The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

Monday, January 26, 2015 — 1:15 to 4:15 p.m.

MODEL RESPONSE SET

Table of Contents

25 Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

Patrick is correct.
4.2 is rational. $\sqrt{2}$ is irrational.
A rational number plus
a irrational number
always gives you
a irrational.

Score 2: The student has a complete and correct response.

25 Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

Patrick is right because

$$4.2 + \sqrt{2} = I$$

R   I

Score 2:   The student has a complete and correct response.

25 Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

The sum of 4.2 and $\sqrt{2}$ has an answer of 5.614213562³7. Therefore it is irrational, leaving Patrick with the correct answer.

Score 1: The student did not justify that the decimal answer written is irrational.

25 Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

Patrick is incorrect because the sum of 4.2 and $\sqrt{2}$ is 5.614213562. This number is rational because the numbers stop.

$$4.2 + \sqrt{2} = 5.614213562$$

$$\sqrt{2} = 1.414213562$$

$$\begin{array}{r} 1.414213562 \\ + \ 4.200000000 \\ \hline 5.614213562 \end{array}$$

Score 1: The student made a conceptual error in interpreting the sum as a terminating decimal.

25 Ms. Fox asked her class "Is the sum of 4.2 and $\sqrt{2}$ rational or irrational?" Patrick answered that the sum would be irrational.

State whether Patrick is correct or incorrect. Justify your reasoning.

yes patrick is correct.

Score 0: The student gave no work or justification.

26 The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9th	90	33	12
10th	125	12	15
11th	87	22	18
12th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

$$33 + 12 = 45$$

$$\frac{45}{180} = .25 \Rightarrow \boxed{25\%}$$

Score 2: The student has a complete and correct response.

26 The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9th	90	33	12
10th	125	12	15
11th	87	22	18
12th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

$$\frac{45}{180} = \frac{9}{36} \approx \frac{3}{12} = \boxed{\frac{1}{4}}$$

Score 1: The student made an error by expressing the answer as a fraction.

26 The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9th	90	33	12
10th	125	12	15
11th	87	22	18
12th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

$$90 + 33 + 12 = 135$$

180 total # of students in 9th grade

$$\frac{135}{180} = .75 = \boxed{75\%}$$

Score 1: The student made a conceptual error by including 90 with the sum for more than one club.

26 The school newspaper surveyed the student body for an article about club membership. The table below shows the number of students in each grade level who belong to one or more clubs.

	1 Club	2 Clubs	3 or More Clubs
9th	90	33	12
10th	125	12	15
11th	87	22	18
12th	75	27	23

If there are 180 students in ninth grade, what percentage of the ninth grade students belong to more than one club?

$$90$$
$$+33$$
$$\underline{12}$$
$$135$$

$$\frac{135}{180} = 81\%$$

Score 0: The student made one conceptual and one computational error.

27 A function is shown in the table below.

x	f(x)
−4	2
−1	−4
0	−2
3	16

If included in the table, which ordered pair, $(−4,1)$ or $(1,−4)$, would result in a relation that is no longer a function? Explain your answer.

IF $(-4,1)$ is added to the table, then the relation would no longer be a function, because you can't have one input with 2 different outputs.

Score 2: The student has a complete and correct response.

27 A function is shown in the table below.

x	f(x)
−4	2
−1	−4
0	−2
3	16

If included in the table, which ordered pair, (−4,1) or (1,−4), would result in a relation that is no longer a function? Explain your answer.

(1,-4) would no longer give a faction because you can't have a y-value with 2 different x-values.

Score 1: The student stated an appropriate answer based on a conceptual error in their definition for a function.

27 A function is shown in the table below.

x	f(x)
−4	2
−1	−4
0	−2
3	16

If included in the table, which ordered pair, (−4,1) or (1,−4), would result in a relation that is no longer a function? Explain your answer.

ordered pair (-4,1)
would make it not a
function anymore.

Score 0: The student stated (−4,1), but gave no explanation.

28 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

$$+ \quad \begin{array}{r} 3x^2 + 8x - 7 \\ -5x^2 - 2x + 11 \\ \hline -2x^2 + 6x + 4 \end{array}$$

Score 2: The student has a complete and correct response.

28 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

$$5x^2 + 2x - 11$$
$$- -3x^2 - 8x + 7$$

$$3x^2 + 8x - 7$$
$$-5x^2 - 2x - 11$$
$$-2x^2 - 6x + 4$$

$$5x^2 + 2x - 11$$
$$- -3x^2 - 8$$

Score 1: The student made one computational error by stating $-6x$.

28 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

$$\left(5x^2 + 2x - 11\right) - \left(3x^2 + 8x - 7\right)$$

$$\left[5x^2 + 2x - 11 \right]\left[-3x^2 - 8x + 7\right]$$

$$\boxed{2x^2 - 6x - 4}$$

Score 1: The student made a conceptual error by subtracting the trinomials in the wrong order.

28 Subtract $5x^2 + 2x - 11$ from $3x^2 + 8x - 7$. Express the result as a trinomial.

$$5x^2 + 2x - 11 - 3x^2 + 8x - 7$$

$$\boxed{2x^2 + 10x - 18}$$

Score 0:   The student made 2 errors by subtracting in the wrong order and only applying subtraction to the first term of the trinomial.

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x.

$$4x^2 - 12x = 7$$
$$\underline{\quad -7 \quad -7}$$
$$4x^2 - 12x - 7 = 0$$
$$(2x+1)(2x-7) = 0$$

$$2x + 1 = 0 \qquad 2x - 7 = 0$$
$$\underline{\quad -1 \quad -1} \qquad \underline{\quad +7 \quad +7}$$
$$\frac{2x}{2} = \frac{-1}{2} \qquad \frac{2x}{2} = \frac{7}{2}$$

$$\boxed{x = \frac{-1}{2}, \quad x = 3\tfrac{1}{2}}$$

$$4x^2 - 12x - 28 = 0$$
$$(4(x+2)(4x-14)$$
$$\cancel{4}(2x+1)\cancel{2}(2x-7)$$

Score 2: The student has a complete and correct response.

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x.

$$4x^2 - 12x - 7 = 0$$

$$(a = 4, \quad b = -12, \quad c = -7)$$

$$X = \frac{-(-12) \pm \sqrt{(-12)^2 - 4(4)(-7)}}{2(4)}$$

$$X = \frac{12 \pm \sqrt{144 - (-112)}}{8}$$

$$X = \frac{12 \pm \sqrt{256}}{8}$$

$$X = \frac{12 + 16}{8} = \frac{28}{8} = \frac{14}{4} = \frac{7}{2} = 3\frac{1}{2}$$

or

$$X = \frac{12 - 16}{8} = \frac{-4}{8} = \frac{-1}{2}$$

Score 2: The student has a complete and correct response.

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x.

$$-7 \quad -7$$

$$4x^2 - 12x - 7 = 0$$

$$(2x+4)(2x-3) = 0$$

$$2x+4 = 0 \qquad 2x-3 = 0$$
$$-4 \; -4 \qquad +3 \; +3$$
$$\frac{2x = -4}{2 \quad 2} \qquad \frac{2x = 3}{2}$$
$$x = -2 \qquad x = \frac{3}{2}$$

$$\boxed{x = -2 \text{ and } x = 3/2}$$

Score 1: The student made one factoring error.

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x.

$$4x^2 - 12x - 7 \qquad {}^{-28}$$

$$4x^2 + 2x - 14x - 7$$

$$2x(2x+1) \quad -7(2x+1)$$

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

Score 1: The student factored correctly, but showed no further correct work.

29 Solve the equation $4x^2 - 12x = 7$ algebraically for x.

$$4x^2 - 12x = 7$$
$$ - 7 = -7$$
$$4x^2 - 12x - 7 = 0$$

Score 0: The student wrote the equation in standard form, but showed no further correct work.

30 Graph the following function on the set of axes below.
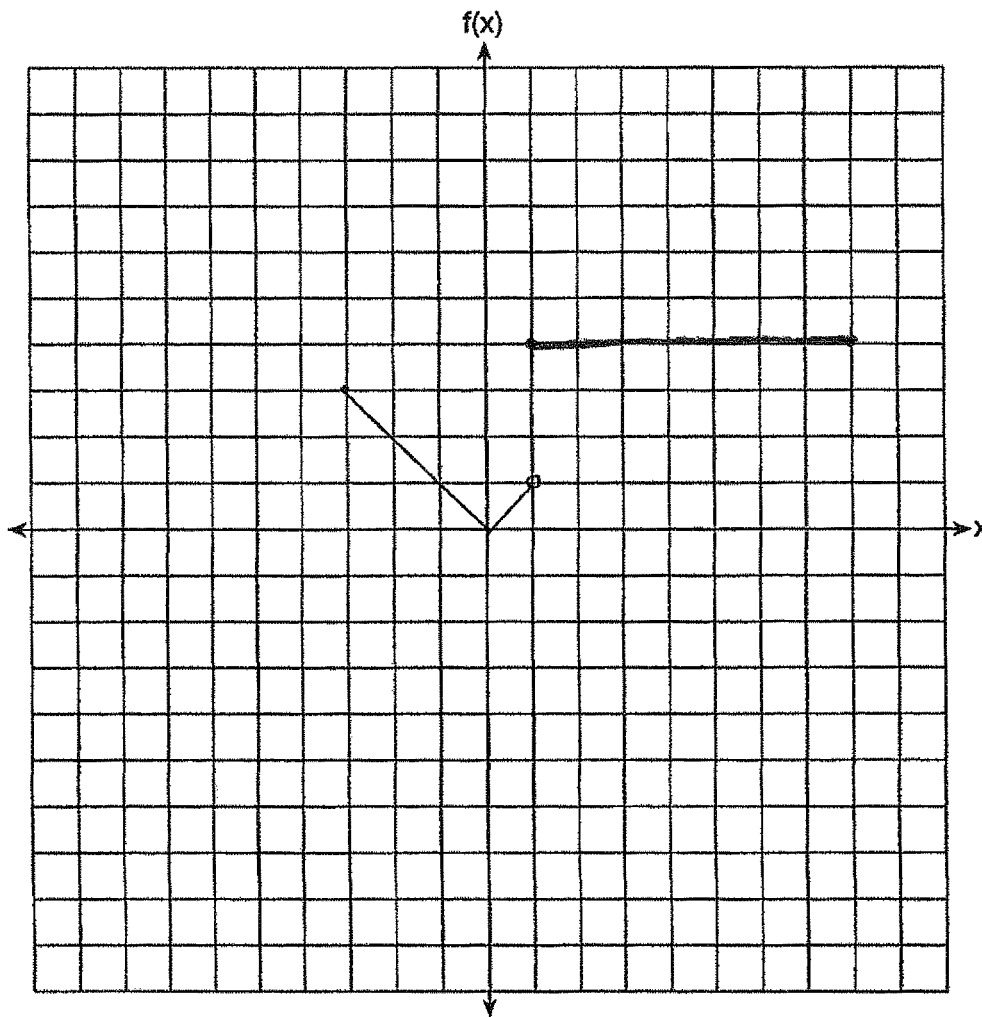
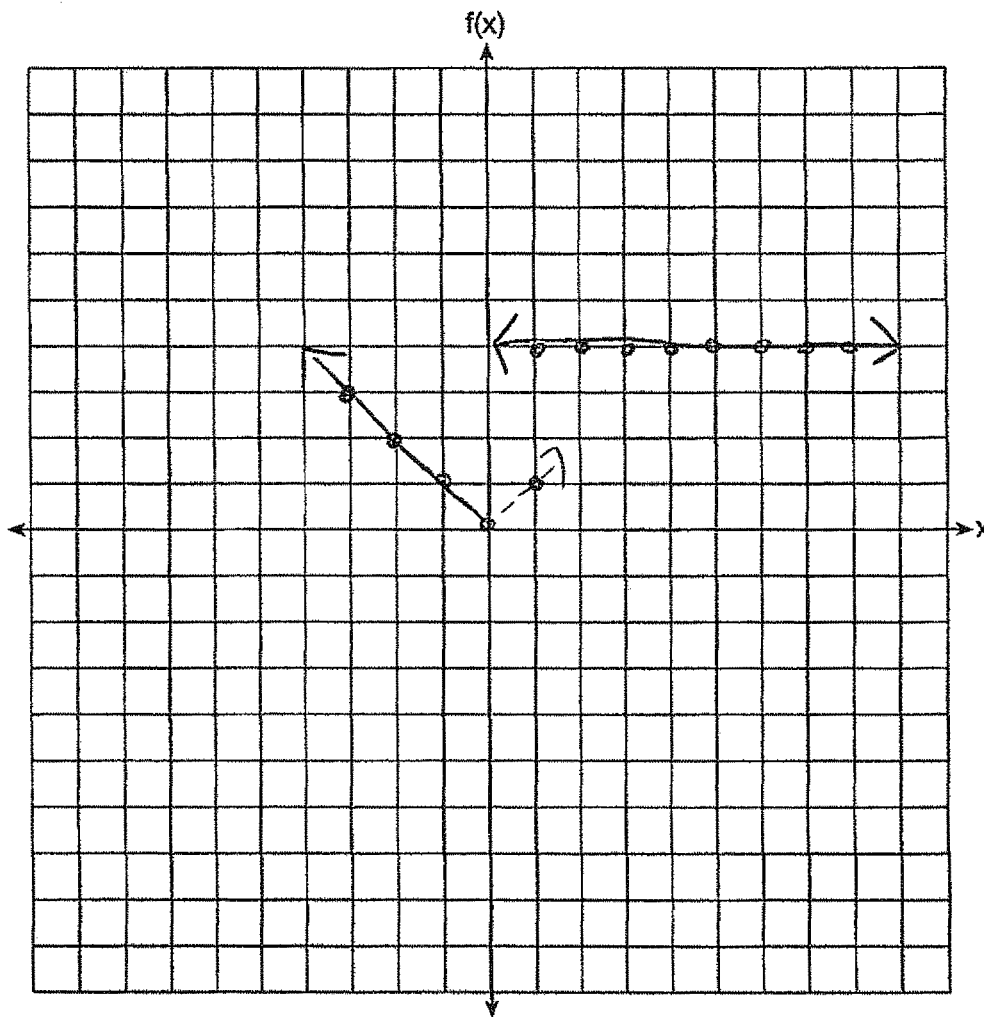$$f(x) = \begin{cases} |x|, & -3 \le x < 1 \\ 4, & 1 \le x \le 8 \end{cases}$$

Score 2:   The student has a complete and correct response.

30 Graph the following function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -3 \le x < 1 \\ 4, & 1 \le x \le 8 \end{cases}$$
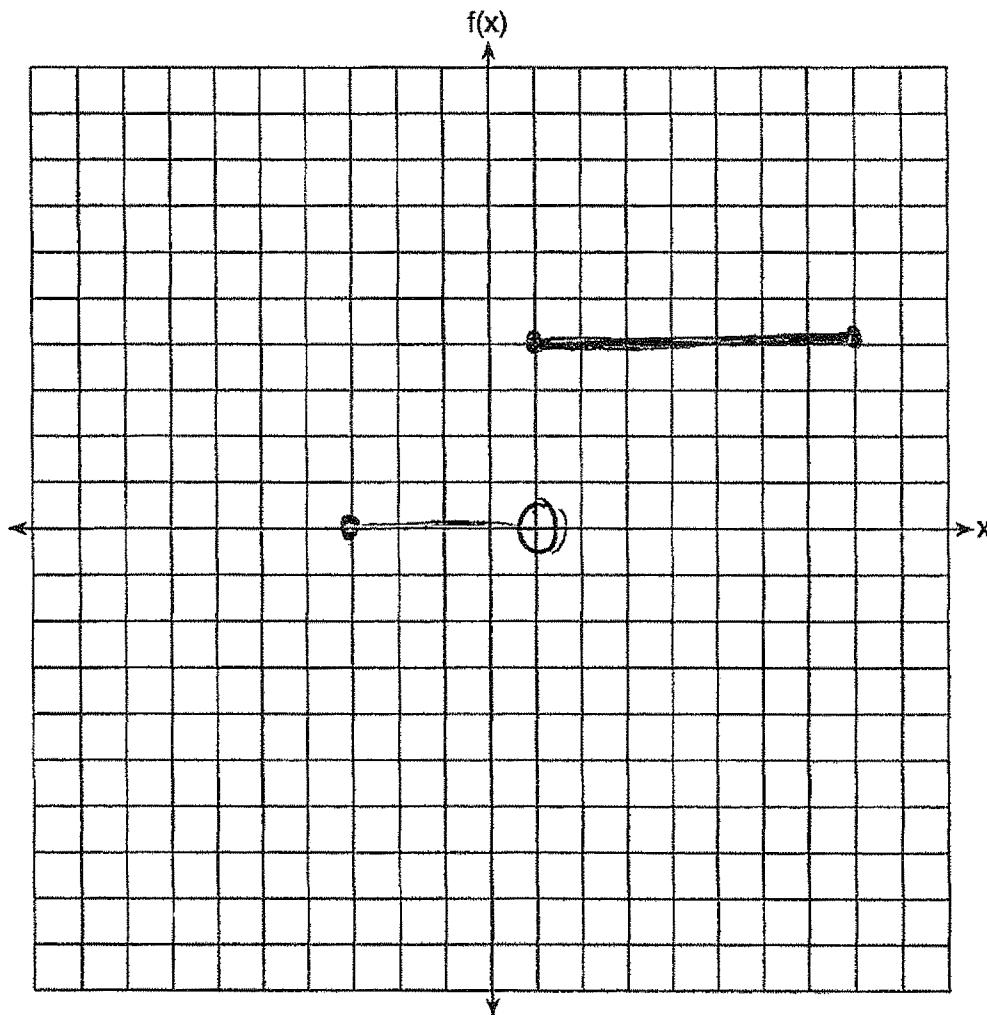
Score 1: The student graphed only one piece of the function correctly.

30 Graph the following function on the set of axes below.

$$f(x) = \begin{cases} |x|, & -3 \le x < 1 \\ 4, & 1 \le x \le 8 \end{cases}$$

Score 0: The student made two errors by not drawing an open circle at (1,1) and extending beyond the given domain.

31 A gardener is planting two types of trees:

Type *A* is three feet tall and grows at a rate of 15 inches per year.

Type *B* is four feet tall and grows at a rate of 10 inches per year.

Algebraically determine exactly how many years it will take for these trees to be the same height.

let x= number of years
~~that each~~ it take for each
tree to be the same height

$$36 inc + 15 in x = 48_{in} + 10x$$
$$5 in x = \frac{36 \quad -10x}{12}$$

$$\boxed{x = 2.4}$$

2

Score 2: The student has a complete and correct response.

31 A gardener is planting two types of trees:

Type *A* is three feet tall and grows at a rate of 15 inches per year.

Type *B* is four feet tall and grows at a rate of 10 inches per year.

Algebraically determine exactly how many years it will take for these trees to be the same height.

A) $y = 3 + 15x \longleftrightarrow$ $x = years$ $y = 15x + 3$

B) $y = 4 + 10x$

$$-y = -10x - 4$$
$$\overline{0 = 5x - 1}$$
$$1 = 5x$$
$$\tfrac{1}{5} = x$$

$$15x + 3 = 10x + 4$$
$$5x + 3 = 4$$
$$5x = 1$$
$$x = \tfrac{1}{5}$$

Score 1:   The student made an error by not converting to an equation with the same units.

31 A gardener is planting two types of trees:

Type *A* is three feet tall and grows at a rate of 15 inches per year.

Type *B* is four feet tall and grows at a rate of 10 inches per year.

Algebraically determine exactly how many years it will take for these trees to be the same height.

.2, 1/5, 6 feet tall

$$f(x) = 15x + 3$$

$$f(2) = 15(2) + 3$$
$$30 + 3$$

$$f(2) = 33$$

$$g(x) = 10x + 4$$
$$g(2) = 10(2) + 4$$
$$g(2) = 20 + 4$$
$$g(2) = 24$$

$$f(.2) = 15(.2) + 3$$
$$f(.2) = 6 \quad 3+3$$

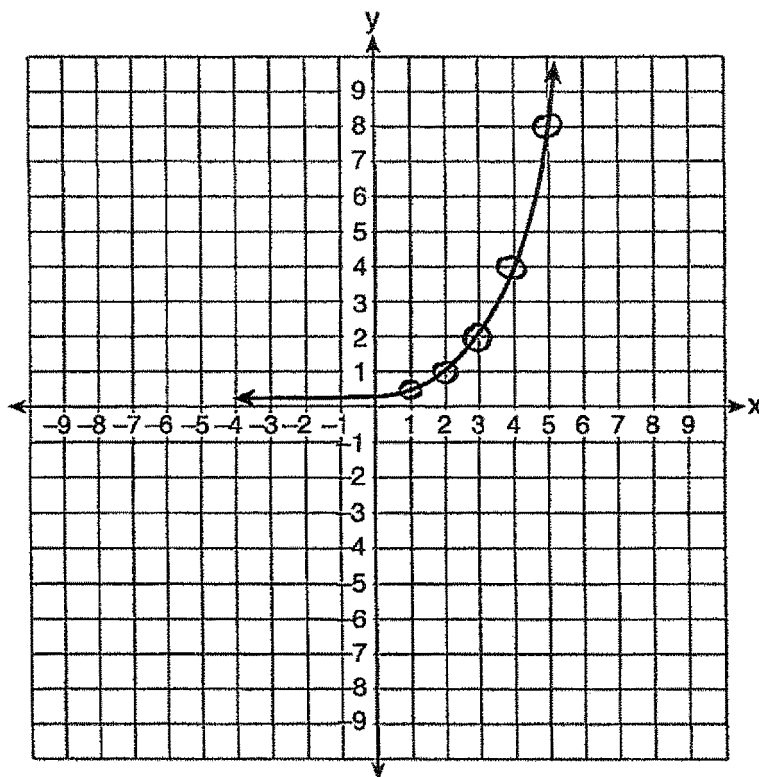$$f(x) = g(x) \qquad 6 = 6$$

$$g(.2) = 10(.2) + 4$$
$$g(.2) = 2 + 4$$
$$g(.2) = 6$$

Score 0: The student made two errors by using a method other than algebraic and not converting to the same units.

32 Write an exponential equation for the graph shown below.

$$y = .25 \times 2^{\wedge}x$$

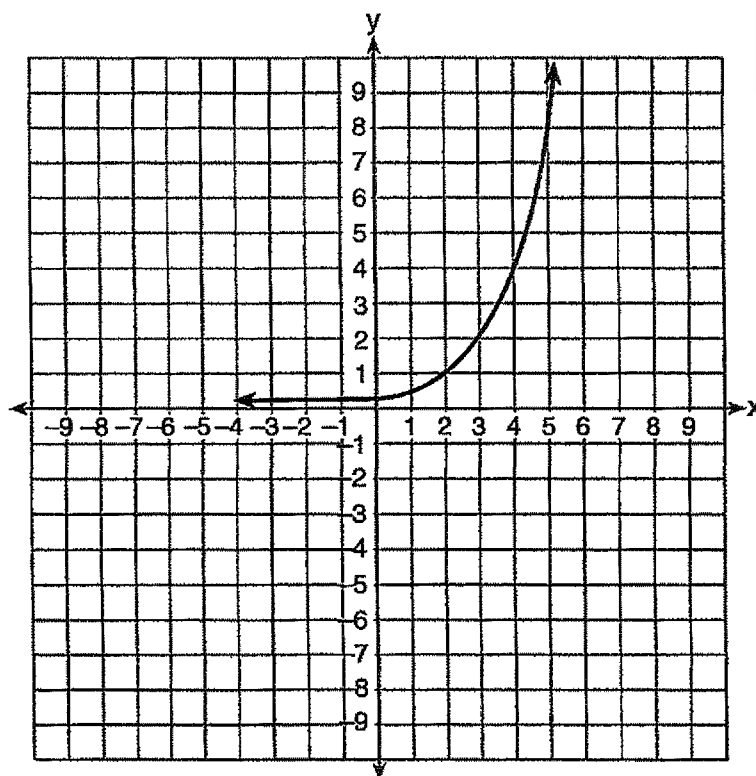Explain how you determined the equation.

I did this by taking the y-values of the domains 1-5 (x) and putting them into my calculator. Then I used ExpReg under STATISTICS and used that equation

Score 2: The student has a complete and correct response.

32 Write an exponential equation for the graph shown below.

$$y = 0.25(2)^x$$

$$y = 0.25(2)^x$$

Explain how you determined the equation.
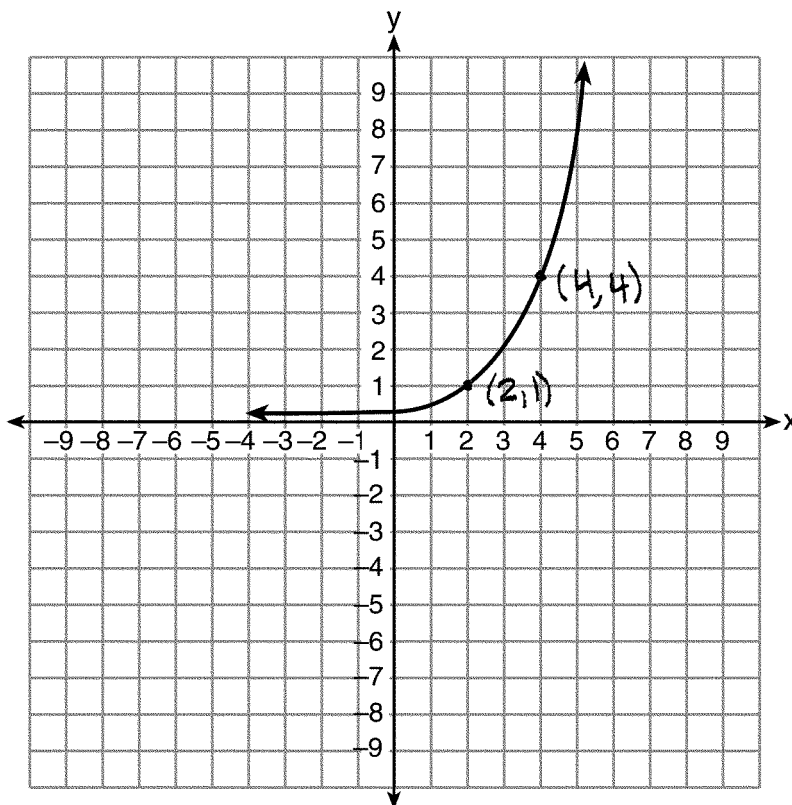
I determined my answer by using my calculator

Score 1: The student gave an insufficient explanation.

32 Write an exponential equation for the graph shown below.

$$m = \frac{4-1}{4-2} = \frac{3}{2}$$

$$y = mx + b$$

$$\boxed{y = \frac{3}{2}x}$$

Explain how you determined the equation.

by using slope intecept form

Score 0: The student gave a completely incorrect response.

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of $18.25 on two bags of popcorn and three drinks. Zachary spends a total of $27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$(2p + 3d = 18.25) - 2$$
$$4p + 2d = 27.50$$

$$\cancel{4p} \quad -6d = -36.50$$
$$\cancel{4p} \quad +2d = 27.50$$
$$ \quad -4d = -9$$
$$ \quad d = 2.25$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

drink is $2.25

$$4p + 4.50 = 27.50$$
$$4p = 23$$

popcorn is $5.75

Score 4: The student has a complete and correct response.

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of $18.25 on two bags of popcorn and three drinks. Zachary spends a total of $27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$b = bag$$
$$d = drink$$

$$18.25 = 2b + 3d$$
$$18.25 = 2b + 3(2.25)$$
$$18.25 = 2b + 6.75$$
$$-6.75 \qquad -6.75$$
$$11.5 = 2b$$
$$5.75 = b$$

(-2)
$$18.25 = \overset{(2)}{2b} + \overset{(2)}{3d} =$$
$$27.50 = 4b + 2d$$
$$\overline{}$$
$$-9 = -4d$$
$$2.25 = d$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

Score 4: The student has a complete and correct response.

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of $18.25 on two bags of popcorn and three drinks. Zachary spends a total of $27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

Let x = the price of one bag of popcorn $18.25 = 2x + 3y$

Let y = the price of one drink. $27.50 = 4x + 2y$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

The price of one bag of popcorn = $5.38

The price of one drink = $3.00

$$27.50 = 4x + 2y$$
$$-2(18.25 = 2x + 3y)$$
$$= -36.5 = -4x - 6x$$

$$-36.5 = -4x - 6y$$
$$+ \ 27.5 = 4y + 2y$$
$$= \ \frac{-9}{-3} = \frac{-3y}{-3}$$
$$3 = y$$

$$27.50 = 4x + 2(3)$$
$$27.50 = 4x + 6$$
$$\frac{21.5}{4} = \frac{4x}{4}$$
$$x = 5.38$$

Score 3: The student made a computational error when adding $-6y$ and $2y$.

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of $18.25 on two bags of popcorn and three drinks. Zachary spends a total of $27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

let $x =$ popcorn

$y =$ drinks

$2x + 3y = 18.25$

$4x + 2y = 27.50$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

$2x + 3y = 18.25$

$2(7.67) + 3y = 18.25$

$15.33 + 3y = 18.25$

$-15.33 \qquad -15.33$

$\dfrac{3y}{3} = \dfrac{2.92}{3}$

$\boxed{y = 97}$

$-2(2x + 3y = 18.25)$

$3(4x + 2y = 27.50)$

$-4x - 6y = -36.50$

$12x + 6y = 82.50$

$\dfrac{6x}{6} = \dfrac{46}{6}$

$\boxed{x = 7.67}$

Score 2: The student made multiple computational errors: adding $-4x$ and $12x$, and multiplying $2(7.67)$.

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of $18.25 on two bags of popcorn and three drinks. Zachary spends a total of $27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$2p + 3d = 18.25$$

$$4p + 2d = 27.50$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

$$4p + 2d = 27.50$$

$$2p + 3d + 18.25 = 4p + 2d + 27.50$$

$$2p - 1d + 9.25 = 0$$
$$ - 9.25$$

$$\frac{2p - 1d}{2p} = \frac{-9.25}{2p}$$

$$\frac{-1d}{-1} = \frac{-4.63}{-1}$$

$$d = 4.63$$

$$2p - d + 9.25$$

$$2p - 4.63 + 9.25 = 0$$

$$\frac{2p}{2} = \frac{-4.62}{2}$$

$$p = 2.31$$

Score 2: The student wrote a correct system of equations, but showed no further correct work.

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of $18.25 on two bags of popcorn and three drinks. Zachary spends a total of $27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$4p - 2d = 27.50 \qquad 2p - 3d = 18.25$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

$$4p - 2d = 27.50$$
$$-2(2p - 3d = 18.25)$$
$$\overline{}$$
$$4p - 2d = 27.50$$
$$-4p + 6d = -36.50$$
$$\overline{}$$
$$\frac{4d}{4} = \frac{9}{4}$$
$$d = 2.25$$

$$4p - 2(2.25) = 27.50$$
$$4p - 4.50 = 27.50$$
$$+4.50 \quad +4.50$$
$$\overline{}$$
$$\frac{4p}{4} = \frac{32.00}{4}$$
$$p = 8$$

Score 1: The student made one conceptual error when writing the system and one computational error when adding 27.50 and −36.50.

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of $18.25 on two bags of popcorn and three drinks. Zachary spends a total of $27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

$$2x + 3y = 18.25$$
$$2x + 4y = 27.50$$

Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

$$y = 9.25$$

Score 1: The student wrote one equation correctly, but showed no further correct work.

33 Jacob and Zachary go to the movie theater and purchase refreshments for their friends. Jacob spends a total of $18.25 on two bags of popcorn and three drinks. Zachary spends a total of $27.50 for four bags of popcorn and two drinks.

Write a system of equations that can be used to find the price of one bag of popcorn and the price of one drink.

Jacob— 18.25 — 2 b of pop + 3 drinks

Zachary— 27.50 — 4 b of pop and 2 drinks

Y = 3
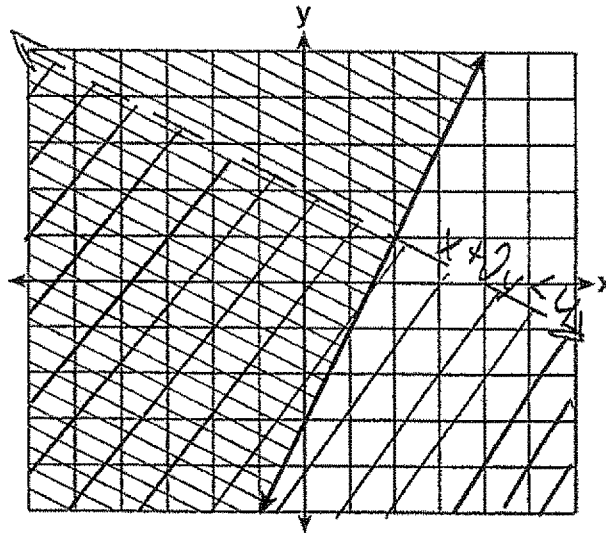
Using these equations, determine and state the price of a bag of popcorn and the price of a drink, to the *nearest cent*.

1 bag of popcorn = 5.56 $

1 drink = 2.25

Score 0: The student stated one correct solution, but showed no further correct work.

34 The graph of an inequality is shown below.

a) Write the inequality represented by the graph.

$$y \geq 2x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$x + 2y < 4$$
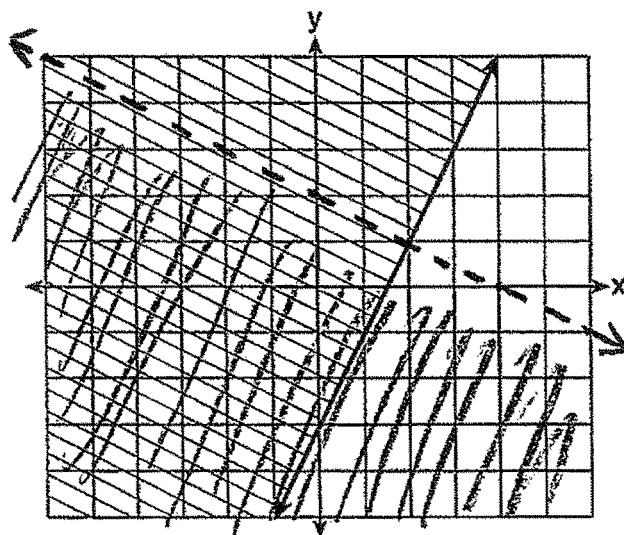$$2y < 4 - x$$
$$y < 2 - \tfrac{1}{2}x$$

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point $(2,1)$ is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

I disagree with Oscar. While it would make $y \geq 2x - 3$ true $(1 \geq 2(2) - 3)$ the other can't be on the line of $y < 2 - \tfrac{1}{2}x$ $(1 < 2 - \tfrac{1}{2}(2))$.

Score 4: The student has a complete and correct response.

34 The graph of an inequality is shown below.

$$y < -\tfrac{1}{2}x + 2$$

a) Write the inequality represented by the graph.

$$y \geq 2x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$\underset{-x}{x} + 2y \underset{-x}{<} 4 \qquad \frac{2y}{2} < \frac{-x + 4}{2}$$
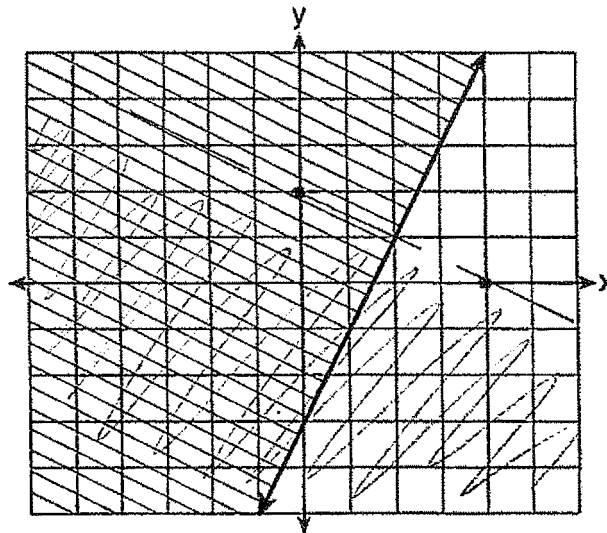
$$y < -\tfrac{1}{2}x + 2$$

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point $(2,1)$ is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

no, because $(2,1)$ is not a solution to $y < -\tfrac{1}{2}x + 2$

Score 4: The student has a complete and correct response.

34 The graph of an inequality is shown below.

$$\frac{y^2 - y^1}{x^2 - x^1}$$

$$\frac{3 - 1}{0 - 2}$$

$$\frac{2}{-2}$$

a) Write the inequality represented by the graph.

$$\boxed{y \geq -1x - 3}$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$-x \qquad -x$

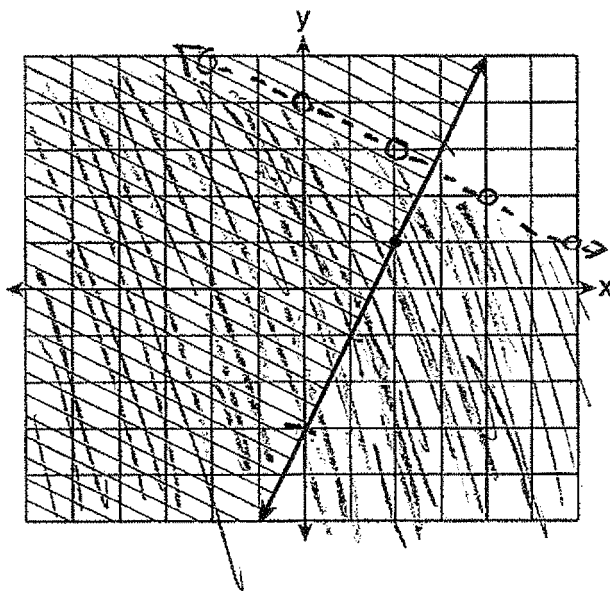$$\frac{2y}{2} < \frac{4 - x}{2}$$

$$y < \frac{4 - x}{2}$$

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point $(2,1)$ is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

I disagree because $y < \frac{4 - x}{2}$ is dotted and a solution can't be on a dotted line.

Score 3: The student wrote an incorrect inequality in part a.

34 The graph of an inequality is shown below.

a) Write the inequality represented by the graph.

$$y \geq 2x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$2y < -x + 4$$
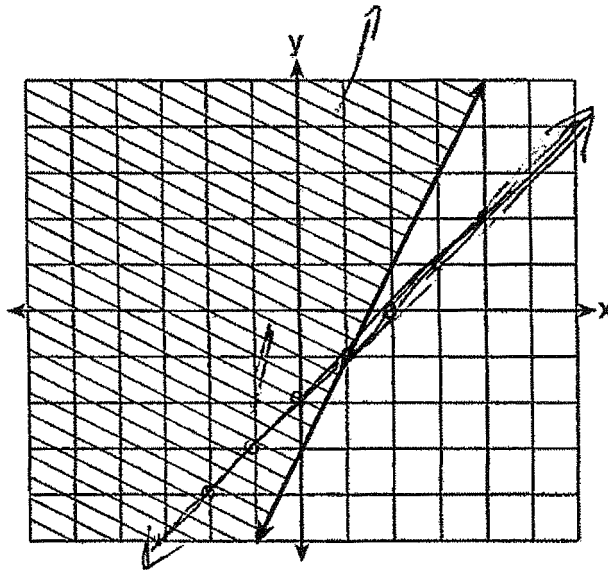$$y < -\tfrac{1}{2}x + 4$$

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point $(2,1)$ is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

yes point (2, 1) is part of the system of inequalities because the point is covered by both inequalities

Score 3: The student made one error in part b.

34 The graph of an inequality is shown below.

a) Write the inequality represented by the graph.

$$\frac{3}{1}x + \frac{1}{2}y < 5$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$x + 2y < 4$$
$$0 + 2(0) < 4$$
$$0 + 0 < 4$$
$$0 < 4 \checkmark \text{ true}$$

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point $(2,1)$ is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

$$x + 2y < 4$$
$$2 + 2(1) < 4$$
$$2 + 2 < 4$$
$$4 < 4$$

No because one of them does not work for $(2,1)$.

Score 2: The student disagreed and wrote a correct explanation, but showed no further correct work.

34 The graph of an inequality is shown below.

a) Write the inequality represented by the graph.

$$y \geq 2x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$2y < -x + 4$$

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point $(2,1)$ is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.
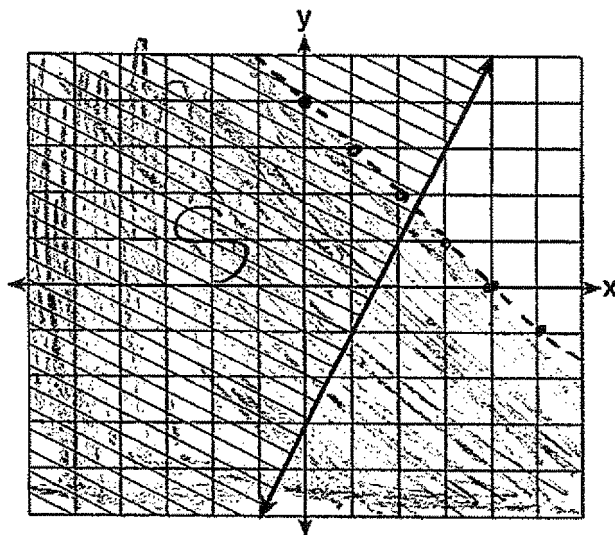
yes because a soild line means it is included in the solution.

Score 2: The student wrote a correct inequality in part a and gave a partially correct explanation based on an incorrect graph.

34 The graph of an inequality is shown below.

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

a) Write the inequality represented by the graph.

b) On the same set of axes, graph the inequality $x + 2y < 4$.

$$\frac{-x \quad -x}{2y < -x + 4}$$
$$\frac{}{2} \qquad \frac{}{2}$$
$$y < -\frac{1}{2}x + 2$$

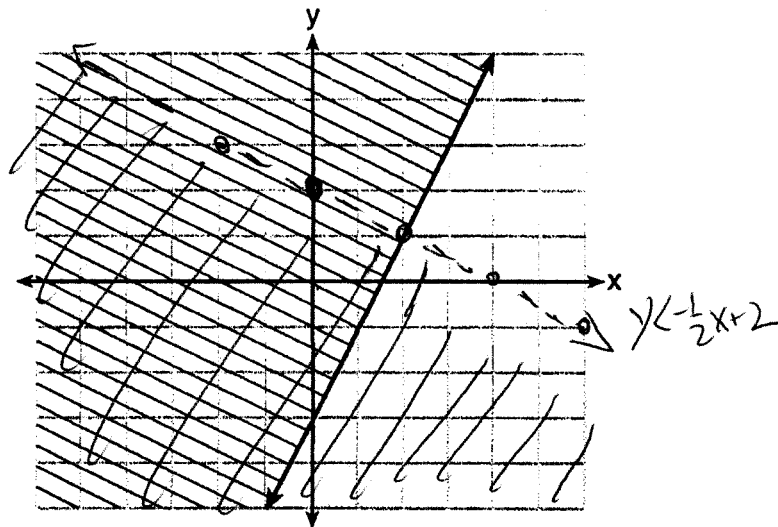$y < -\frac{1}{2}x + 2$
$0 < 0 + 2$
$0 < 2$
TRUE

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point (2,1) is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

yes he's correct !!

Score 1: The student graphed the inequality for part b correctly, but showed no further correct work.

34 The graph of an inequality is shown below.

a) Write the inequality represented by the graph.

$$y \geq \frac{-5}{3}x - 3$$

b) On the same set of axes, graph the inequality $x + 2y < 4$.

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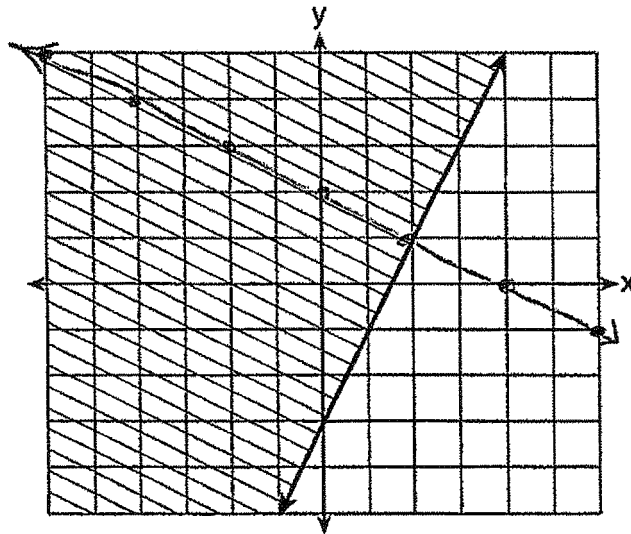$$y < \frac{-1}{2}x + 2$$

c) The two inequalities graphed on the set of axes form a system. Oscar thinks that the point $(2,1)$ is in the solution set for this system of inequalities. Determine and state whether you agree with Oscar. Explain your reasoning.

No, he is incorrect because the solution of the system shouldn't be on the line but where both areas are shaded together.

Score 0: The student has a completely incorrect response.

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth.*

$r = .94$

b) Explain what the correlation coefficient suggests in the context of this problem.

the line is a good model which
shows as the calories increase
so does the milligrams of Sodium

Score 4: The student has a complete and correct response.

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth.*

.94

b) Explain what the correlation coefficient suggests in the context of this problem.

It is a strong correlation

Score 3: The student's explanation was incomplete because it did not refer to the context of the problem.

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth.*

$$r = .9422$$

b) Explain what the correlation coefficient suggests in the context of this problem.

there is a strong linear relationship

Score 2: The student made a rounding error in part a and the explanation was incomplete because it did not refer to the context of the problem.

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth.*

$$r = .942$$

b) Explain what the correlation coefficient suggests in the context of this problem.

The r value shows that 94.2% of the time you will have a hotdog with a lot of calories that has a lot of milligrams also.

Score 1: The student made one rounding error and one conceptual error.

35 A nutritionist collected information about different brands of beef hot dogs. She made a table showing the number of Calories and the amount of sodium in each hot dog.

Calories per Beef Hot Dog	Milligrams of Sodium per Beef Hot Dog
186	495
181	477
176	425
149	322
184	482
190	587
158	370
139	322

a) Write the correlation coefficient for the line of best fit. Round your answer to the *nearest hundredth.*

b) Explain what the correlation coefficient suggests in the context of this problem.

The ⊙ The correlation coefficent suggests in this context of this problem that the less milligrams of sodium per beef hot dog, the less calories per beef hot dog.

Score 0: The student's explanation was not based on a stated correlation coefficient.

36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

$y = -x^2 + 8x + 9$

The vertex represents a maximum point for the function because the function is negative, as stated by the $-x^2$. Therefore, we know that the parabola opens downward making the vertex a maximum and not a minimum.

b) Rewrite $f(x)$ in vertex form by completing the square.

$y = -x^2 + 8x + 9$ $\frac{-8}{2} = -4 \Rightarrow 16$

$y = -(x^2 - 8x) + 9$

$y = -(x^2 - 8x + 16) - (-16) + 9$

$y = -(x-4)^2 + 16 + 9$

$y = -(x-4)^2 + 25$ (h,k)

Score 4:   The student has a complete and correct response.

36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

Max because of the -1, coeff of x^2

b) Rewrite $f(x)$ in vertex form by completing the square.

$$-f(x) = x^2 - 8x - 9$$
$$-f(x) = (x^2 - 8x + 16) - 9 - 16$$
$$-f(x) = (x-4)^2 - 25$$
$$f(x) = -(x-4)^2 + 25$$

Score 4: The student has a complete and correct response.

36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

Maximum beccause the Quadratic is a negative which means it's facing down. The Therefore the vertex is the highest point which makes it a maximum.

b) Rewrite $f(x)$ in vertex form by completing the square.

$f(x) = -x^2 + 8x + 9$

$-1(x^2 - 8x - 9) = 0$

$-1(x^2 - 8x - 9 + 25) - 25(-1) = 0$

$-1(x^2 - 8x + 16) + 25 = 0$

$-1(x - 4)^2 + 25 = 0$

$-y^2 = 16$

$16 = -9 + n$
$+9 \quad +9$ \qquad $n = 25$

Score 3: The student made an error in setting the correct expression equal to zero.

36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

$$y = -x^2 + 8x + 9$$

The vertex represents a maximum point for the function. The y values leading up to $(4, 25)$ are increasing, and the y values after that point are decreasing.

b) Rewrite $f(x)$ in vertex form by completing the square.

$$-x^2 + 8x + 9 = 0$$
$$\cdot -1 \quad -9 \quad -9$$
$$x^2 - 8x - 9 = 0$$
$$-x \qquad 9 = 9$$
$$x^2 - 8x + 16 = 25$$
$$(x - 4)(x - 4) = 25$$
$$(\sqrt{(x-4)^2} = \sqrt{25} + 4)$$
$$x - 4 = \pm 5$$
$$+4 \quad +4$$
$$x = 4 \pm 5$$

$$-x^2 - 4x + 4x + 16$$

Score 2: The student stated a correct maximum and gave a correct explanation, but showed no further correct work.

36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

The vertex represents a maximum because the number in frot of the x^2 is negative.

b) Rewrite $f(x)$ in vertex form by completing the square.

$$f(x) = -x^2 + 8x + 9$$

$$\underline{-9 \qquad\qquad -9}$$

$$-9 = -x^2 + 8x$$

$-a^2 \rightarrow$

Score 2: The student stated maximum and gave a correct explanation, but showed no further correct work.

36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

The vertex represents a minimum point because the coefficient of the a value is negative.

b) Rewrite $f(x)$ in vertex form by completing the square.

~~$-x^2 + 8x + 16 + 9 = 16$~~

~~$f(x) = (x+4)^2 = 7$~~

$-x^2 + 8x + 9$

$x^2 = 8x - 9$

$x^2 - 8x + 16 - 9 - 16$

$f(x) = (x-4)^2 - 25$

Score 1: The student made one error in completing the square, but showed no further correct work.

36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

$$maximum$$

b) Rewrite $f(x)$ in vertex form by completing the square.

$$f(x) = -x^2 + 8x + 9$$

$$-(x^2 + 8x) + 9$$

$$-(x^2 + 8x) + 16$$

$$f(x) = -(x^2 + 8x) + 25$$

Score 0: The student stated maximum, but showed no further correct work.

36 a) Given the function $f(x) = -x^2 + 8x + 9$, state whether the vertex represents a maximum or minimum point for the function. Explain your answer.

Maximum, it is a maximum because the graph is at the maximum point it can be at

b) Rewrite $f(x)$ in vertex form by completing the square.

$f(x) = -x^2 + 8x + 9$

$f(x) - (x+4)^2 - 8 + 9$

Score 0: The student stated maximum, but showed no further correct work.

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

$$x \,\square \quad \square \,x\text{-}3$$
$$x \qquad 2x$$

$$2x(x-3)$$
$$= 2x^2 - 6x$$

$$\boxed{2x^2 - 6x = 1.25x^2}$$
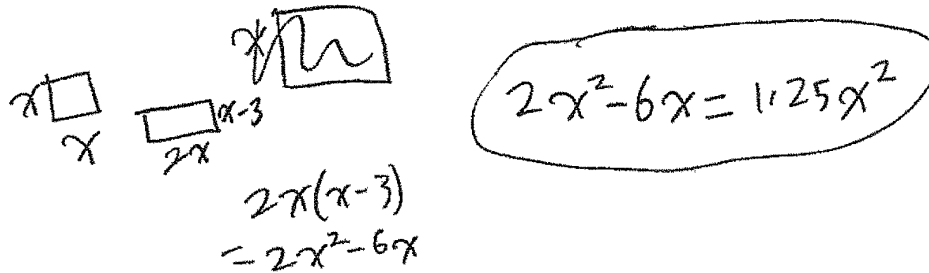
Explain how your equation models the situation.

My equation models the situation because It shows $2x^2-6x$, the area of the new garden, is 1.25 times larger than the area of the original garden, x^2 with x being the length of a side of the original square garden.

Determine the area, in square meters, of the new rectangular garden.

$$2x^2 - 6x = 1.25x^2$$
$$0.75x^2 - 6x = 0$$
$$x(0.75x - 6) = 0$$
$$x = 0 \quad 0.75x = 6$$
$$x = 8$$

$$6 \div 0.75 = 8$$

$$2(8)^2 - 6(8) = 2(64) - 48$$
$$= 128 - 48$$
$$= 80$$

$$\boxed{80 \text{ square units}}$$

Score 6: The student has a complete and correct response.

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden
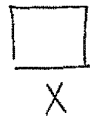
$$2X \cdot (X-3) = \frac{5}{4}X^2$$
$$2X^2 - 6X = \frac{5}{4}X^2$$
$$-\frac{5}{4}X^2 + 2X^2 - 6X = 0$$
$$\boxed{.75X^2 - 6X = 0}$$

(square labeled X)

Explain how your equation models the situation.

2x is the side length doubled and x-3 is the side decreased by 3 meters, its product $2x^2 - 6x$ should equal to 125% of the original field which is x^2. The area
X is the original sidelength of the garden.

Determine the area, in square meters, of the new rectangular garden.

$$-\frac{5}{4}X^2 + 2X^2 - 6X = 0 \qquad 2X \cdot (X-3)$$
$$.75X^2 - 6X = 0 \qquad 2(8) \cdot (8-3)$$
$$X(.75X - 6) = 0 \qquad 16 \cdot (5)$$
$$80$$
$$.75X - 6 = 0 \qquad \cancel{X} \cancel{\cancel{0}}$$
$$.75X = 6 \qquad \text{The new field}$$
$$\frac{.75X}{.75} = \frac{6}{.75} \qquad \text{will be } 80 \text{ sq meters}$$
$$\boxed{X = 8}$$

Score 6: The student has a complete and correct response.

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

~~Let L=length, w=w~~

~~a=area~~

Let s=side of square,

$$2s(s-3) = 1.25s^2$$

Explain how your equation models the situation.

~~the~~ My equation models the situation because $2s(s-3)$ explains one side of the square is being doubled while the other side is decreased by 3 m. $(1.25)(s^2)$ represents the area of the original square; s^2, being increased by 25%, 1.25.

Determine the area, in square meters, of the new rectangular garden.

$$2s^2 - 6s = 1.25s^2$$
$$-1.25s^2 \qquad -1.25s^2$$

$$.75s^2 - 6s = 0$$

$$.75s(s-8) = 0$$

$$s=0 \quad \boxed{s=8}$$

REJECT

$$8^2 = \boxed{64}$$
area

Score 5: The student made an error in finding 64, the area of the original.

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

$$2x(x-3) = 1.25x^2$$
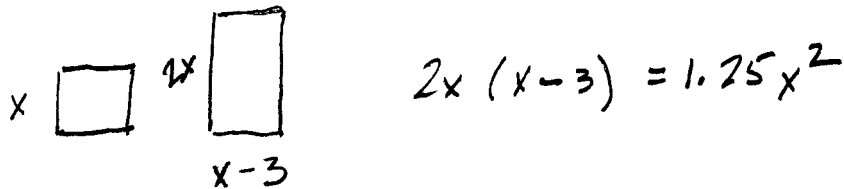
Explain how your equation models the situation.

It just does

Determine the area, in square meters, of the new rectangular garden.

$$2(20)(17) = 680$$ $$1.25(400) = 500$$

$$2(10)(7) = 140$$ $$1.25(100) = 125$$ no

$$2(5)(2) = 20$$ $$1.25(25) = 31.25$$ no

$$2(8)(5) = \boxed{80}$$ $$1.25(64) = 80$$

Score 5:   The student has an incorrect explanation.

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

Explain how your equation models the situation.

Determine the area, in square meters, of the new rectangular garden.

$$2L(L-3) = 1.25L^2$$
$$2L^2 - 6L - 1.25L^2 = 0$$
$$.75L^2 - 6L = 0$$
$$L(.75L - 6) = 0$$
$$.75L - 6 = 0$$
$$L = 8$$

$$\text{AREA} =$$
$$16(5) = 80$$

Score 5: The student did not write an explanation.

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

$A = x^2$ $A = 2x(x-3)$ $2x(x-3) = .25x^2$

Explain how your equation models the situation.

My equation models the situation because x−3 represents the side of the square decreased by 3 and 2x represents the side of the square doubled. The original square has an area of x^2 and the rectangle's area is $2x(x-3)$. 25% more than the original square's area is $.25x^2$.

Determine the area, in square meters, of the new rectangular garden.

$2x(x-3) = .25x^2$

$2x^2 - 6x = .25x^2$

$1.75x^2 - 6x = 0$

$x(1.75x - 6) = 0$

$x \neq 0$
reject

$1.75x - 6 = 0$
$1.75x = 6$
$x = \frac{24}{7}$

Area of New Field

$A = 2\left(\frac{24}{7}\right)^2 - 6\left(\frac{24}{7}\right)$

$A = \frac{144}{49}$

Score 4: The student made one conceptual error by using .25 instead of 1.25.

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

$$1.25(x^2) = 2x(x-3)$$

Explain how your equation models the situation.

The original sides, which were equal to each other, are represented by x. One side was doubled(2x) while the other had 3 yards subtracted from it. Then these quantities are multiplied together is equal to 1.25 times the old area; x^2.

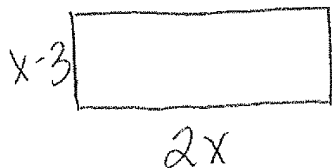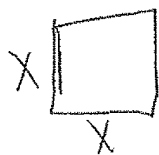Determine the area, in square meters, of the new rectangular garden.

$$1.25(x^2) = 2x(x-3)$$

$$\frac{1.25x^2}{x^2} = \frac{2x^2}{x^2} - \frac{6x}{x^2}$$

$$1.25 = 2$$

Score 3: The student wrote a correct equation in one variable and a correct explanation, but showed no further correct work.

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

$$2x(x-3) = 1.25x^2$$

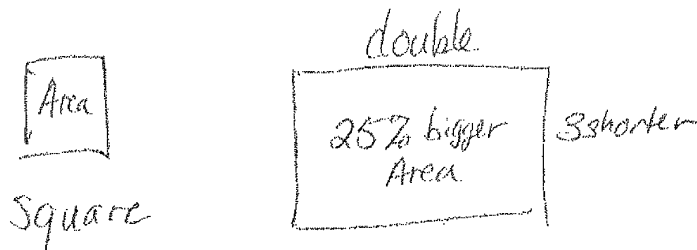Explain how your equation models the situation.

Determine the area, in square meters, of the new rectangular garden.

Score 2: The student wrote a correct equation in one variable, but showed no further correct work.

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

double

Area

Square

25% bigger
Area

3 shorter

Explain how your equation models the situation.

You would have to times the new double side by the side that is 3 shorter and that is the new area.
The new area is 1.25 times the old area. Put those equal and you have an equation

Determine the area, in square meters, of the new rectangular garden.

Score 1: The student wrote a correct explanation, but showed no further correct work.

37 New Clarendon Park is undergoing renovations to its gardens. One garden that was originally a square is being adjusted so that one side is doubled in length, while the other side is decreased by three meters.

The new rectangular garden will have an area that is 25% more than the original square garden. Write an equation that could be used to determine the length of a side of the original square garden.

Explain how your equation models the situation.

Using the original length and garden of the original garden X will be the length and G will be the garden which wasn't shown. TO find the area of an we need to multiply the length and width. Sp the length is 2x-3 when adjusted and multiplied by the width which will equal to the orig inal garden when multiplied by 1.25.

Determine the area, in square meters, of the new rectangular garden.

Score 0: The student wrote an incorrect explanation, and showed no further correct work.