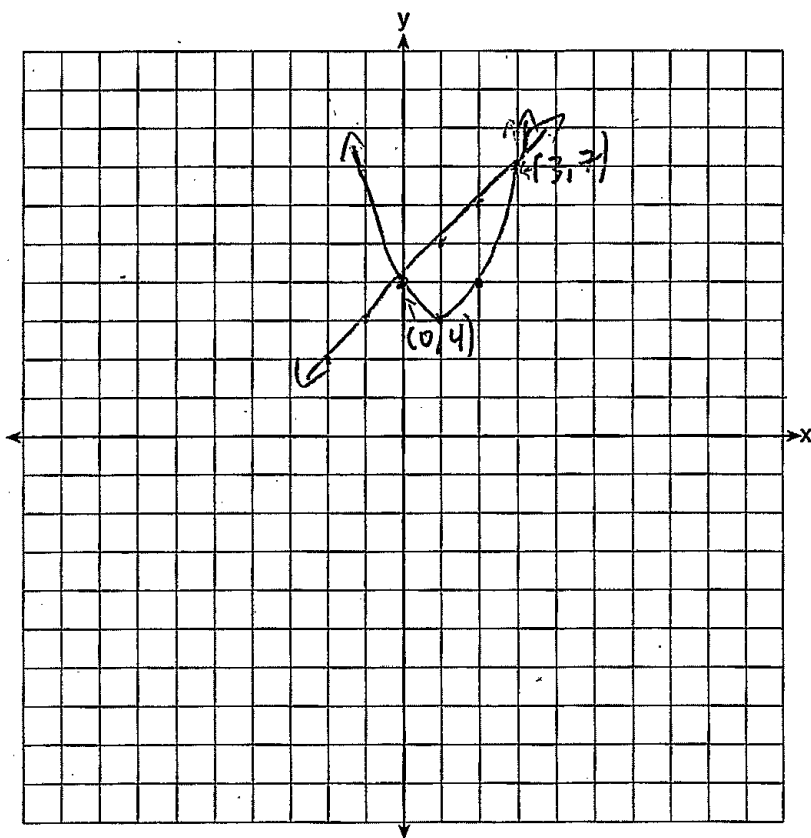
Practice Papers—Question 39

39 On the set of axes below, graph the following system of equations.

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

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

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.



Score: 4

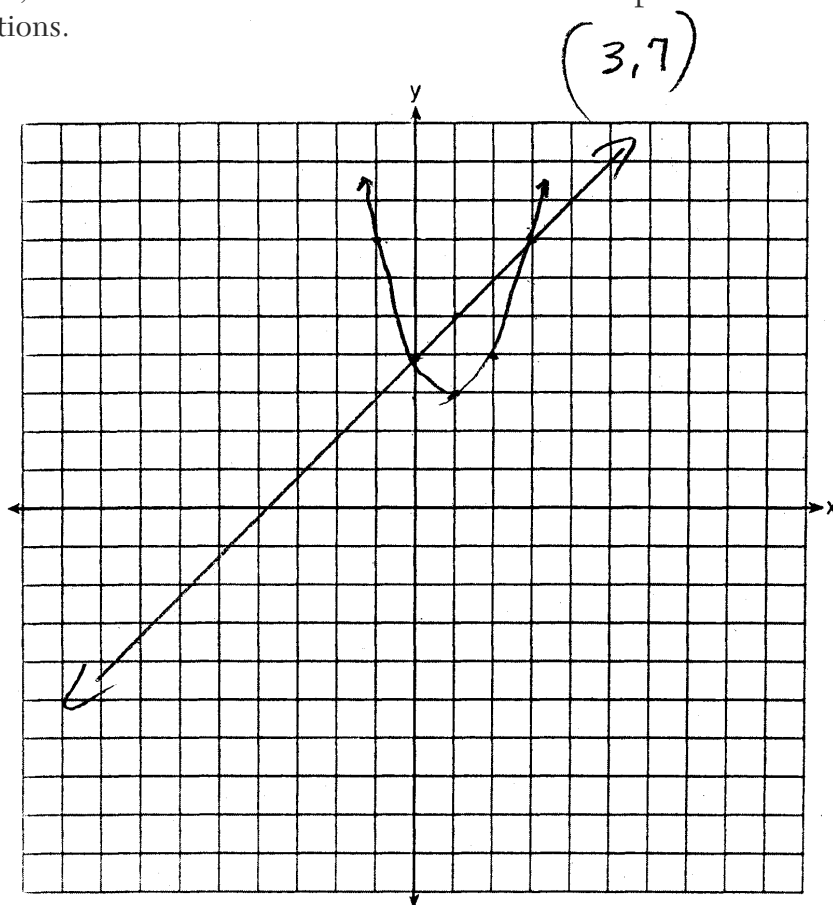
The student has a complete and correct response.

Practice Papers—Question 39

39 On the set of axes below, graph the following system of equations.

$$\begin{aligned}y + 2x &= x^2 + 4 \\ y - x &= 4\end{aligned}$$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.



Score: 3

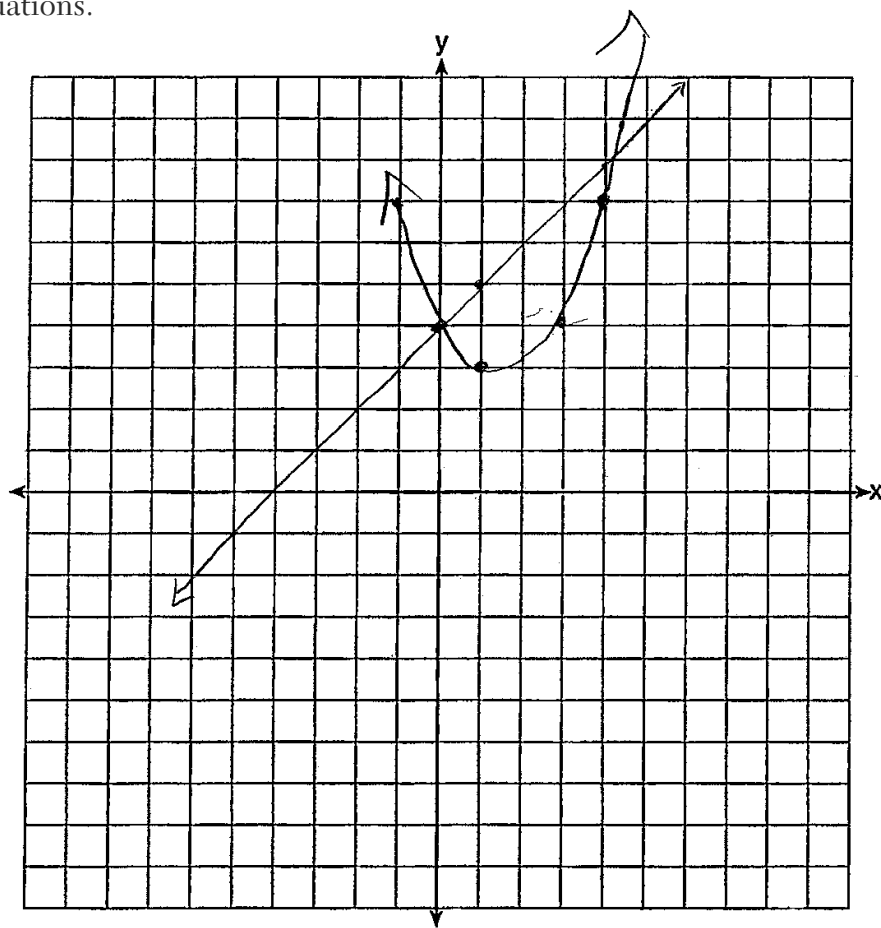
The student graphs both equations correctly, but only states one solution.

Practice Papers—Question 39

39 On the set of axes below, graph the following system of equations.

$$\begin{aligned}y + 2x &= x^2 + 4 \\ y - x &= 4\end{aligned}$$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.



(0, 4)
(4, 7)

Score: 2

The student makes an error graphing the parabola and only states one solution correctly.

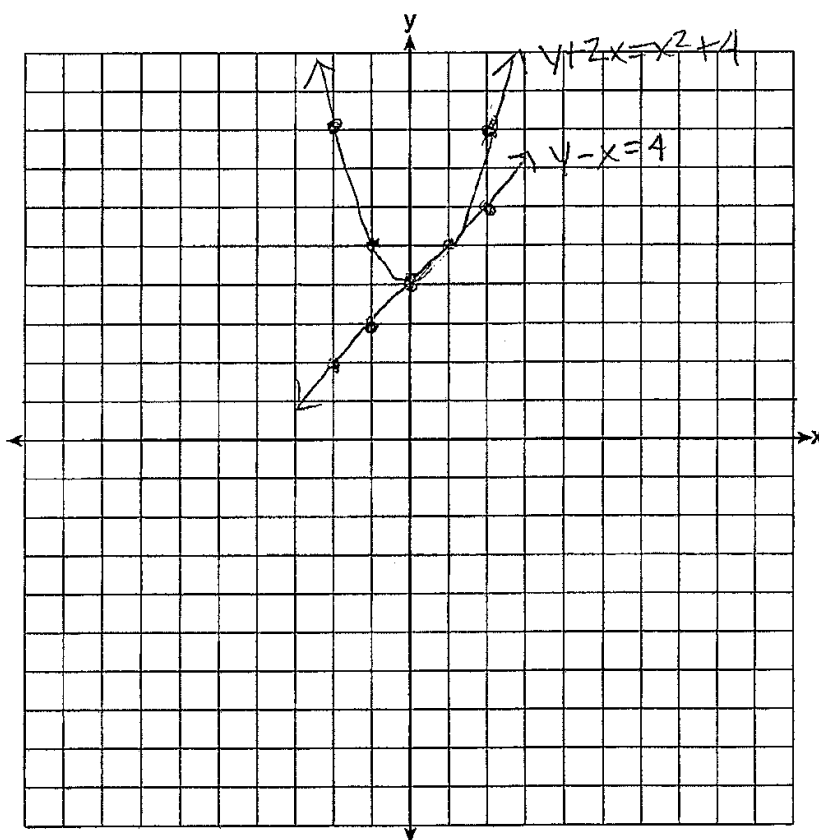
Practice Papers—Question 39

39 On the set of axes below, graph the following system of equations.

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

$$y - x = 4 + x$$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.



$(0, 4) + (1, 5)$

Score: 2

The student makes a conceptual error when graphing the parabola, but appropriate solutions are found.

Practice Papers—Question 39

39 On the set of axes below, graph the following system of equations.

$$y + 2x = x^2 + 4$$

$$y - x = 4$$

$$x = x$$

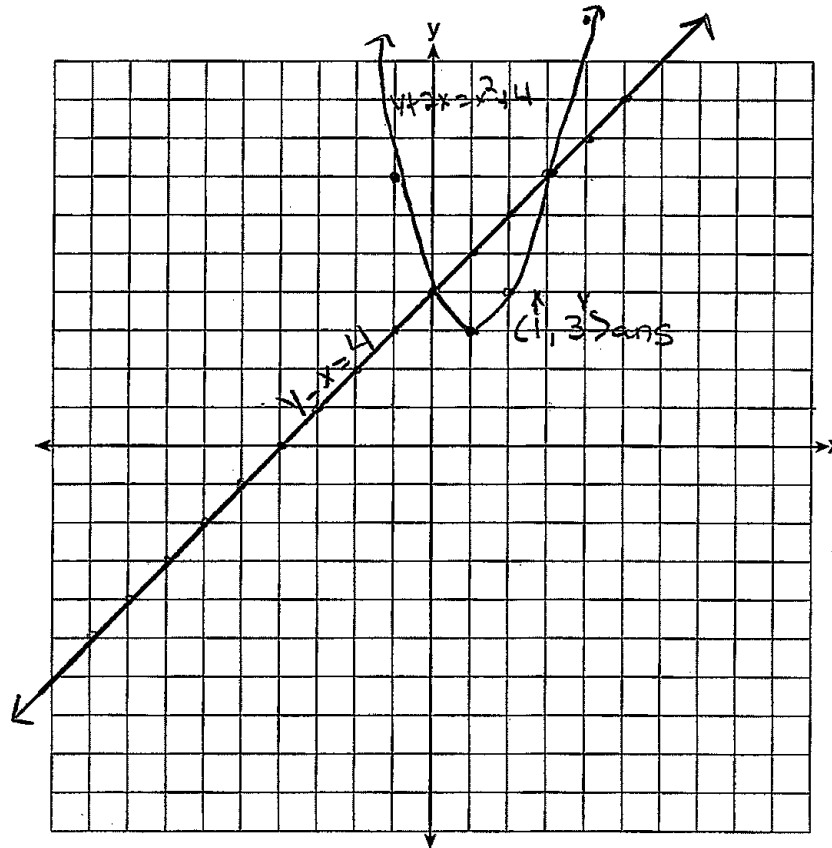
$$y = x + 4$$

10-0-1-1
 9-1-1-1
 8-1-1-1
 7-1-1-1
 6-1-1-1
 5-1-1-1
 4-1-1-1
 3-1-1-1
 2-1-1-1
 1-1-1-1
 0-1-1-1
 -1-1-1-1
 -2-1-1-1
 -3-1-1-1
 -4-1-1-1
 -5-1-1-1
 -6-1-1-1
 -7-1-1-1
 -8-1-1-1
 -9-1-1-1
 -10-1-1-1

$$\begin{array}{r}
 y + 2x = x^2 + 4 \\
 -2x \\
 \hline
 y = x^2 - 2x + 4
 \end{array}$$

$$\begin{array}{r}
 x \\
 -1 \\
 0 \\
 1 \\
 2 \\
 3 \\
 4 \\
 5 \\
 6 \\
 7 \\
 8 \\
 9 \\
 10
 \end{array}$$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.



Score: 2

The student graphs both equations correctly, but the solutions are not stated.

Practice Papers—Question 39

39 On the set of axes below, graph the following system of equations.

$$y + 2x = x^2 + 4$$

$$y - x = 4$$

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

$$y + 2x = x^2 + 4$$

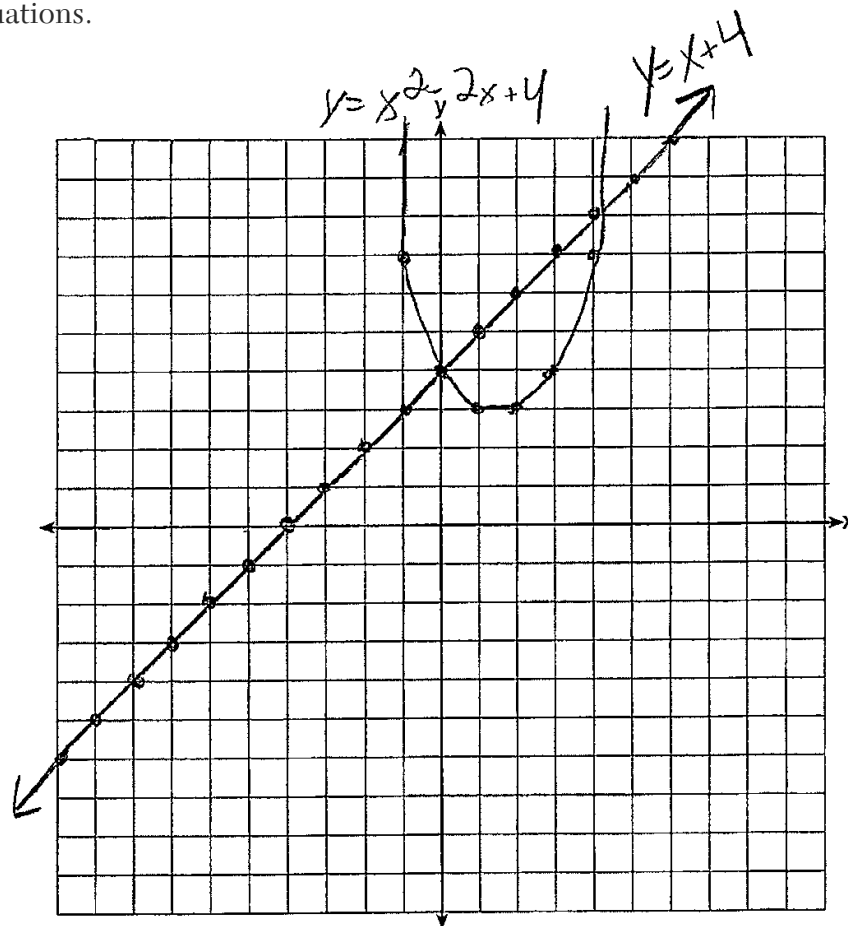
$$-2x - 2x$$

$$+ x$$

$$y = x + 4$$

(x > 4)

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.



Score: 1

The student graphs one equation correctly.

Practice Papers—Question 39

39 On the set of axes below, graph the following system of equations.

$\frac{y+2x}{2} = \frac{x^2+4}{2}$
 $y-x=4$

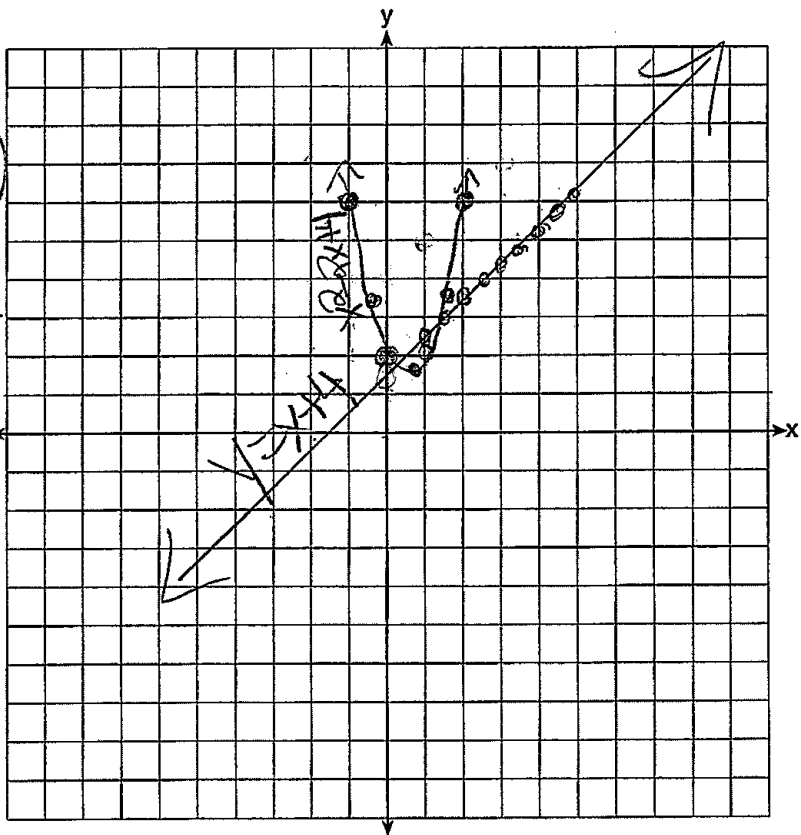
$$y + 2x = x^2 + 4$$

$$y - x = 4$$

~~$y = x^2 + 2x + 4$~~ $(x+2)(x-2)$
 ~~$y = x^2 + 2x + 4$~~
 $y = x + 4$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.

Lines
 $y = x + 4$
 $y = x^2 + 2x + 4$



Score: 1

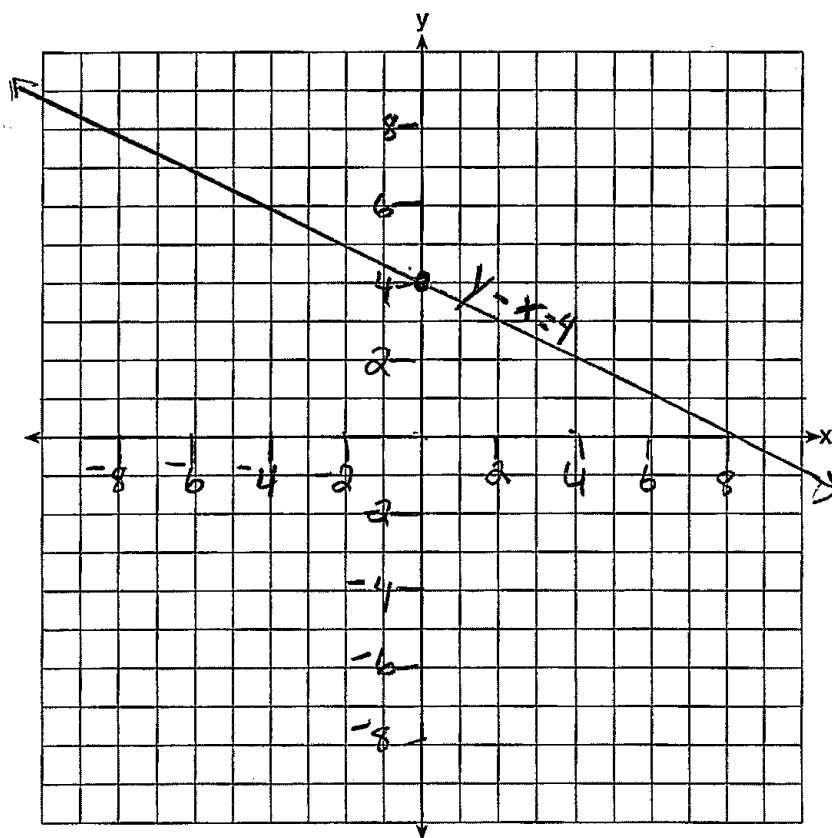
The student graphs the parabola correctly.

Practice Papers—Question 39

39 On the set of axes below, graph the following system of equations.

$$y + 2x = x^2 + 4$$
$$y - x = 4 \quad (0, 4)$$

Using the graph, determine and state the coordinates of *all* points in the solution set for the system of equations.



Score: 0

No correct work is shown.