The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

Thursday, June 16, 2016 — 9:15 a.m. to 12:15 p.m.

MODEL RESPONSE SET

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Question 25

25 Given that $f(x) = 2x + 1$, find $g(x)$ if $g(x) = 2[f(x)]^2 - 1$.

$g(x) = 2(2x+1)^2 - 1$

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

Question 25

25 Given that $f(x) = 2x + 1$, find $g(x)$ if $g(x) = 2[f(x)]^2 - 1$.

$2[2x+1]^2-1$

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

Question 25

25 Given that $f(x) = 2x + 1$, find $g(x)$ if $g(x) = 2[f(x)]^2 - 1$.

$g(x) = 2(f(x))^2 - 1$

$gx = 2(2x+1)^2 - 1$

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

$gx = 2(4x+1) - 1$

$gx = (8x+2) - 1$

Score 1: The student made an error when squaring the binomial.

Question 25

25 Given that $f(x) = 2x + 1$, find $g(x)$ if $g(x) = 2[f(x)]^2 - 1$.

When $2(x)^2 - 1$ is put in the y= it turns into a quadratic

Score 0: The student gave a completely incorrect response.

Question 26

26 Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.

$\sqrt{144}$ → RATIONAL
144 CAN BE WRITTEN AS A FRACTION

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

Question 26

26 Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.

I MULTIPIED IT ON MY CALCULATOR AND GOT 144 WHICH IS RATIONAL BECAUSE ITS AN INTEGER.

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

Question 26

26 Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.

$24 \cdot \sqrt{36}$

$24 \cdot 6$

both are rational

Score 1: The student wrote an incomplete explanation.

Question 26

26 Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.

$(4.242640687)(33.94211255) = 144$

Rational

Score 1: The student did not write an explanation.

Question 26

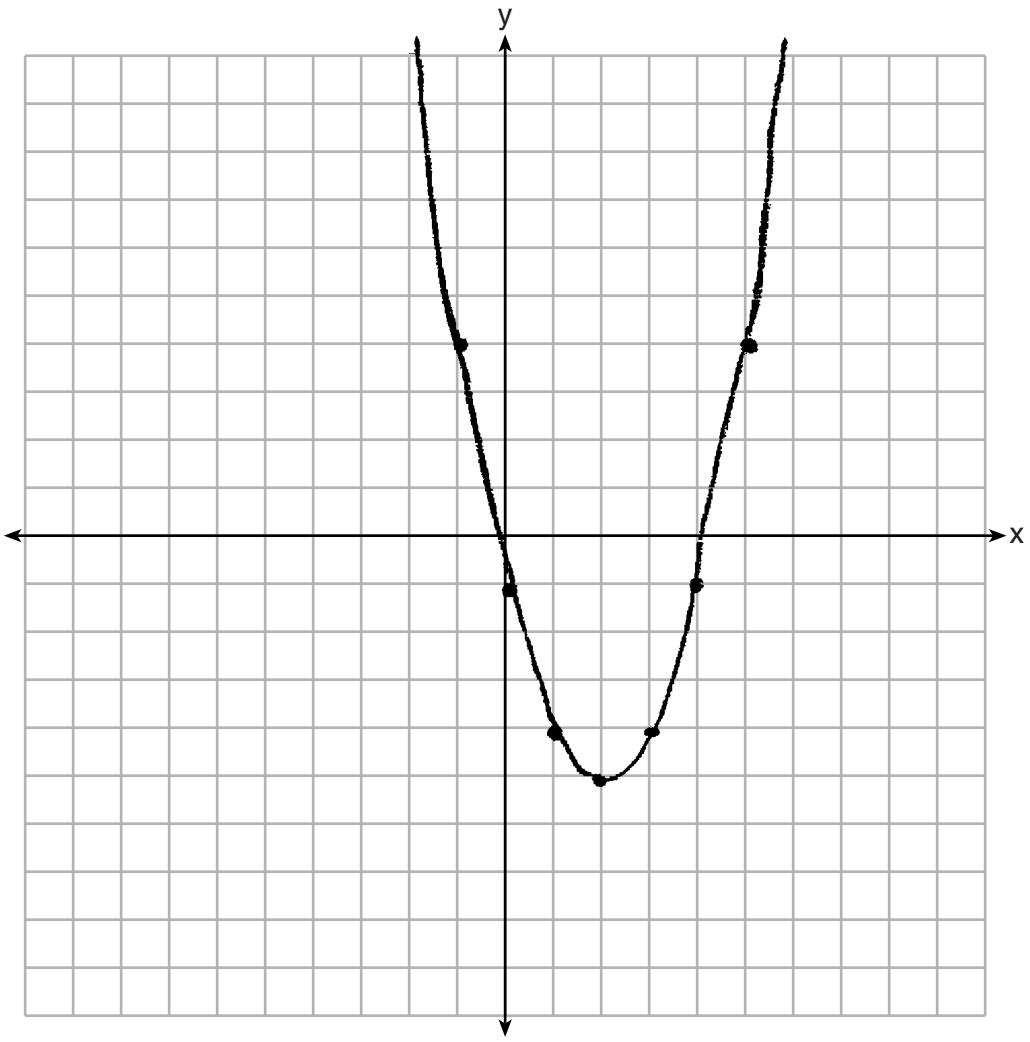
26 Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.

I believe that it is irrational because it can't be written as a fraction 3. both answers come out as decimals.

Score 0: The student gave an irrelevant response.

Question 27

27 On the set of axes below, draw the graph of $y = x^2 - 4x - 1$.



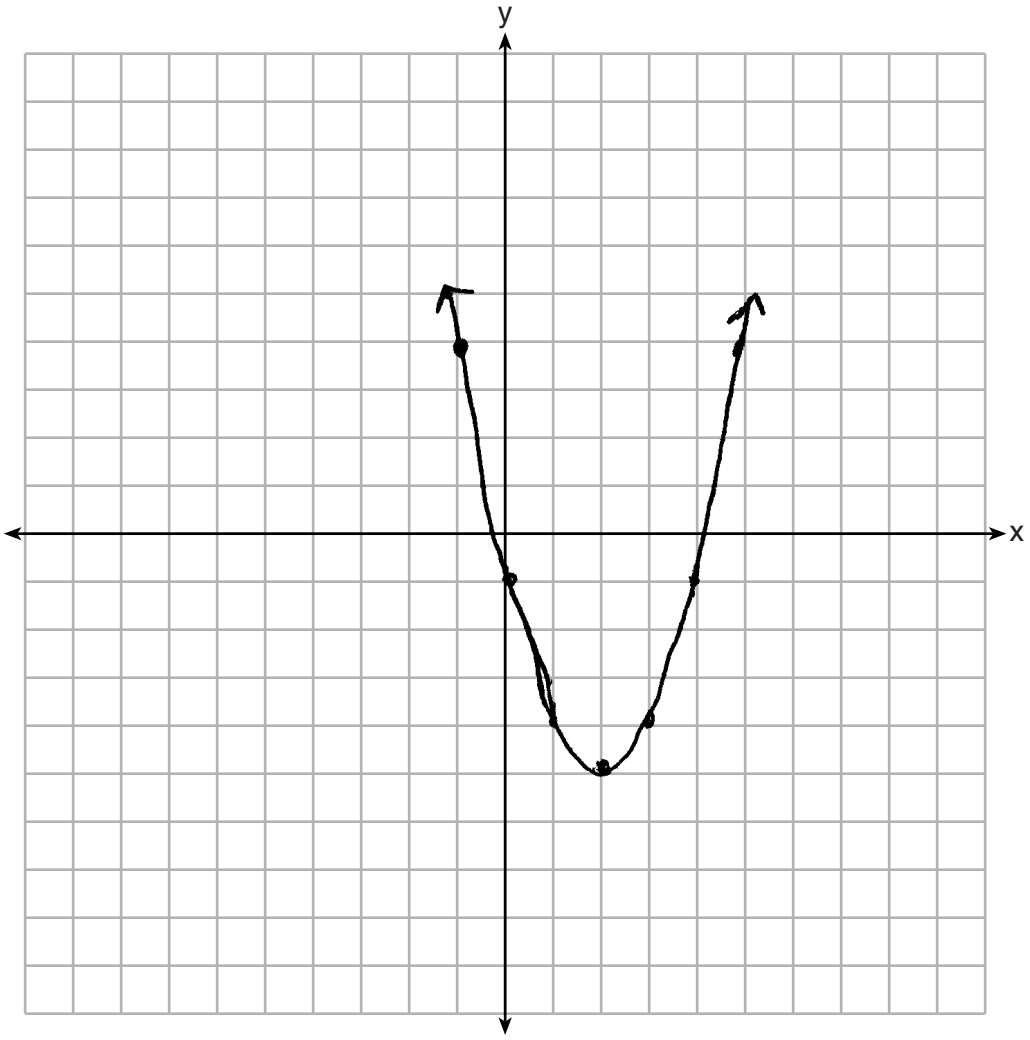
State the equation of the axis of symmetry.

x = 2

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

Question 27

27 On the set of axes below, draw the graph of $y = x^2 - 4x - 1$.



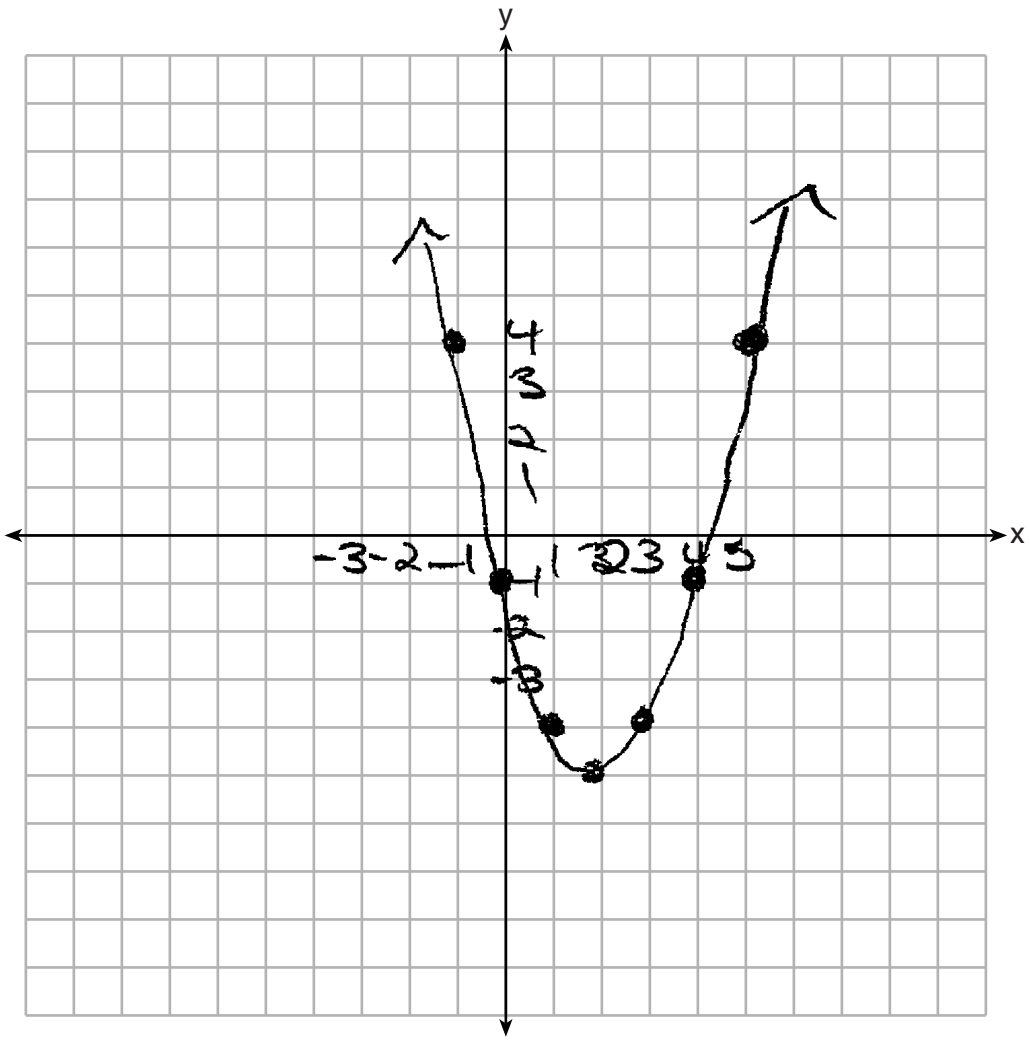
State the equation of the axis of symmetry.

$x = \frac{-b}{2a} = \frac{4}{2}$

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

Question 27

27 On the set of axes below, draw the graph of $y = x^2 - 4x - 1$.



State the equation of the axis of symmetry.

$x = \frac{-b}{2a}$ $\frac{4}{2}$ $x = 2$ $y = 2^2 - 4(2) - 1$

$4 - 8 - 1$

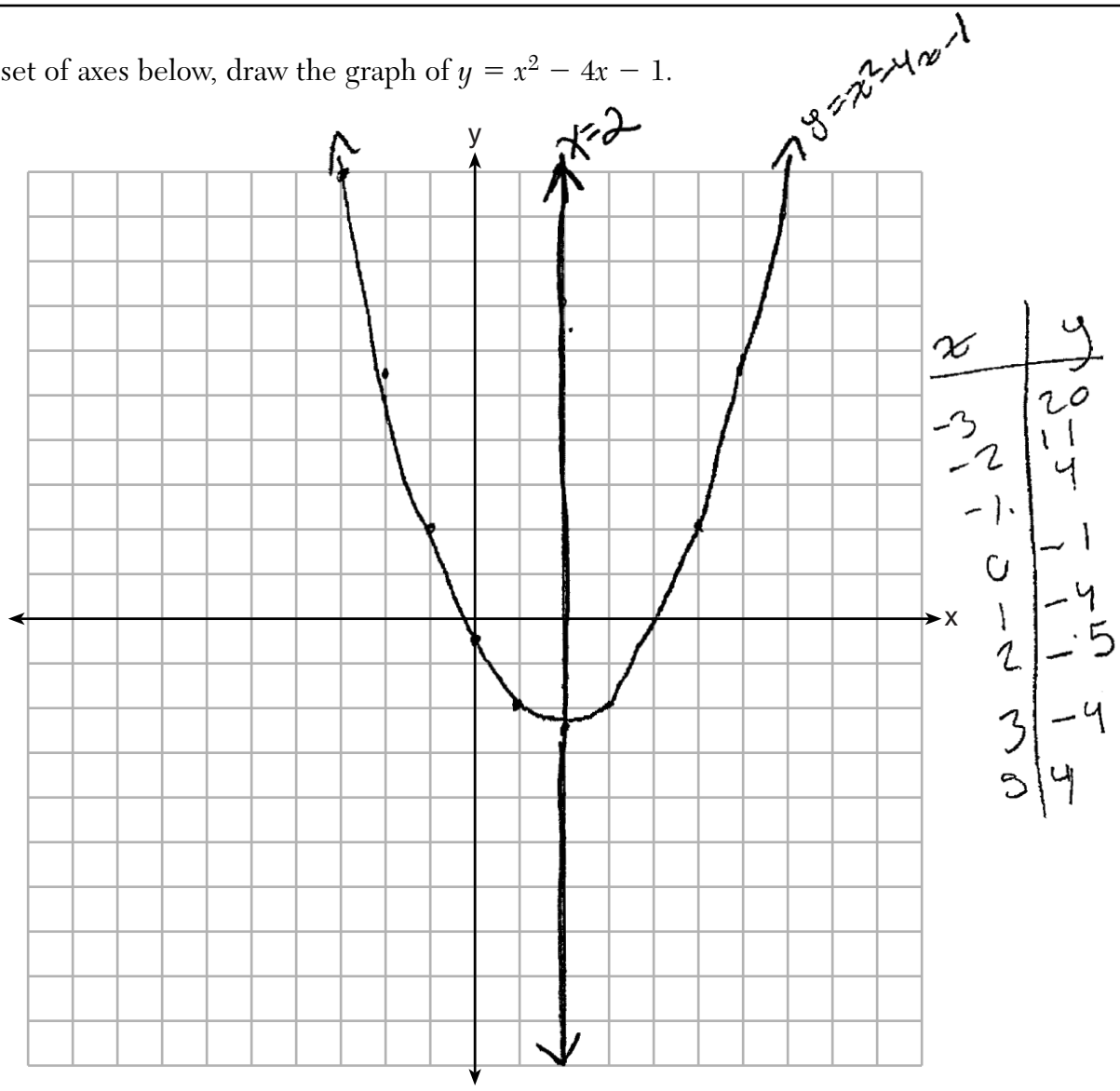
$-4 - 1$

$(2, -5)$ $y = -5$

Score 1: The student did not indicate which boxed-in response was the equation of the axis of symmetry.

Question 27

27 On the set of axes below, draw the graph of $y = x^2 - 4x - 1$.

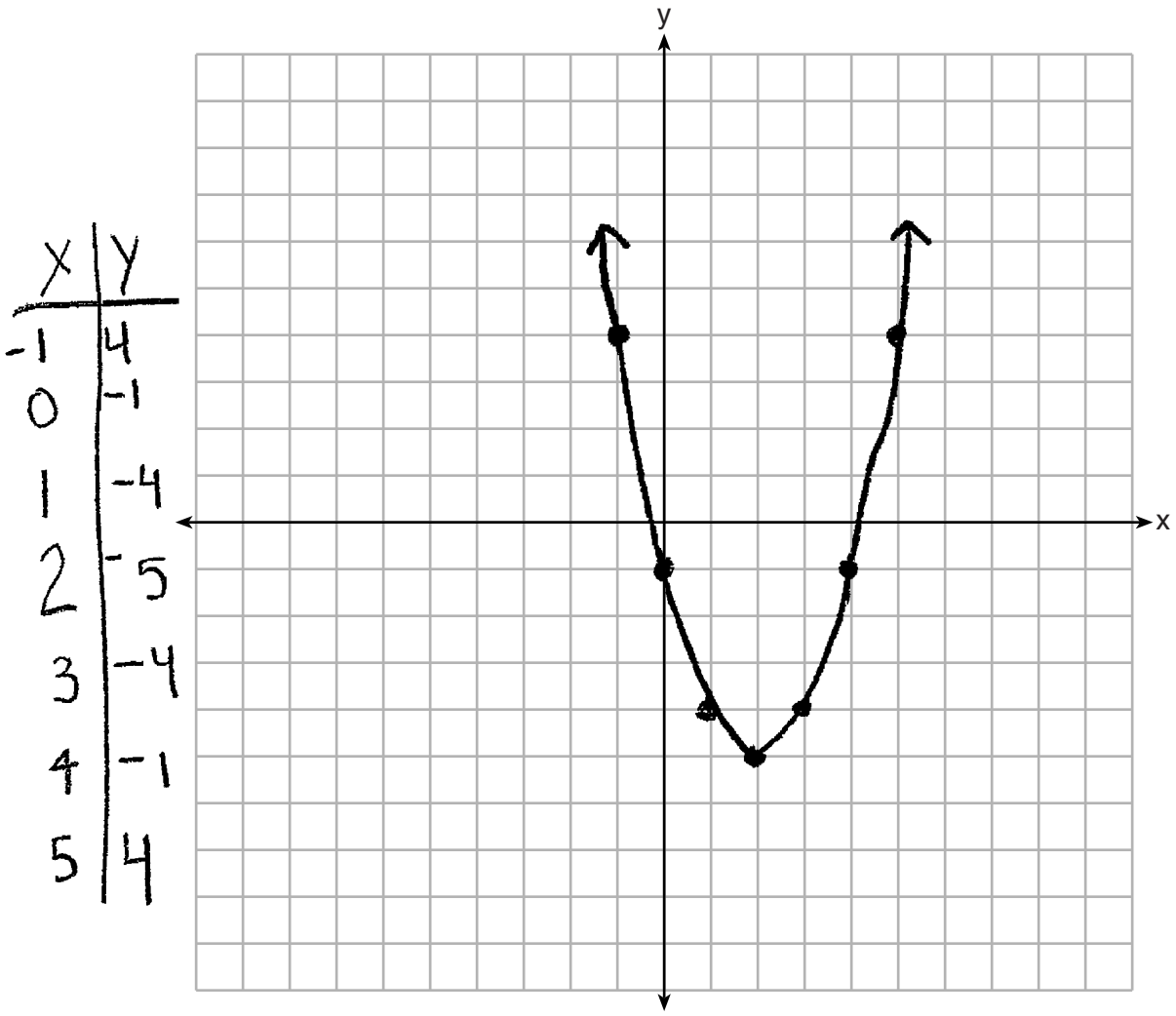


State the equation of the axis of symmetry.

Score 1: The student used a scale other than one on the y-axis, but did not label it on the graph.

Question 27

27 On the set of axes below, draw the graph of $y = x^2 - 4x - 1$.



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

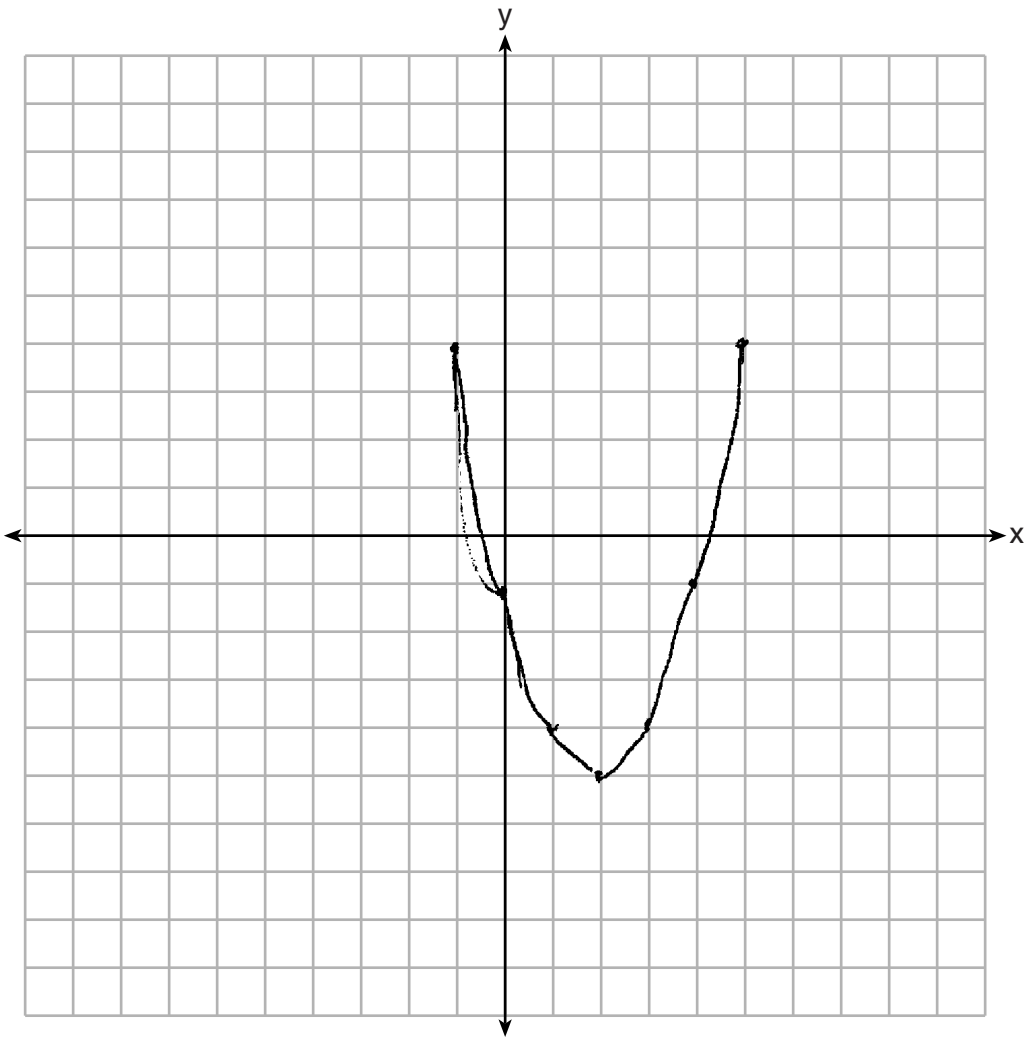
State the equation of the axis of symmetry.

$$\frac{-b}{2a} = \frac{4}{2 \cdot 1} = \frac{4}{2} = 2$$

Score 1: The student did not write the axis of symmetry as $x = 2$.

Question 27

27 On the set of axes below, draw the graph of $y = x^2 - 4x - 1$.



State the equation of the axis of symmetry.

Score 0: The student did not indicate that the graph continues beyond $(-1,4)$ and $(5,4)$, and did not write the equation of the axis of symmetry.

Question 28

28 Amy solved the equation $2x^2 + 5x - 42 = 0$. She stated that the solutions to the equation were $\frac{7}{2}$ and -6. Do you agree with Amy's solutions? Explain why or why not.

$2x^2 + 5x - 42 = 0$

$2(-6)^2 + 5(-6) - 42 = 0$

$72 - 30 - 42 = 0$

$42 - 42 = 0$

$0 = 0$

$2(3.5)^2 + 5(3.5) - 42 = 0$

$24.5 + 17.5 - 42 = 0$

$42 - 42 = 0$

$0 = 0$

She is correct because when the solutions are substituted for "x" and the equation is solved, both sides equal 0.

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

Question 28

28 Amy solved the equation $2x^2 + 5x - 42 = 0$. She stated that the solutions to the equation were $\frac{7}{2}$ and -6. Do you agree with Amy's solutions? Explain why or why not.

$(2x - 7)(x + 6)$

yes because when you solve for the zeroes using the factoring method the factors of the equation are 2x-7 and x+6. If you set those equal to 0 then you would get $\frac{7}{2}$ and -6 as the zeroes.

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

Question 28

28 Amy solved the equation $2x^2 + 5x - 42 = 0$. She stated that the solutions to the equation were $\frac{7}{2}$ and -6. Do you agree with Amy's solutions? Explain why or why not.

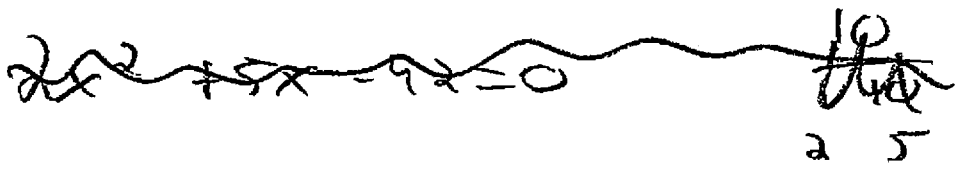
Yes

When I graphed the equation on my calculator it crossed the x-axis at 3.5 and -6.

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

Question 28

28 Amy solved the equation $2x^2 + 5x - 42 = 0$. She stated that the solutions to the equation were $\frac{7}{2}$ and -6. Do you agree with Amy's solutions? Explain why or why not.



Yes the solutions are $\frac{7}{2}$ and -6

$x = \frac{-6 \pm \sqrt{(6)^2 - 4(6)(7)}}{2(6)}$

$x = \frac{-5 \pm \sqrt{(5)^2 - 4(2)(-42)}}{2(2)}$

$x = \frac{-5 \pm \sqrt{361}}{4}$ $\sqrt{361} = 19$

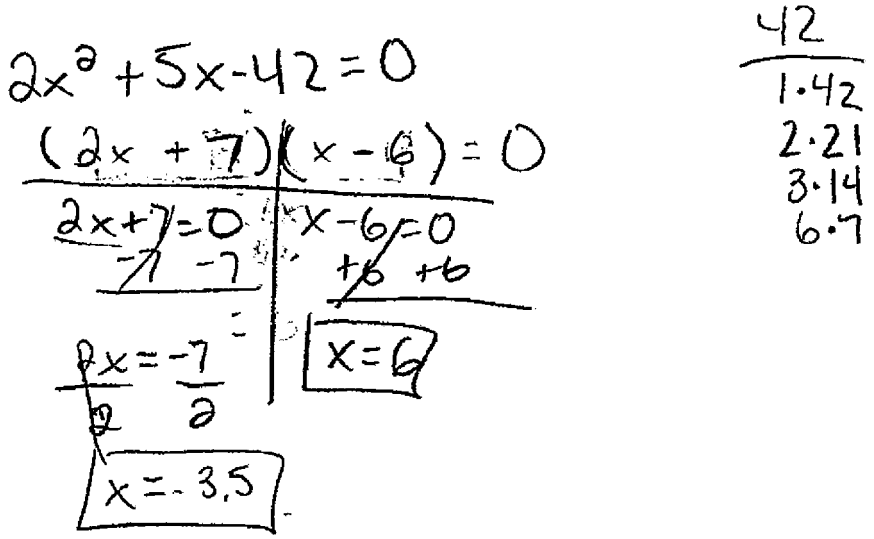
$\frac{-5+19}{4} = \frac{7}{2}$

$\frac{-5-19}{4} = -6$

Score 1: The student justified that the solutions are $\frac{7}{2}$ and -6, but did not write an explanation.

Question 28

28 Amy solved the equation $2x^2 + 5x - 42 = 0$. She stated that the solutions to the equation were $\frac{7}{2}$ and -6. Do you agree with Amy's solutions? Explain why or why not.



No, I do not agree with Amy's solutions because the right answers are -3.5 and 6.

Score 1: The student made a factoring error, but wrote an appropriate explanation.

Question 28

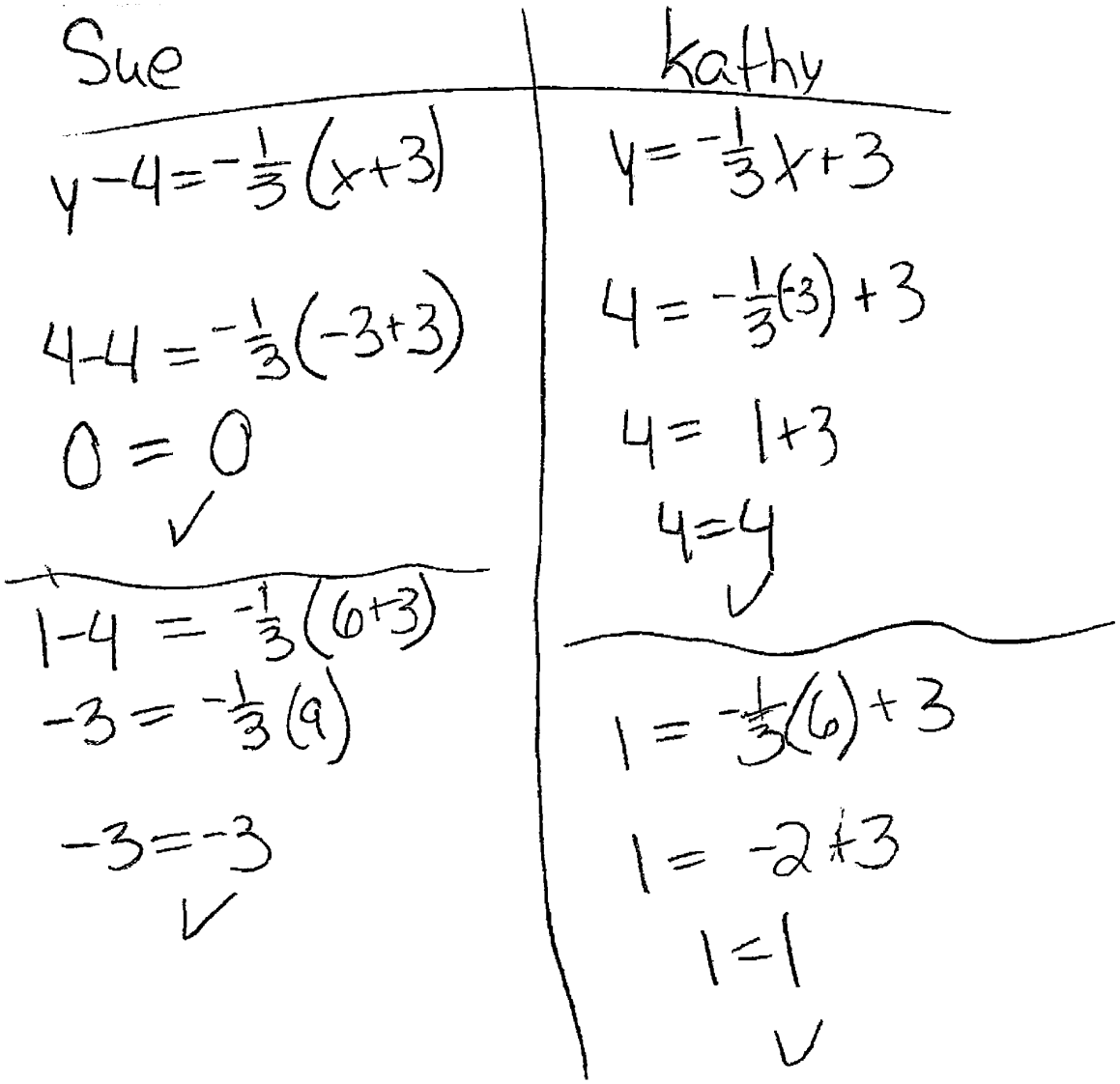
28 Amy solved the equation $2x^2 + 5x - 42 = 0$. She stated that the solutions to the equation were $\frac{7}{2}$ and -6. Do you agree with Amy's solutions? Explain why or why not.

yes Because the Soultion is $\frac{7}{2}$ and -6

Score 0: The student wrote yes, but did not write an explanation.

Question 29

29 Sue and Kathy were doing their algebra homework. They were asked to write the equation of the line that passes through the points $(-3,4)$ and $(6,1)$. Sue wrote $y - 4 = -\frac{1}{3}(x + 3)$ and Kathy wrote $y = -\frac{1}{3}x + 3$. Justify why both students are correct.



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

Question 29

29 Sue and Kathy were doing their algebra homework. They were asked to write the equation of the line that passes through the points $(-3,4)$ and $(6,1)$. Sue wrote $y - 4 = -\frac{1}{3}(x + 3)$ and Kathy wrote $y = -\frac{1}{3}x + 3$. Justify why both students are correct.

They are both correct because as I plugged the equations in the calculator, and they both have the same points, (-3,4) and (6,1) on the table

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

Question 29

29 Sue and Kathy were doing their algebra homework. They were asked to write the equation of the line that passes through the points $(-3,4)$ and $(6,1)$. Sue wrote $y - 4 = -\frac{1}{3}(x + 3)$ and Kathy wrote $y = -\frac{1}{3}x + 3$. Justify why both students are correct.

The students are both correct because the graph show two lines declining but they both go through (-3,4) (6,1). The two lines are on one another so they went through the same points.

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

Question 29

29 Sue and Kathy were doing their algebra homework. They were asked to write the equation of the line that passes through the points $(-3,4)$ and $(6,1)$. Sue wrote $y - 4 = -\frac{1}{3}(x + 3)$ and Kathy wrote $y = -\frac{1}{3}x + 3$. Justify why both students are correct.

Both students are correct because they are just doing different reprensentations of the same equation. Kathy wrote it in the $y=mx+b$ format while Sue wrote it in the point slope format. They are both the same equations just in different forms.

Score 1: The student wrote an incomplete justification because no work was shown to demonstrate that the equations are the same.

Question 29

29 Sue and Kathy were doing their algebra homework. They were asked to write the equation of the line that passes through the points $(-3,4)$ and $(6,1)$. Sue wrote $y - 4 = -\frac{1}{3}(x + 3)$ and Kathy wrote $y = -\frac{1}{3}x + 3$. Justify why both students are correct.

$\frac{y}{x}$ $\frac{y_2 - y_1}{x_2 - x_1}$ $\frac{1-4}{6-3} = \frac{-3}{9} \rightarrow \frac{-1}{3}$

Sue → $y - 4 = -1/3\,(x+3)$ $\frac{-1}{3}$

$y - 4 = -1/3x + -1$

Katy → $y = -1/3x + 3$

Score 1: The student wrote an incomplete justification.

Question 29

29 Sue and Kathy were doing their algebra homework. They were asked to write the equation of the line that passes through the points $(-3,4)$ and $(6,1)$. Sue wrote $y - 4 = -\frac{1}{3}(x + 3)$ and Kathy wrote $y = -\frac{1}{3}x + 3$. Justify why both students are correct.

Both students are correct because they both used the same equation except Sue put $y-4=\frac{1}{3}(x+3)$ and Kathy wrote $y=-\frac{1}{3}x+3$. They just used different numbers in some places.

Score 0: The student rewrote the question, but did not provide a justification.

Question 30

30 During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m.

If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?

x	y
3pm	4
7pm	6

(3,4)
(7,6)

$\frac{4-6}{3-7} = \frac{-2}{-4} = \frac{1}{2}$

It represents the rate of which snow falls per hour. ($\frac{1}{2}$ in. every hour.)

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

Question 30

30 During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m.

If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?

2 inches of snow every four hours.

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

Question 30

30 During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m.

If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?

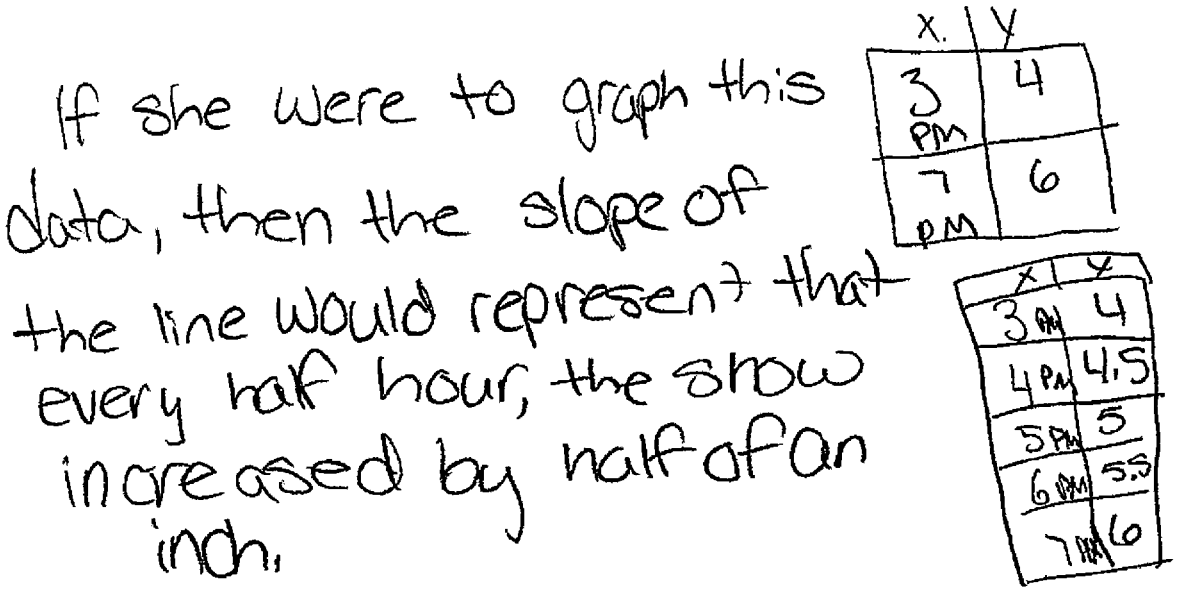
The amount of snow increases as time increases.

Score 1: The student wrote an explanation that did not include inches and hours.

Question 30

30 During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m.

If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?



Score 1: The student made an error in the explanation by writing "every half hour."

Question 30

30 During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m.

If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?

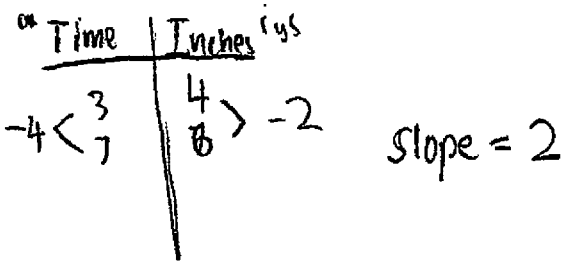
The slope of the line represents the amount of inches of snow on the ground at different times.

Score 0: The student gave a completely incorrect response.

Question 30

30 During a recent snowstorm in Red Hook, NY, Jaime noted that there were 4 inches of snow on the ground at 3:00 p.m., and there were 6 inches of snow on the ground at 7:00 p.m.

If she were to graph these data, what does the slope of the line connecting these two points represent in the context of this problem?

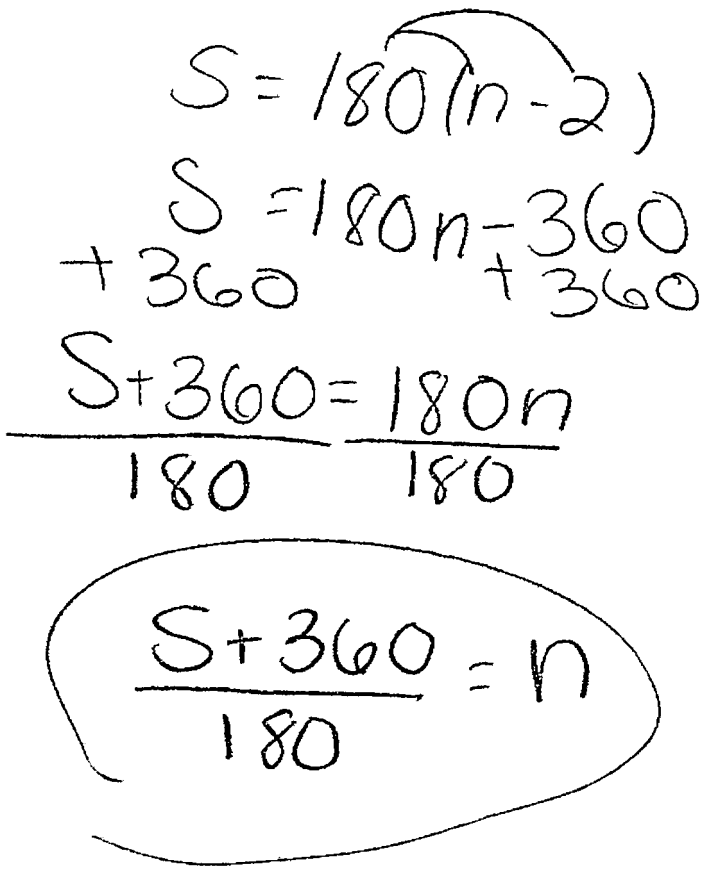


The slope of the line represents an increase of the value of snow on the ground

Score 0: The student gave a completely incorrect response.

Question 31

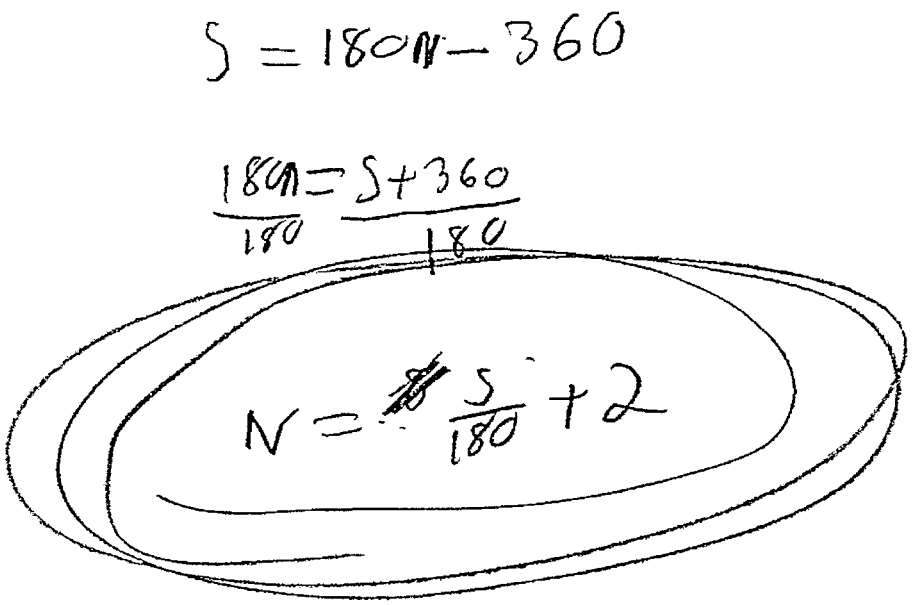
31 The formula for the sum of the degree measures of the interior angles of a polygon is $S = 180(n - 2)$. Solve for n, the number of sides of the polygon, in terms of S.



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

Question 31

31 The formula for the sum of the degree measures of the interior angles of a polygon is $S = 180(n - 2)$. Solve for n, the number of sides of the polygon, in terms of S.



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

Question 31

31 The formula for the sum of the degree measures of the interior angles of a polygon is $S = 180(n - 2)$. Solve for n, the number of sides of the polygon, in terms of S.

$S = 180(n-2)$

$\frac{S}{180} = \frac{180n - 360}{180}$

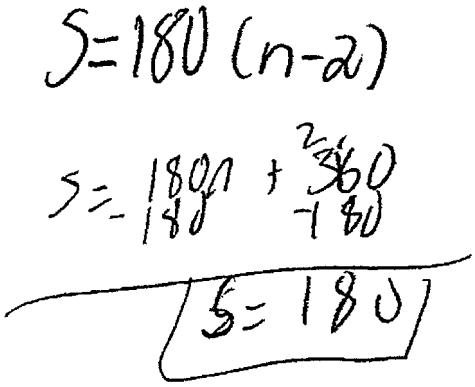
$\frac{S}{180} = n - 360$
$+360$

$\frac{S}{180} + 360 = n$

Score 1: The student did not divide 360 by 180.

Question 31

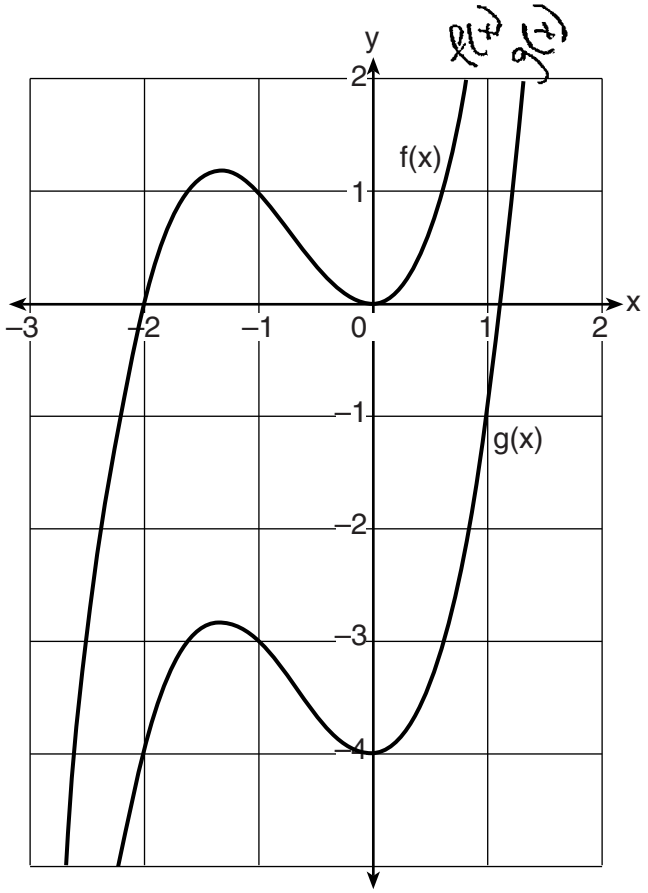
31 The formula for the sum of the degree measures of the interior angles of a polygon is $S = 180(n - 2)$. Solve for n, the number of sides of the polygon, in terms of S.



Score 0: The student gave a completely incorrect response.

Question 32

32 In the diagram below, $f(x) = x^3 + 2x^2$ is graphed. Also graphed is $g(x)$, the result of a translation of $f(x)$.



Determine an equation of $g(x)$. Explain your reasoning.

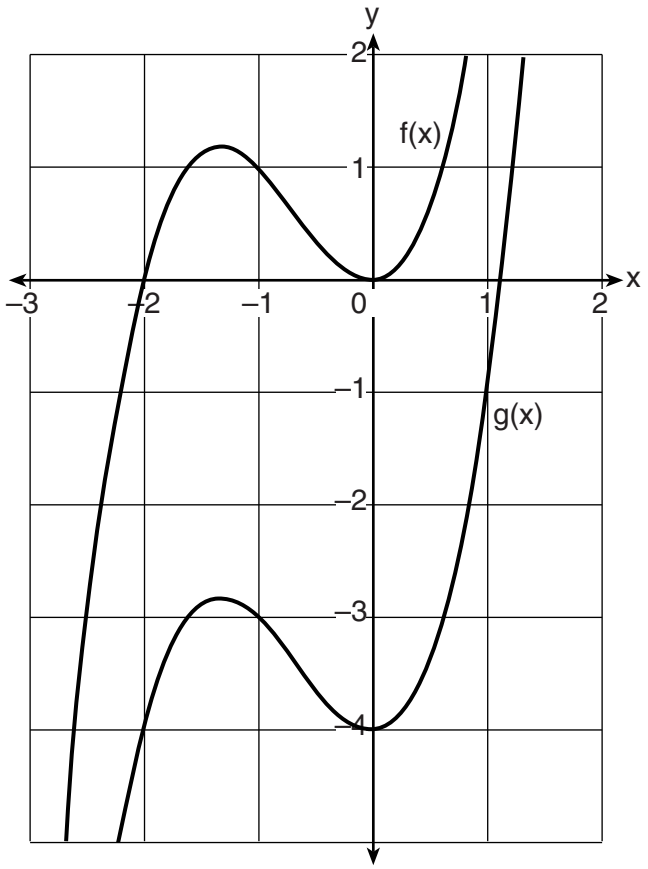
$g(x) = x^3 + 2x^2 - 4$

translated down 4 units.

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

Question 32

32 In the diagram below, $f(x) = x^3 + 2x^2$ is graphed. Also graphed is $g(x)$, the result of a translation of $f(x)$.



Determine an equation of $g(x)$. Explain your reasoning.

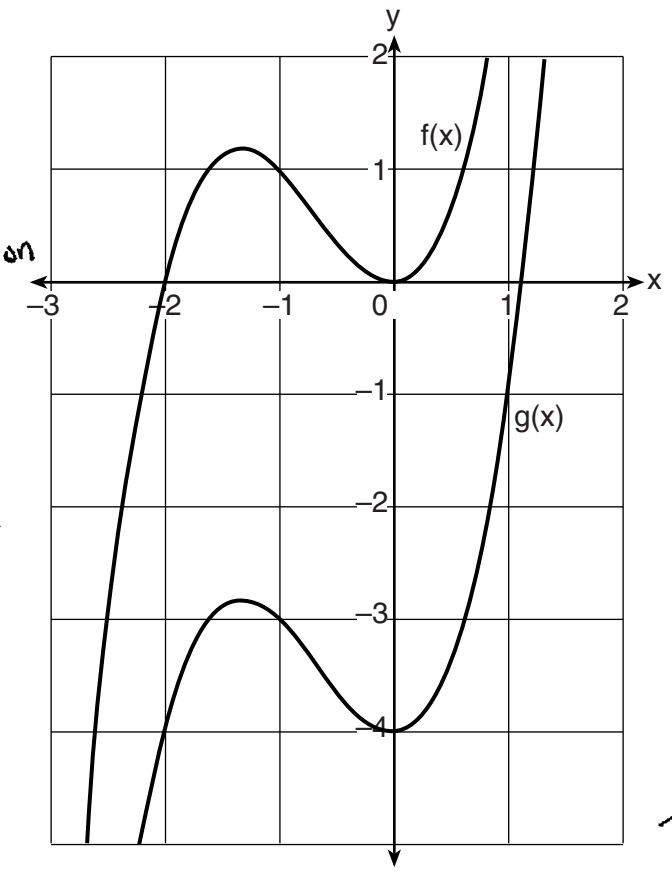
$g(x) = -4x^3 + 4x^2$

b/c it is a translation 4 down

Score 1: The student wrote a correct explanation, but the equation is incorrect.

Question 32

32 In the diagram below, $f(x) = x^3 + 2x^2$ is graphed. Also graphed is $g(x)$, the result of a translation of $f(x)$.



f(x)=x³+2x²

g(x) = translation of f(x)

x³+2x²

X	Y
0	0
−1	1
−2	0

X	Y
k	−1
−0.75	−2
−0.50	−3
−0	−4
−1	−3
−2	−4

x³+2x²

X	X
1	−1 (+3)
−1	0 (−4) (+1)
−1	−1 (−3) (+1)
−1	−2 (−4)

Determine an equation of $g(x)$. Explain your reasoning.

g(x)= x^3 −4.

The equation of g(x) is x³−4 because for f(x) it's +2x²

so x³ cause the line/way of the graph but then 2x² show the level of the line so I put −4 as my answer b/c the point for f(x) were at negative and it's far apart from f(x).

Score 0: The student gave a completely incorrect response.

Question 33

33 The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$.

How many feet did the object fall between one and two seconds after it was dropped?

After the first second, the object was 128 feet from the ground and after 2 seconds, the object was 80 feet from the ground. That means that it fell 48 feet between 1 and 2 seconds.

Determine, algebraically, how many seconds it will take for the object to reach the ground.

$0 = -16t^2 + 144$

$-144 \quad\quad +144$

$\frac{-144}{-16} = \frac{-16t^2}{-16}$

$\sqrt{9} = \sqrt{t^2}$

$3 = t$

$t = 3$

It will take 3 seconds for the object to reach the ground.

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

Question 33

33 The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$.

How many feet did the object fall between one and two seconds after it was dropped?

$H(1) = 128$

$H(2) = 80$

$128 - 80 = 48$

Determine, algebraically, how many seconds it will take for the object to reach the ground.

$16t^2 - 144 = 0$

$4(4t^2 - 36) = 0$

$4(2t + 6)(2t - 6) = 0$

~~$2t = -6$~~ $t = -3$

$2t = 6$

$t = 3$

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

Question 33

33 The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$.

How many feet did the object fall between one and two seconds after it was dropped?

$H(t) = -16t^2 + 144$

$H(1) = -16(1)^2 + 144 = 128$

$H(2) = -16(2)^2 + 144 = 80$

$128 - 80 = 48$

48 feet

Determine, algebraically, how many seconds it will take for the object to reach the ground.

$H(3) = -16(3)^2 + 144 = 0$

3 seconds

Score 3: The student did not determine 3 algebraically.

Question 33

33 The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$.

How many feet did the object fall between one and two seconds after it was dropped?

32

Determine, algebraically, how many seconds it will take for the object to reach the ground.

$0 = -16t^2 + 144$

$\sqrt{t^2} = \sqrt{9}$

$t = 3$

Score 2: The student showed appropriate algebraic work to determine 3.

Question 33

33 The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$.

How many feet did the object fall between one and two seconds after it was dropped?

$H(t) = -16t^2 + 144$
$H(t) = -16(2)^2 + 144$
$H(t) = 80$ ft

$H(t) = -16t^2 + 144$
$H(t) = -16(1)^2 + 144$
$H(t) = 128$ ft

Determine, algebraically, how many seconds it will take for the object to reach the ground.

$H(t) = -16(3)^2 + 144$
$H(t) = 0$

3 seconds

Score 2: The student did not find the difference between the two heights and did not determine 3 algebraically.

Question 33

33 The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$.

How many feet did the object fall between one and two seconds after it was dropped?

$-16(1)^2 + 144 = 128$ ft
$-16(2)^2 + 144 = 80$ ft

$128 + 80 = 208$ ft after it

Determine, algebraically, how many seconds it will take for the object to reach the ground.

$-16t^2 + 144 = 128$
$-16t^2 + 144 = 80$

$\frac{208}{-32}$

$\frac{0t^2}{0t^2} = \frac{48}{0t^2}$

48 more seconds

Score 1: The student showed appropriate work to find 128 and 80.

Question 33

33 The height, H, in feet, of an object dropped from the top of a building after t seconds is given by $H(t) = -16t^2 + 144$.

How many feet did the object fall between one and two seconds after it was dropped?

t=128 feet

Determine, algebraically, how many seconds it will take for the object to reach the ground.

The second will take the Object 28. to reach the ground

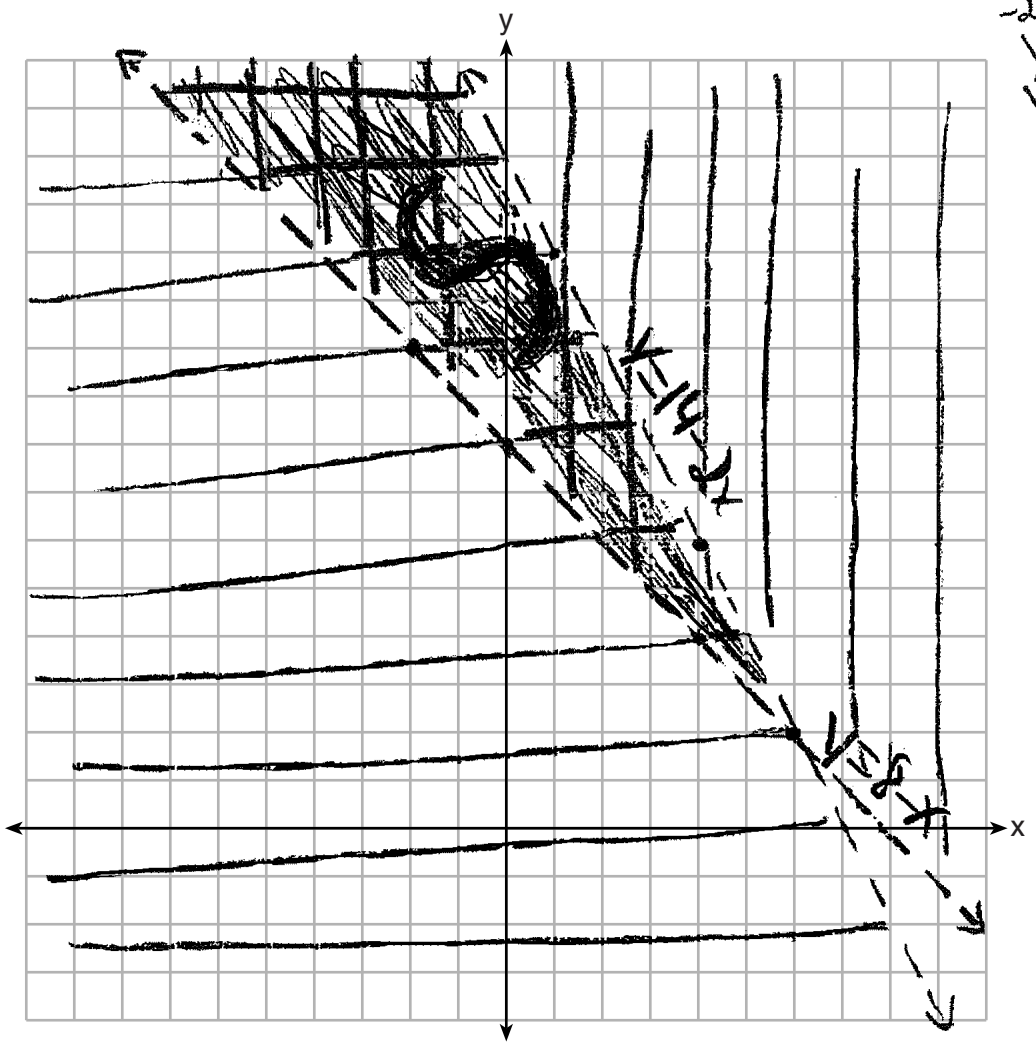
Score 0: The student gave a completely incorrect response.

Question 34

34 The sum of two numbers, x and y, is more than 8. When you double x and add it to y, the sum is less than 14.

Graph the inequalities that represent this scenario on the set of axes below.

$x+y>8$
$2x+y<14$
$-2x \quad -2x$
$y>8-x$
$y<14-2x$



Kai says that the point (6,2) is a solution to this system. Determine if he is correct and explain your reasoning.

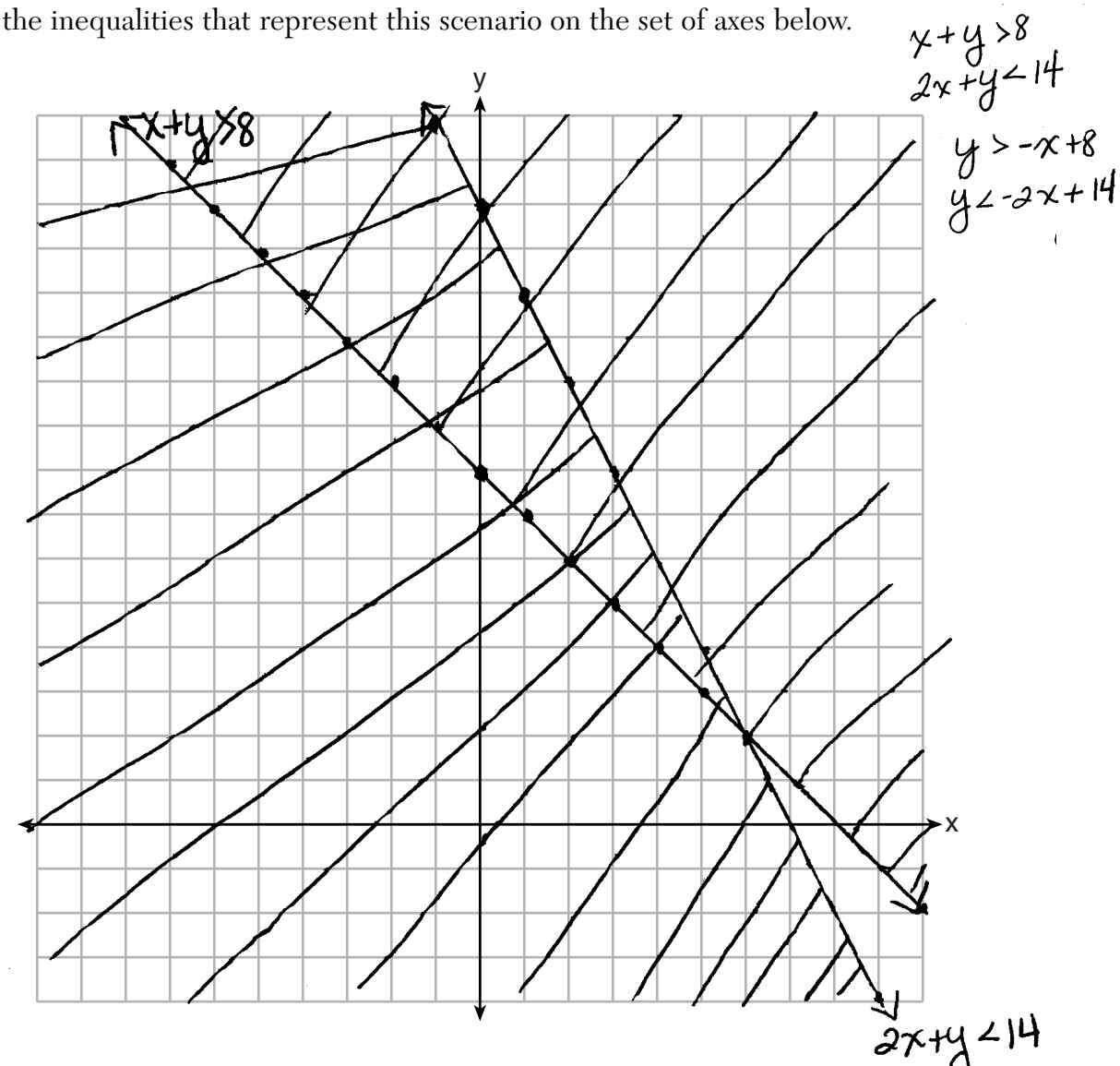
It is not because it lands where the 2 dotted lines meet and it has to be in the shaded area of both lines

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

Question 34

34 The sum of two numbers, x and y, is more than 8. When you double x and add it to y, the sum is less than 14.

Graph the inequalities that represent this scenario on the set of axes below.



Kai says that the point (6,2) is a solution to this system. Determine if he is correct and explain your reasoning.

He is correct because its where the two graphs intersect.

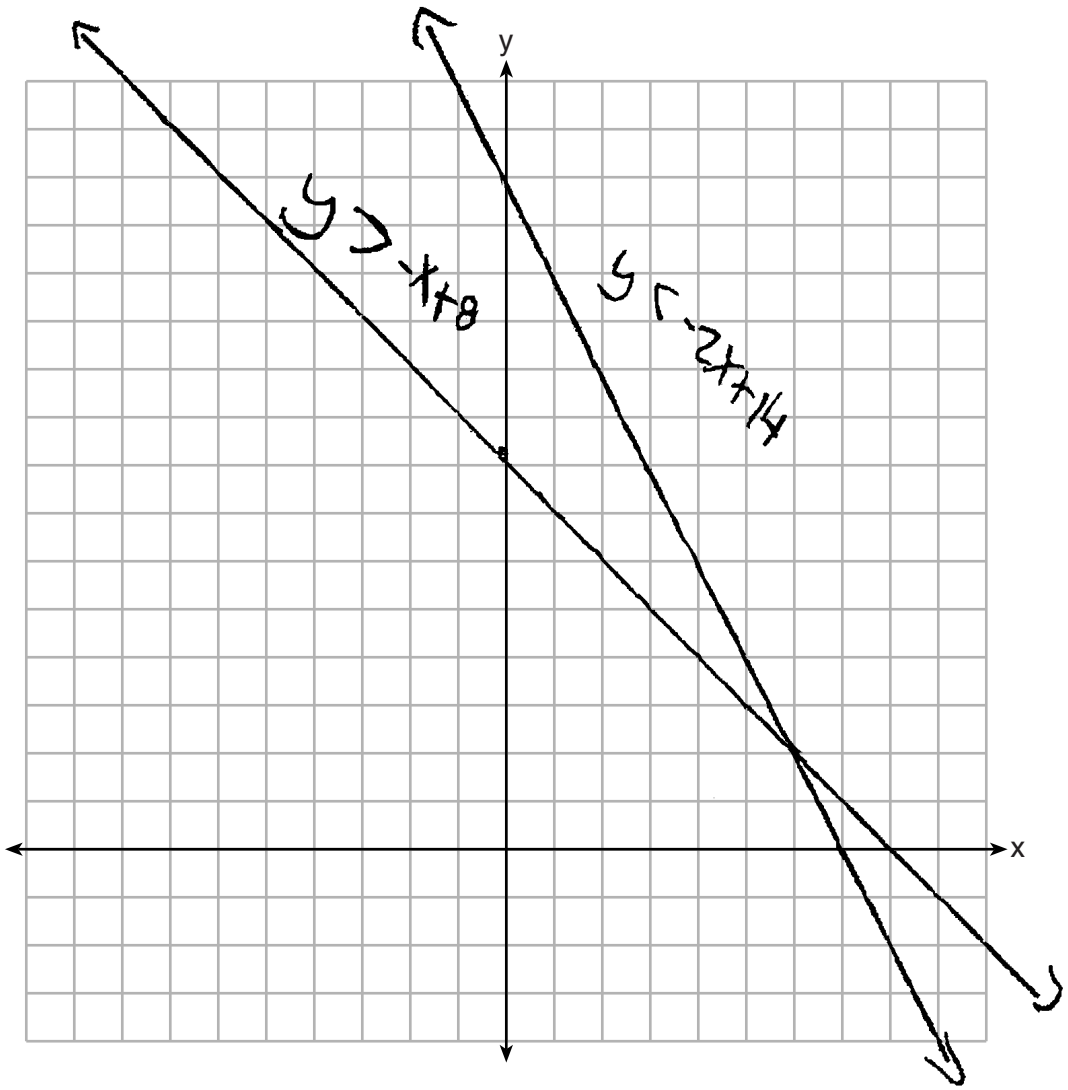
Score 3: The student made one graphing error by drawing solid lines, but wrote an appropriate explanation based on the graph.

Question 34

34 The sum of two numbers, x and y, is more than 8. When you double x and add it to y, the sum is less than 14.

$x+y>8$ $-x$ $2x+y<14$ $-2x$

Graph the inequalities that represent this scenario on the set of axes below.



Kai says that the point (6,2) is a solution to this system. Determine if he is correct and explain your reasoning.

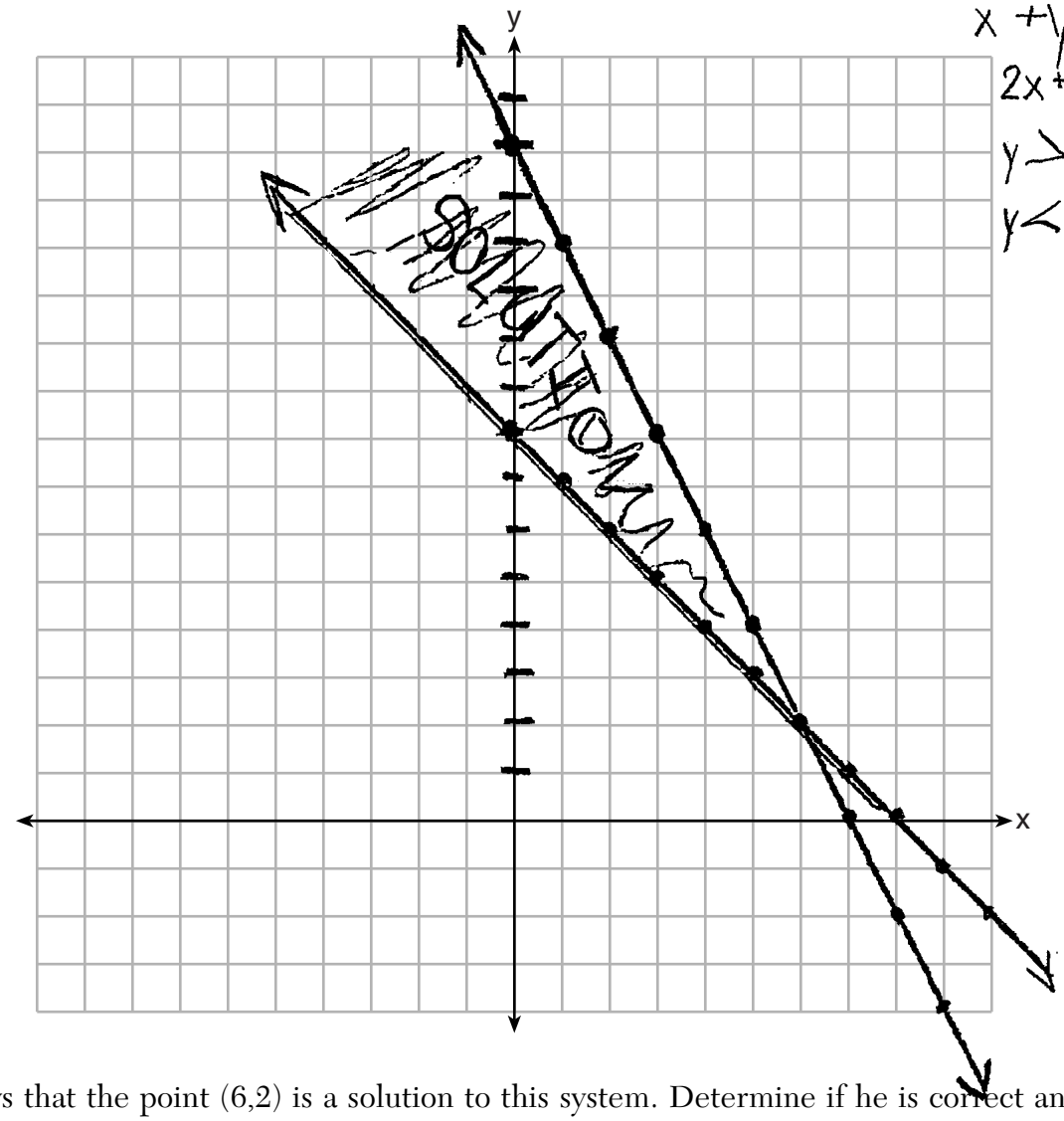
He is correct because that is the point they intersected.

Score 2: The student treated the inequalities as equations, but wrote an appropriate explanation based on the graph.

Question 34

34 The sum of two numbers, x and y, is more than 8. When you double x and add it to y, the sum is less than 14.

Graph the inequalities that represent this scenario on the set of axes below.



Kai says that the point (6,2) is a solution to this system. Determine if he is correct and explain your reasoning.

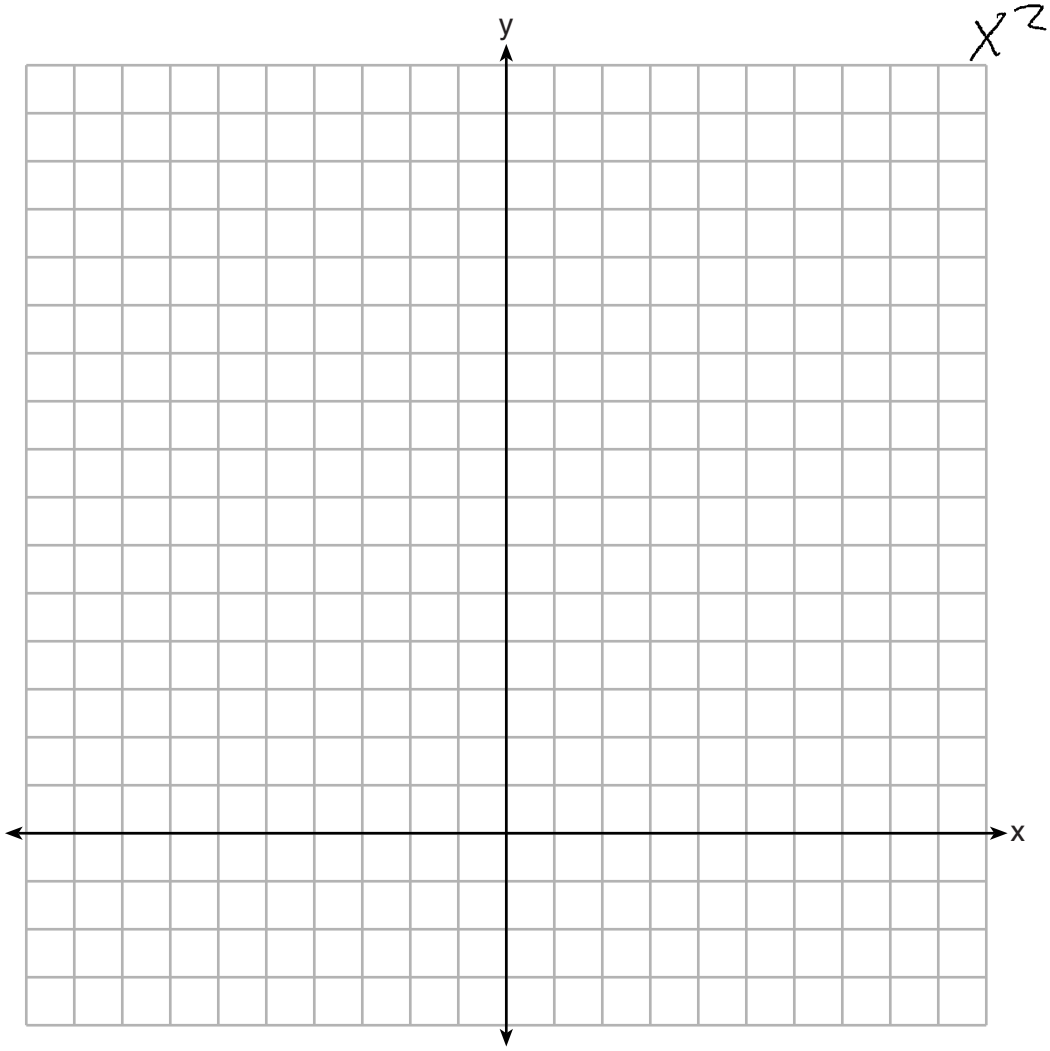
Kai is not correct because point (6, 2) is not in the solution for the graph

Score 1: The student stated both inequalities correctly. The student made multiple errors graphing the inequality and wrote an incorrect explanation based on the graph.

Question 34

34 The sum of two numbers, x and y, is more than 8. When you double x and add it to y, the sum is less than 14.

Graph the inequalities that represent this scenario on the set of axes below. $x+y>8$ $x^2+y<14$



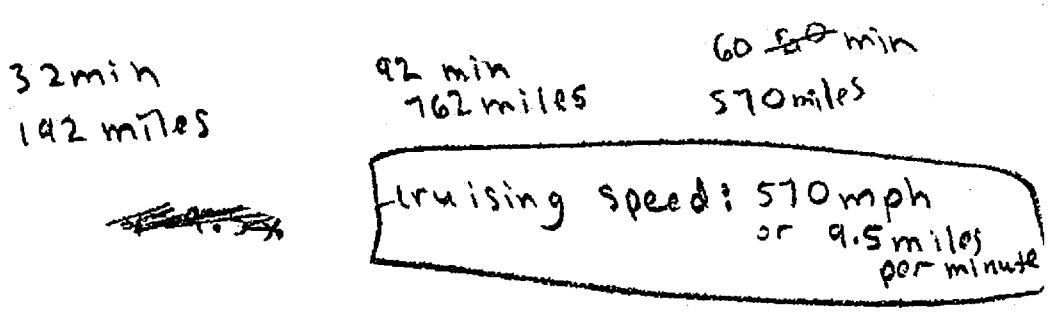
Kai says that the point (6,2) is a solution to this system. Determine if he is correct and explain your reasoning.

Score 0: The student wrote only one correct inequality.

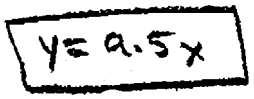
Question 35

35 An airplane leaves New York City and heads toward Los Angeles. As it climbs, the plane gradually increases its speed until it reaches cruising altitude, at which time it maintains a constant speed for several hours as long as it stays at cruising altitude. After flying for 32 minutes, the plane reaches cruising altitude and has flown 192 miles. After flying for a total of 92 minutes, the plane has flown a total of 762 miles.

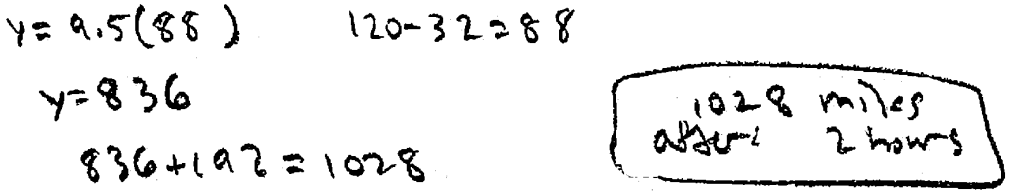
Determine the speed of the plane, at cruising altitude, in miles per minute.



Write an equation to represent the number of miles the plane has flown, y, during x minutes at cruising altitude, only.



Assuming that the plane maintains its speed at cruising altitude, determine the total number of miles the plane has flown 2 hours into the flight.



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

Question 35

35 An airplane leaves New York City and heads toward Los Angeles. As it climbs, the plane gradually increases its speed until it reaches cruising altitude, at which time it maintains a constant speed for several hours as long as it stays at cruising altitude. After flying for 32 minutes, the plane reaches cruising altitude and has flown 192 miles. After flying for a total of 92 minutes, the plane has flown a total of 762 miles.

Determine the speed of the plane, at cruising altitude, in miles per minute.

92 − 32 = 60 min 762 − 192 = 570 miles 9.5 miles per min

Write an equation to represent the number of miles the plane has flown, y, during x minutes at cruising altitude, only.

$y = 9.5x$

Assuming that the plane maintains its speed at cruising altitude, determine the total number of miles the plane has flown 2 hours into the flight.

2 hr = 120 mins − 32 = 88 mins at cruising altitude

$y = 9.5(88)$
$y = 836$

Score 3: The student did not add 192 miles to the 836 miles.

Question 35

35 An airplane leaves New York City and heads toward Los Angeles. As it climbs, the plane gradually increases its speed until it reaches cruising altitude, at which time it maintains a constant speed for several hours as long as it stays at cruising altitude. After flying for 32 minutes, the plane reaches cruising altitude and has flown 192 miles. After flying for a total of 92 minutes, the plane has flown a total of 762 miles.

Determine the speed of the plane, at cruising altitude, in miles per minute.

Let y= number of miles
x= min at cruising speed

32 - 192
60 - 570
92 - 762

$$60\overline{)570} = 9.5$$

9.5

Write an equation to represent the number of miles the plane has flown, y, during x minutes at cruising altitude, only.

$y = x$
$762 =$

Assuming that the plane maintains its speed at cruising altitude, determine the total number of miles the plane has flown 2 hours into the flight.

~~2 hours = 1140~~

836 + 192 = 1028 miles

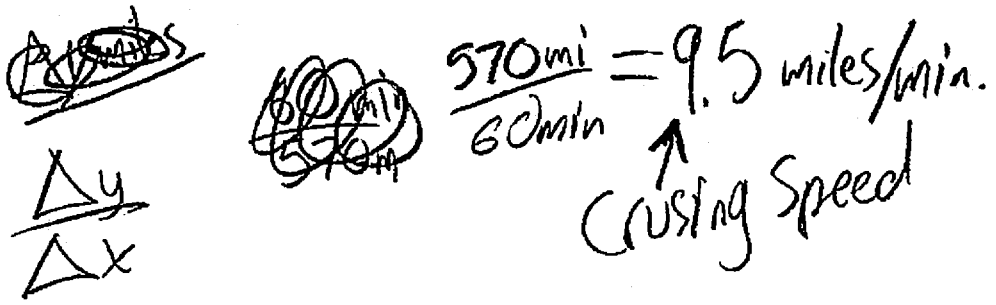
↑ cruise ↑ 32 min

Score 2: The student showed correct work to determine 9.5, but did not write a correct equation or show sufficient work to find 1028.

Question 35

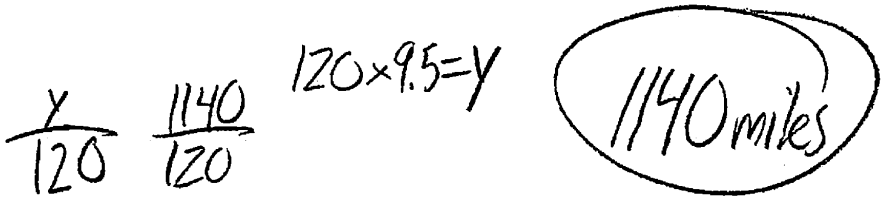
35 An airplane leaves New York City and heads toward Los Angeles. As it climbs, the plane gradually increases its speed until it reaches cruising altitude, at which time it maintains a constant speed for several hours as long as it stays at cruising altitude. After flying for 32 minutes, the plane reaches cruising altitude and has flown 192 miles. After flying for a total of 92 minutes, the plane has flown a total of 762 miles.

Determine the speed of the plane, at cruising altitude, in miles per minute.



Write an equation to represent the number of miles the plane has flown, y, during x minutes at cruising altitude, only.

Assuming that the plane maintains its speed at cruising altitude, determine the total number of miles the plane has flown 2 hours into the flight.



Score 1: The student showed correct work to find 9.5.

Question 35

35 An airplane leaves New York City and heads toward Los Angeles. As it climbs, the plane gradually increases its speed until it reaches cruising altitude, at which time it maintains a constant speed for several hours as long as it stays at cruising altitude. After flying for 32 minutes, the plane reaches cruising altitude and has flown 192 miles. After flying for a total of 92 minutes, the plane has flown a total of 762 miles.

Determine the speed of the plane, at cruising altitude, in miles per minute.

Write an equation to represent the number of miles the plane has flown, y, during x minutes at cruising altitude, only.

$y = mx + b$

$y = 9.5x + 0$

$y = ax^2 + bx + c$

Assuming that the plane maintains its speed at cruising altitude, determine the total number of miles the plane has flown 2 hours into the flight.

1,140 miles

Score 0: The student wrote a correct equation, but did not show any work.

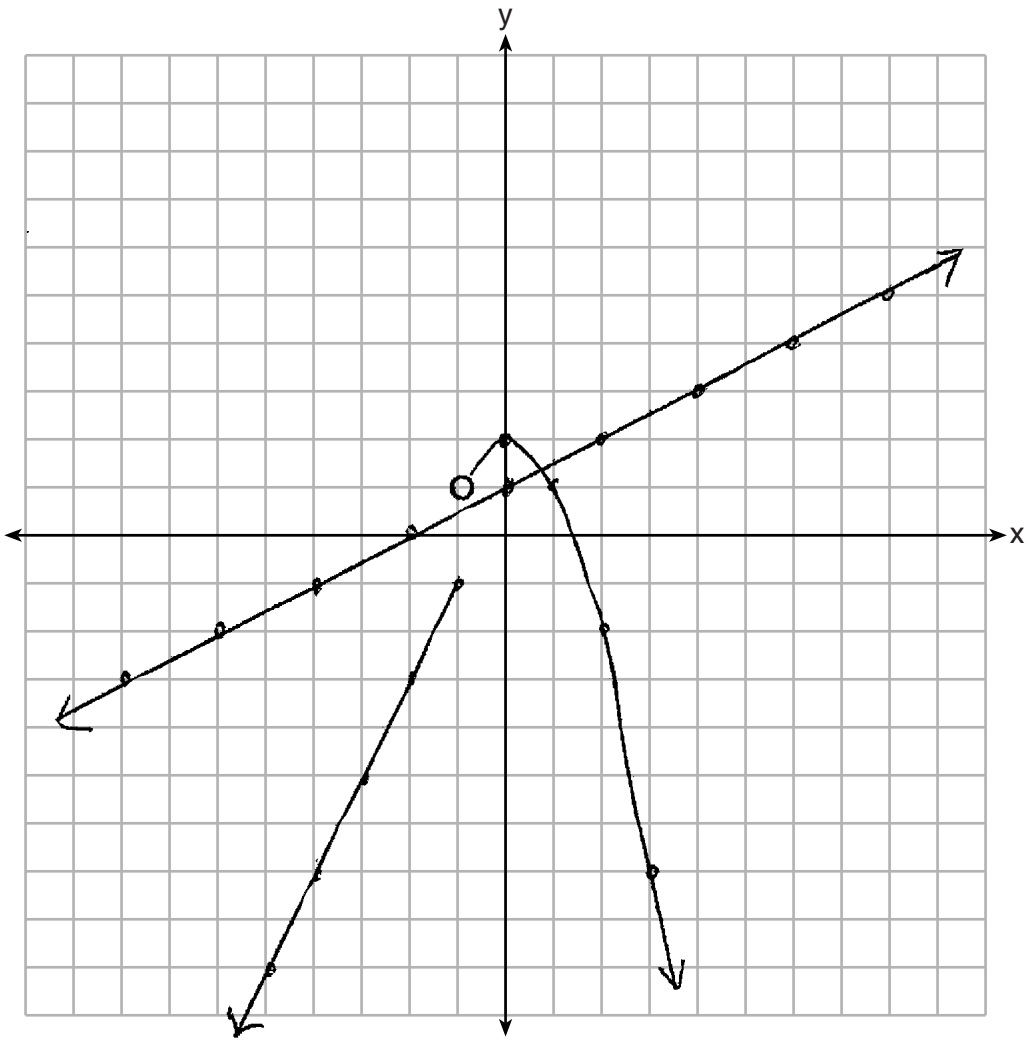
Question 36

36 On the set of axes below, graph

$$g(x) = \frac{1}{2}x + 1$$

and

$$f(x) = \begin{cases} 2x + 1, & x \leq -1 \\ 2 - x^2, & x > -1 \end{cases}$$



How many values of x satisfy the equation $f(x) = g(x)$? Explain your answer, using evidence from your graphs.

1 valve because the functions intersect on the graph one time

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

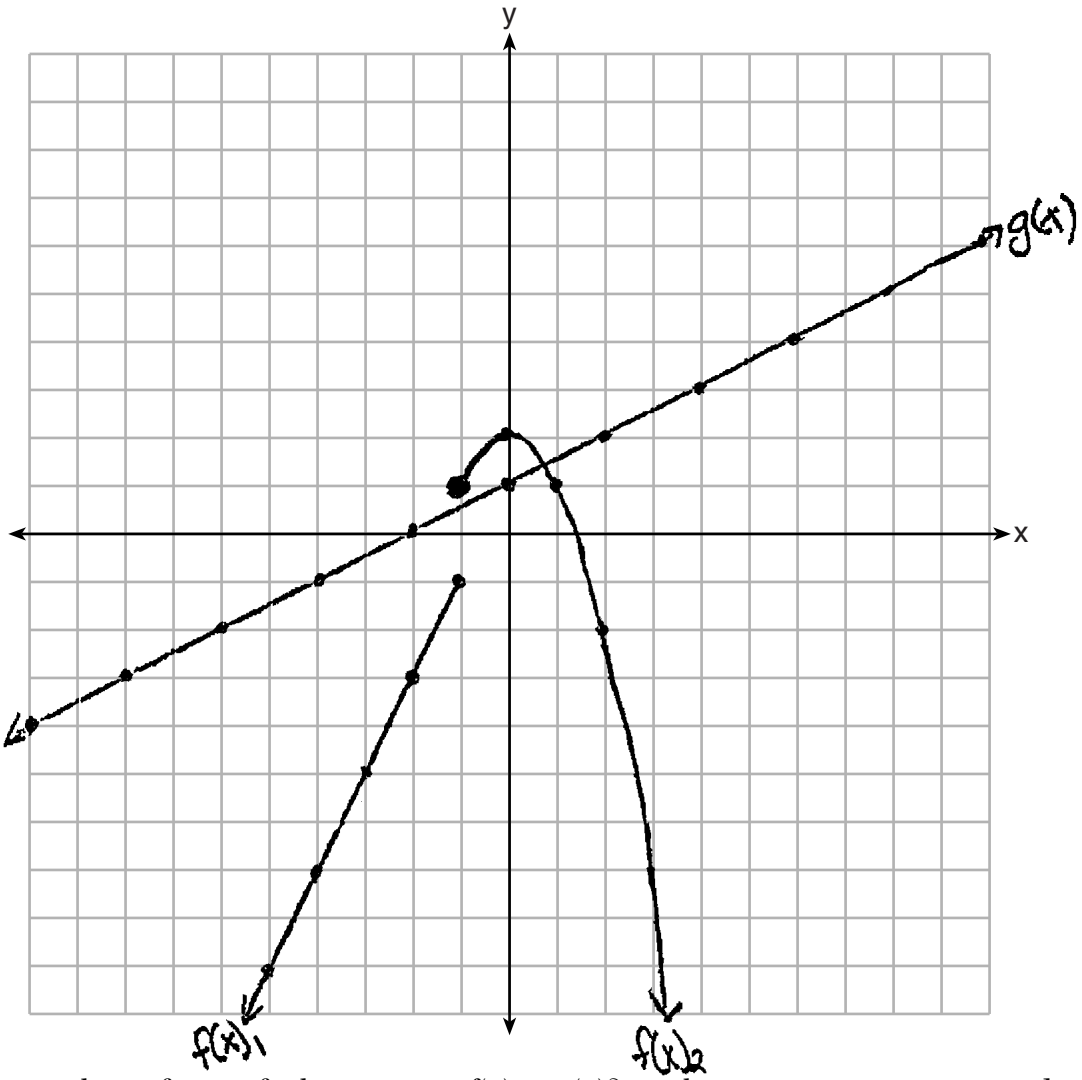
Question 36

36 On the set of axes below, graph

$$g(x) = \frac{1}{2}x + 1$$

and

$$f(x) = \begin{cases} 2x + 1, & x \leq -1 \\ 2 - x^2, & x > -1 \end{cases}$$



How many values of x satisfy the equation $f(x) = g(x)$? Explain your answer, using evidence from your graphs.

Only one value of x satisfies the equation f(x)=g(x) because there is only one place where 2 lines intercept.

Score 3: The student made a graphing error by putting a solid dot at $(-1,1)$.

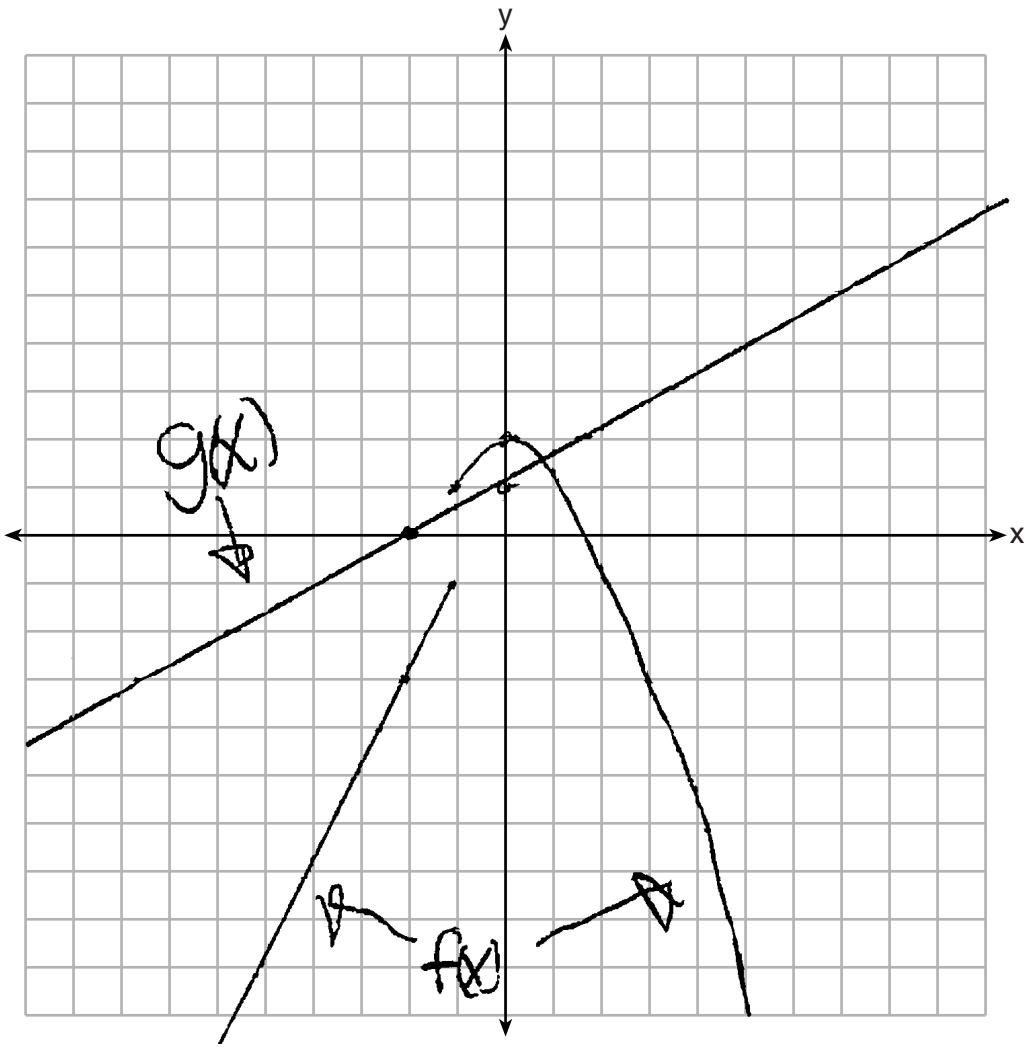
Question 36

36 On the set of axes below, graph

$$g(x) = \frac{1}{2}x + 1$$

and

$$f(x) = \begin{cases} 2x + 1, & x \leq -1 \\ 2 - x^2, & x > -1 \end{cases}$$



How many values of x satisfy the equation $f(x) = g(x)$? Explain your answer, using evidence from your graphs.

one only at (0.781, 1.39)

Score 2: The student graphed two linear equations correctly and stated 1, but did not write an explanation.

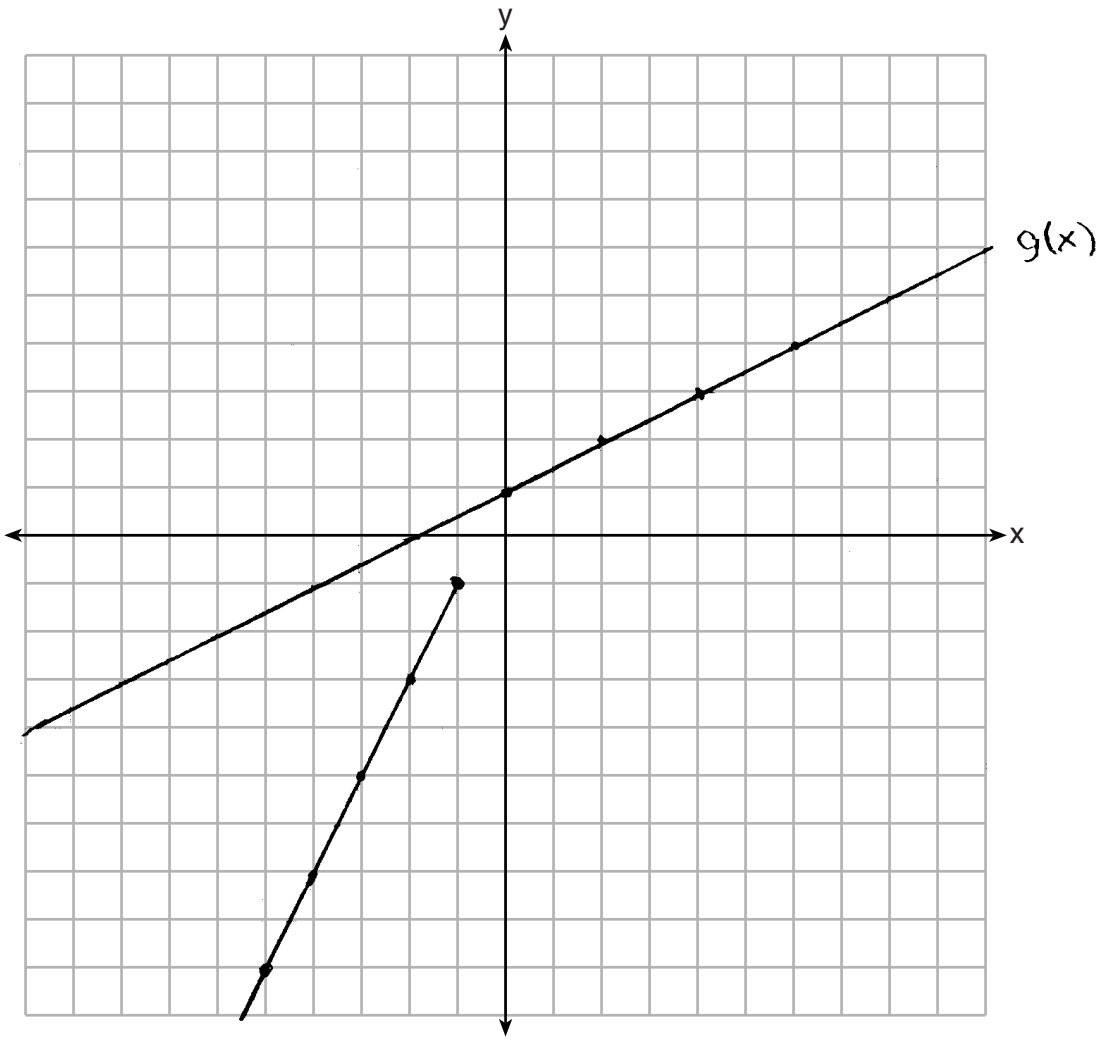
Question 36

36 On the set of axes below, graph

$$g(x) = \frac{1}{2}x + 1$$

and

$$f(x) = \begin{cases} 2x + 1, & x \leq -1 \\ 2 - x^2, & x > -1 \end{cases}$$



How many values of x satisfy the equation $f(x) = g(x)$? Explain your answer, using evidence from your graphs.

Score 1: The student graphed the two linear equations correctly.

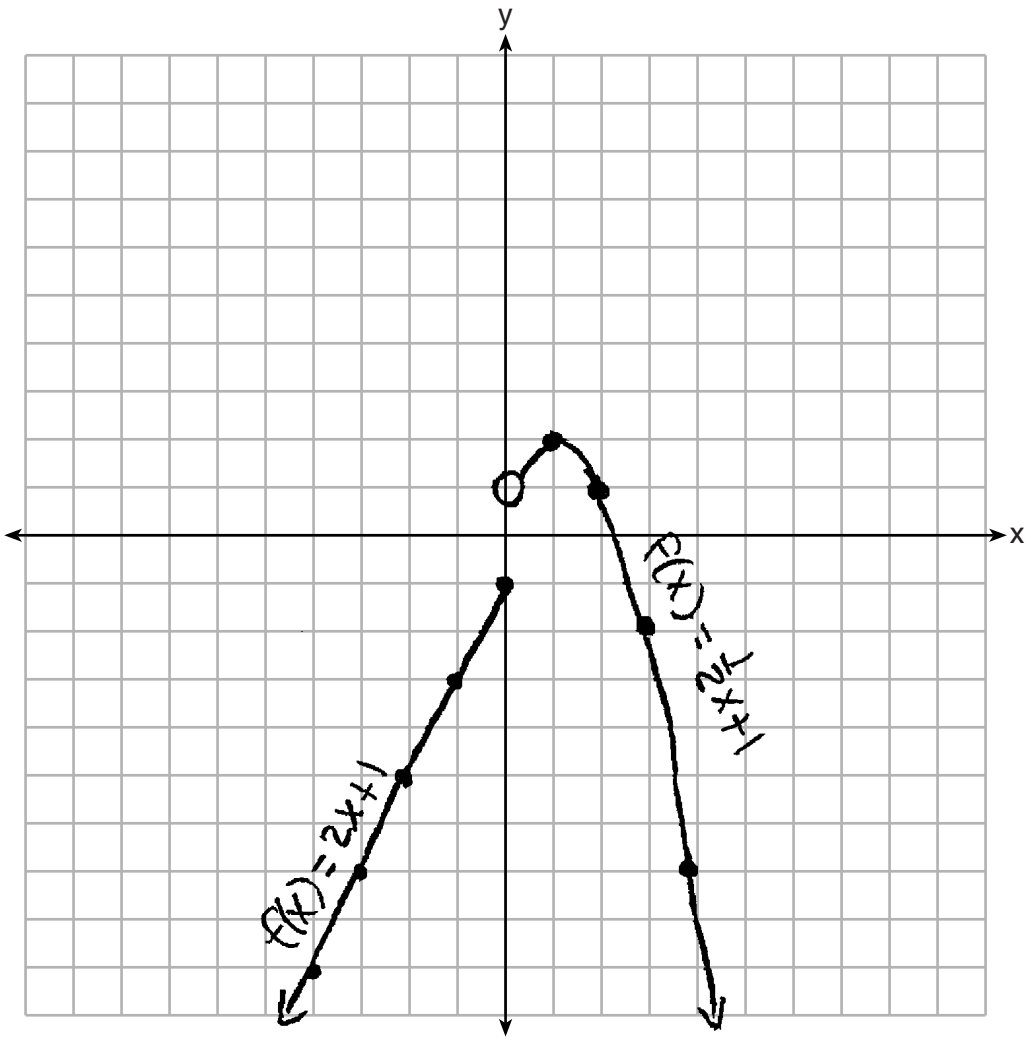
Question 36

36 On the set of axes below, graph

$$g(x) = \frac{1}{2}x + 1$$

and

$$f(x) = \begin{cases} 2x + 1, & x \leq -1 \\ 2 - x^2, & x > -1 \end{cases}$$



How many values of x satisfy the equation $f(x) = g(x)$? Explain your answer, using evidence from your graphs.

-1 because

Score 0: The student graphed $f(x)$ incorrectly.

Question 37

37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

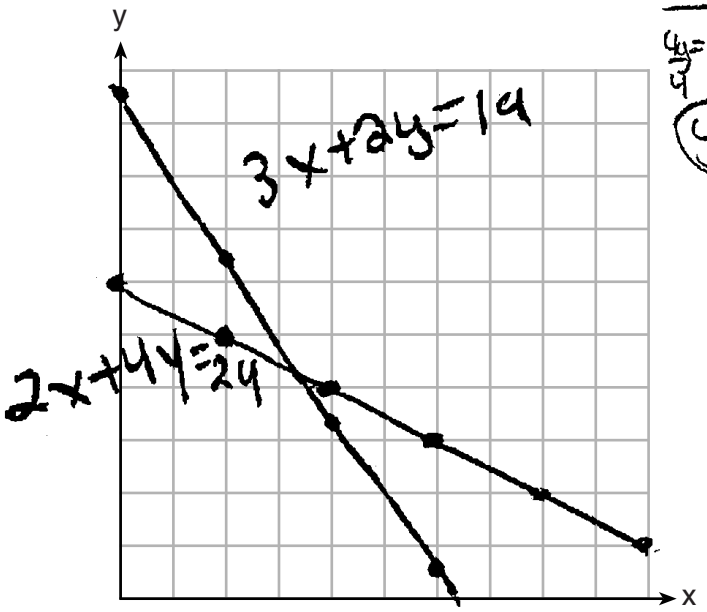
Write a system of equations that describes the given situation.

$3x+2y=19$
$2x+4y=24$

$3x+2y=19$
$-3x \quad -3x$
$2y=-3x+19$
$\frac{2y}{2}=\frac{-3x}{2}+\frac{19}{2}$
$y=-\frac{3}{2}x+9.5$

$2x+4y=24$
$-2x \quad -2x$
$4y=-2x+24$
$\frac{4y}{4}=\frac{-2x}{4}+\frac{24}{4}$
$y=-\frac{1}{2}x+6$

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

3.50 - cupcakes
4.25 - brownies

Set them equal to eachother:

$-\frac{1}{2}x+6=-\frac{3}{2}x+9.5$
$-6 \qquad\qquad -6$
$-\frac{1}{2}x=-\frac{3}{2}x+3.5$
$+\frac{3}{2x} \qquad +\frac{3}{2x}$
$1x=3.50$

Substitute for x:
$-\frac{1}{2}(3.5)+6$
4.25

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

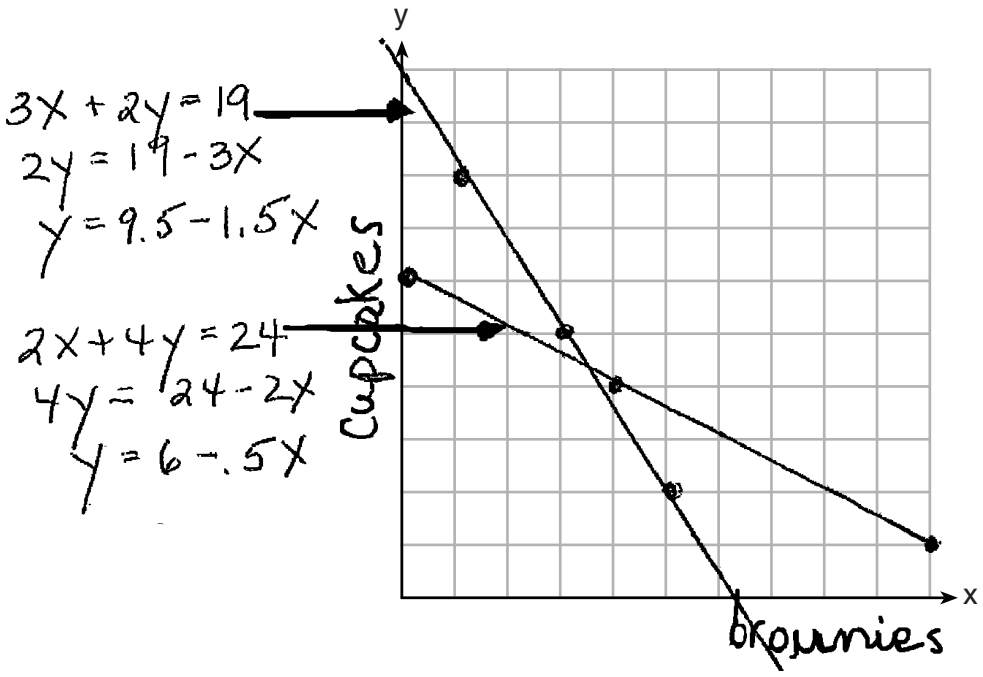
Question 37

37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

$3x + 2y = 19$
$2x + 4y = 24$

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



$3x + 2y = 19$
$2y = 19 - 3x$
$y = 9.5 - 1.5x$

$2x + 4y = 24$
$4y = 24 - 2x$
$y = 6 - .5x$

Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

$y_1 = 9.5 - 1.5x$
$y_2 = 6 - .5x$
2nd calc intersect (3.5, 4.25)

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

Question 37

37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

$2y+3x=19$
$-3x \quad -3x$

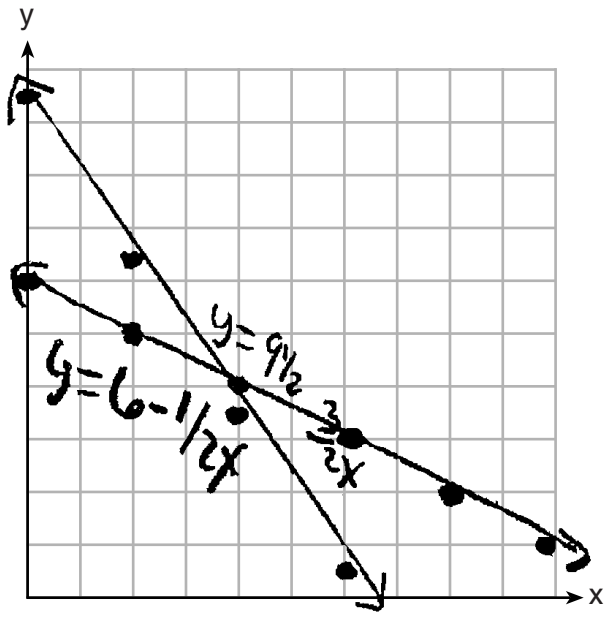
$-2(3x+2y=19)$ → $-6x-4y=-38$
$2x+4y=24$
$4x=-14$
$\frac{4x}{4}=\frac{-14}{4}$ $x=3.50$

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

$\frac{2y}{2}=\frac{19}{2}-\frac{3x}{2}$

$y=9.5-\frac{3}{2}x$

$2x+4y=24$
$-2x \quad -2x$
$4y=24-2x$
$\frac{4y}{4}=\frac{24}{4}-\frac{2x}{4}$
$y=6-1/2x$



$7+4y=24$
$-7 \quad -7$
$4y=17$
$\frac{4y}{4}=\frac{17}{4}$
$y=4.25$

Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

$x=3.50$
$y=4.25$

$3(3.50)+2(4.25)=19$ ✓
$2(3.50)+4(4.25)=24$ ✓

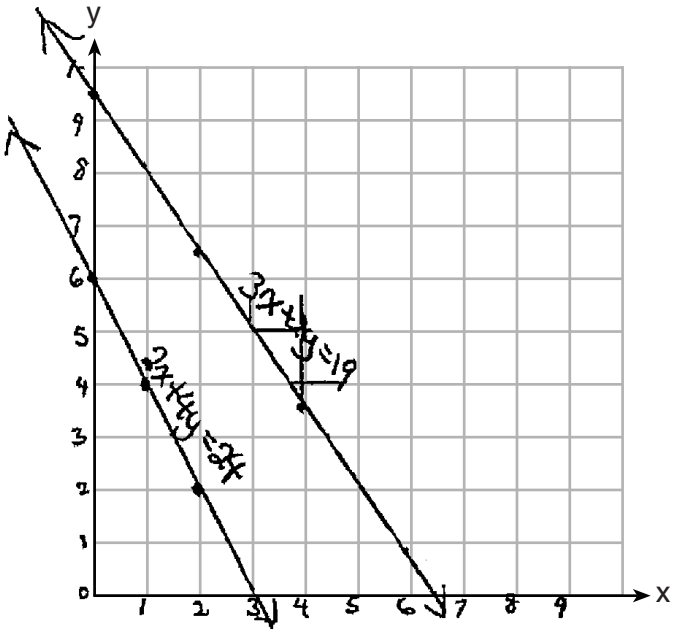
Score 5: The student did not draw the line through the plotted points for $y = 9\frac{1}{2} - \frac{3}{2}x$.

Question 37

37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

Let x = cupcakes = 3.5
y = brownies = 4.25

$2(3x+2y=19)$
$-\ 2x+4y=24$
$\frac{4x}{4} = \frac{14}{4}$
$x = 3.5$

$3(3.5)+2y=19$
$10.5+2y=19$
$2y=8.5$
$y=4.25$

Score 5: The student made an error when graphing $2x + 4y = 24$.

Question 37

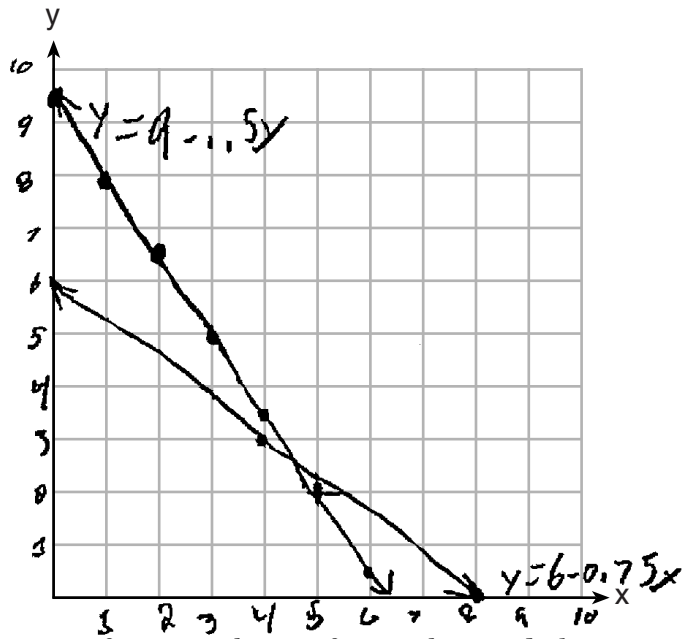
37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

$3x+2y=19 \longrightarrow y=9.5-1.5x$

$3x+4y=24 \longrightarrow y=6-0.75x$

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

$3x+4y=24$
$3x+2y=19$
$2y=5$
$y=2.5$

$3x+4(2.5)=24$
$3x+10=24$
$3x=14$
$x=4.67$

Cupcakes costs \$4.67
Brownies costs \$2.50

Score 5: The student wrote one incorrect equation, but graphed and solved the system of equations appropriately.

Question 37

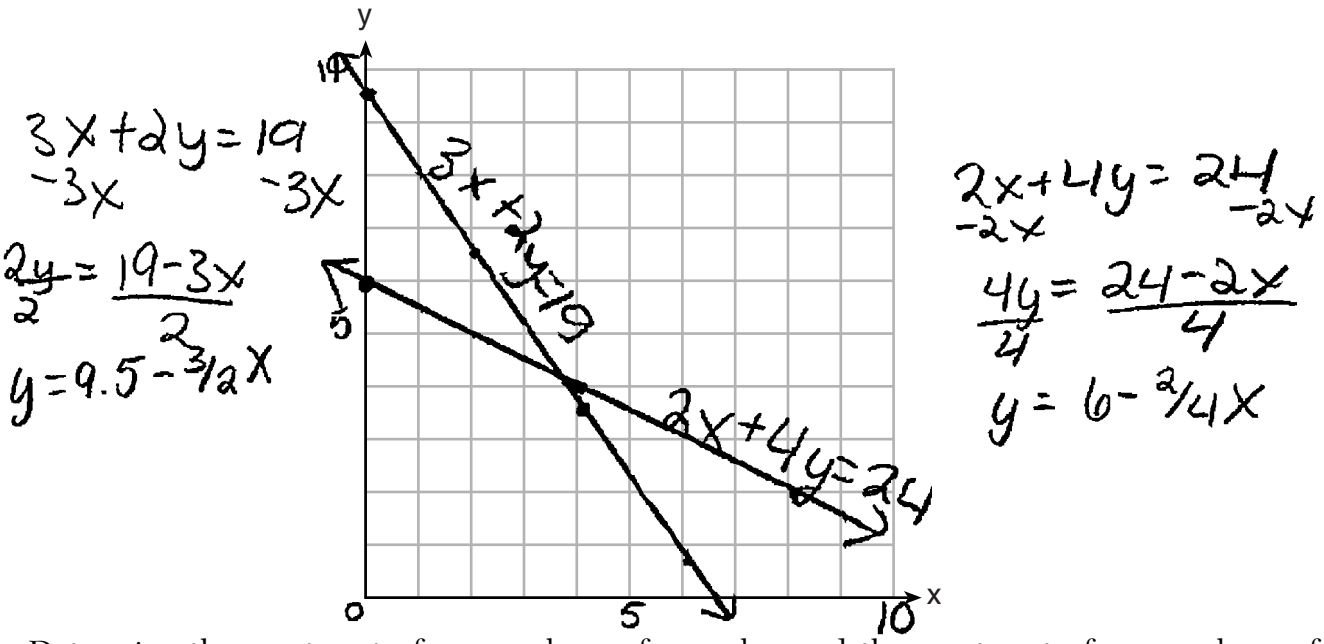
37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

$3x + 2y = 19$

$2x + 4y = 24$

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

trial and error

3, 5

$3x + 2y = 19$

$2x + 4y = 24$

3 5 15 7 14

I don't know what else to do

15 4

$3(5) + 2(2) = 19$

10 8

$2(5) + 4(2) = 18$

5 cupcakes = \$5

10 brownies = \$3.5

Score 4: The student wrote and graphed a correct system of equations.

Question 37

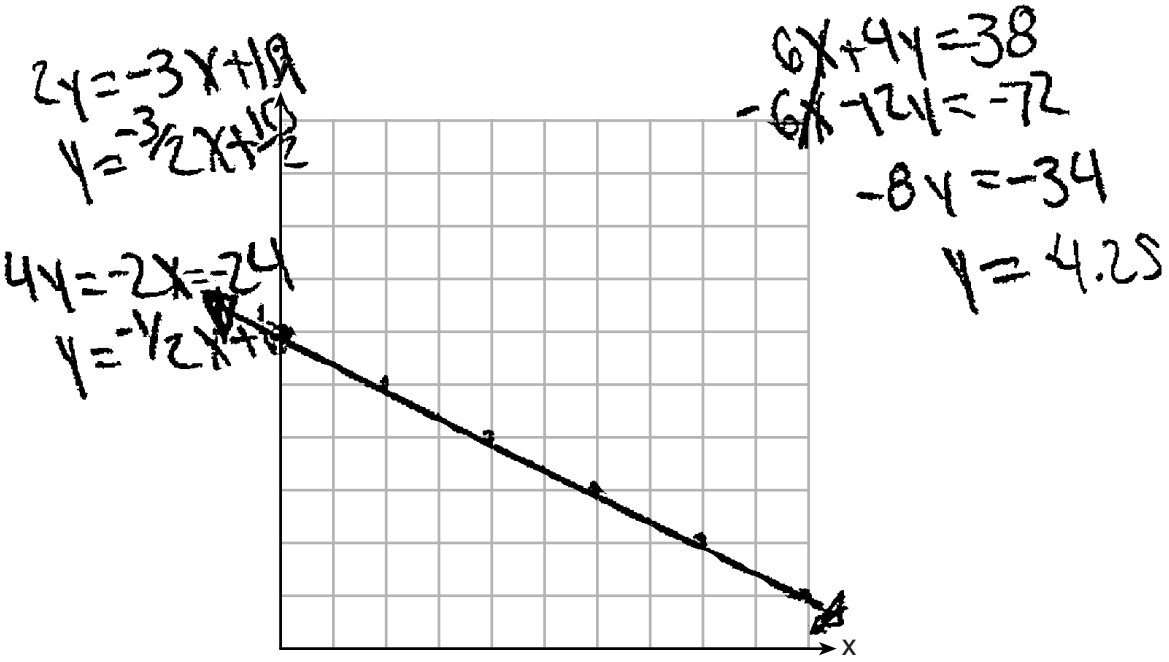
37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

$3x+2y=19$
$2x+4y=24$

$2(3x+2y=19)$
$-3(2x+4y=24)$

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

add equations

Score 4: The student wrote a correct system of equations. One equation was graphed correctly and one cost was determined.

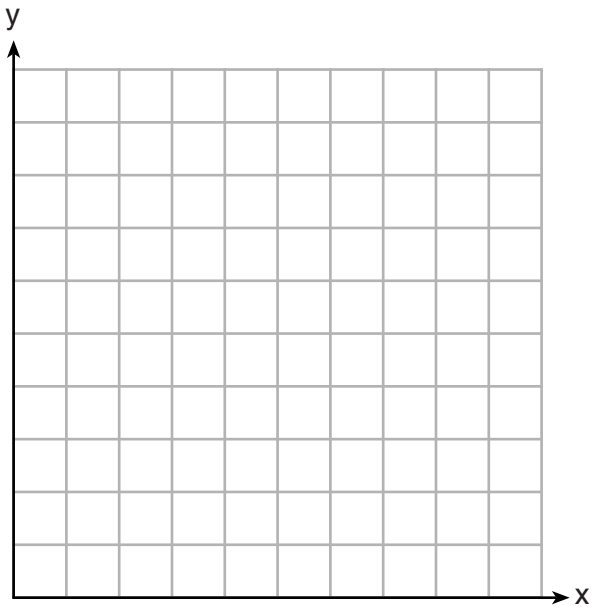
Question 37

37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

$3c+2n=19$
$2c+4n=24$

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

$2(3c+2b=19) \rightarrow 6c+4b=38$
$3(2c+4b=24) \rightarrow -(6c+12b=72)$
$\frac{-8n}{-8}=\frac{-34}{-8}$
$b=4.25$

$3c+2b=19$
$3c+2(4.25)=19$
$3c+8.50=19$
$-8.50 \quad -8.50$
$3c=10.5$
$c=3.5$

Score 3: The student wrote and solved an appropriate system of equations, but did not use x and y.

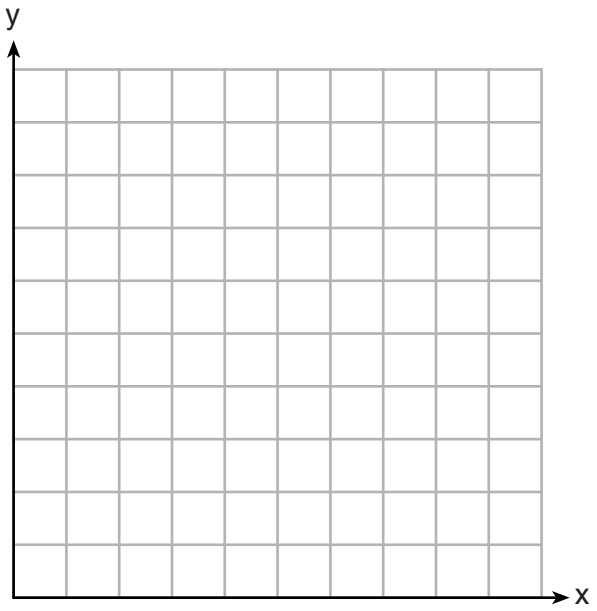
Question 37

37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

$3x + 2y = 19$
$2x + 4y = 24$

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

$2(3x + 2y = 19)$
$2x + 4y = 24$
$-\ 6x + 4y = 38$
$-\ 2x + 4y = 24$

$\frac{4x}{4} = \frac{14}{4}$
$= \$3.50$

Score 3: The student wrote a correct system of equations and determined one cost correctly.

Question 37

37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

Franco → \$19 = 3x + 2y

Caryl → \$24 = 2x + 4y

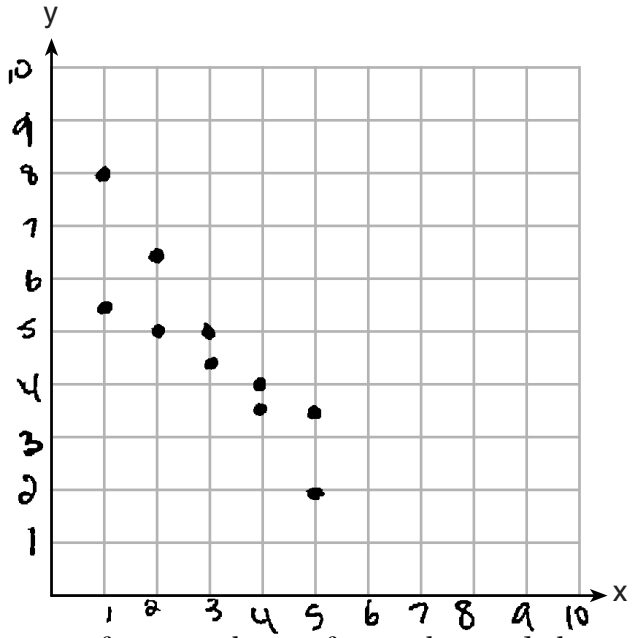
$2y = -3x + 19$

$4y = -2x + 24$

$y = -\frac{3}{2}x + 9.5$

$y = -\frac{1}{2}x + 6$

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

$2(19 = 3x + 2y) \rightarrow 38 = 6x + 4y$

$3(24 = 2x + 4y) \rightarrow 72 = 6x + 8y$

$72 = 6x + 8y$

$-38 = 6x + 4y$

$\frac{34}{4} = \frac{4y}{4}$

\$8.50 = y

$24 = 2x + 4(8.5)$

$24 = 2x + 34$

$-34 \quad -34$

$\frac{-10}{2} = \frac{2x}{2}$

$-5 = x$

Score 2: The student wrote a correct system of equations.

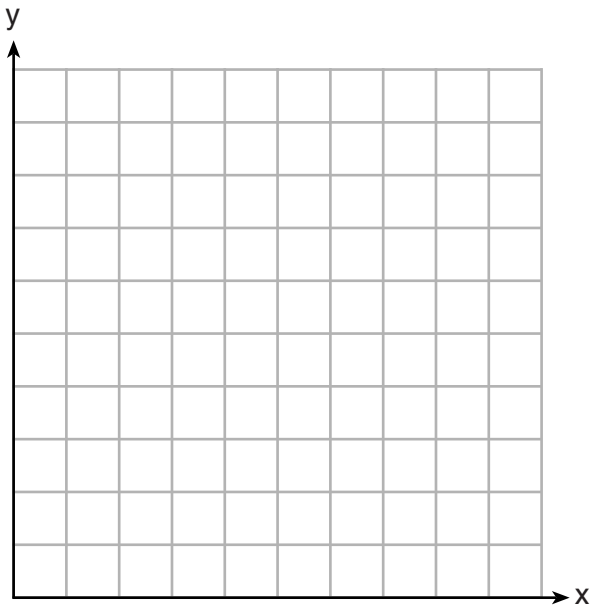
Question 37

37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

$3x+2y=19$

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

$3x+2y=19$

Score 1: The student wrote one correct equation.

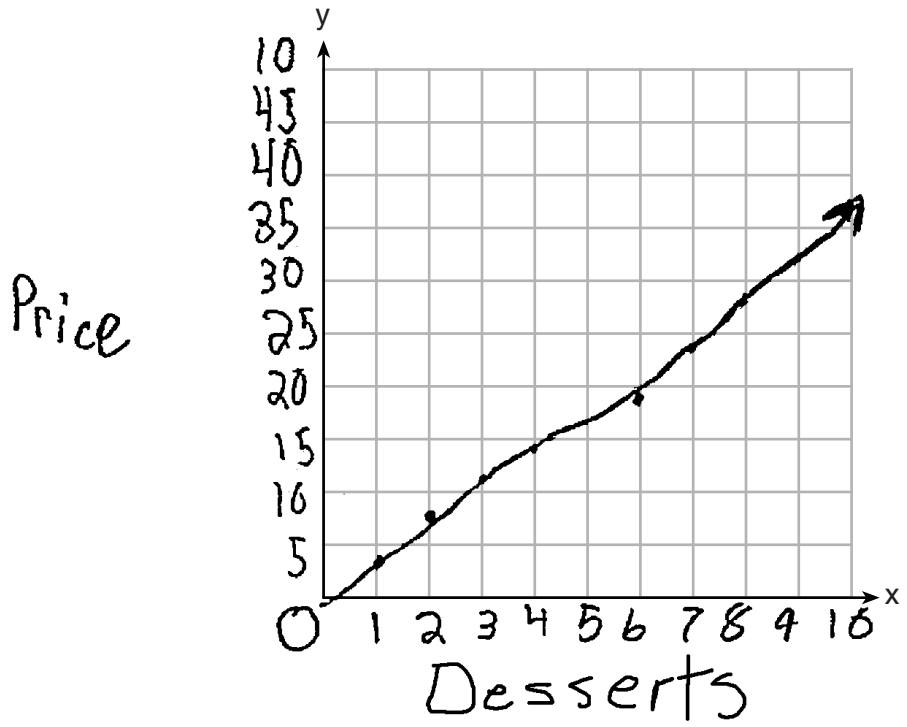
Question 37

37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

$5(c)+6(b)$

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

$24 = 2(c)+4(b)$

Cupcakes = \$3.50

Brownies = \$4.93

Score 0: The student wrote one equation, but not in terms of x and y, and did not show work to find the cost of the cupcakes.

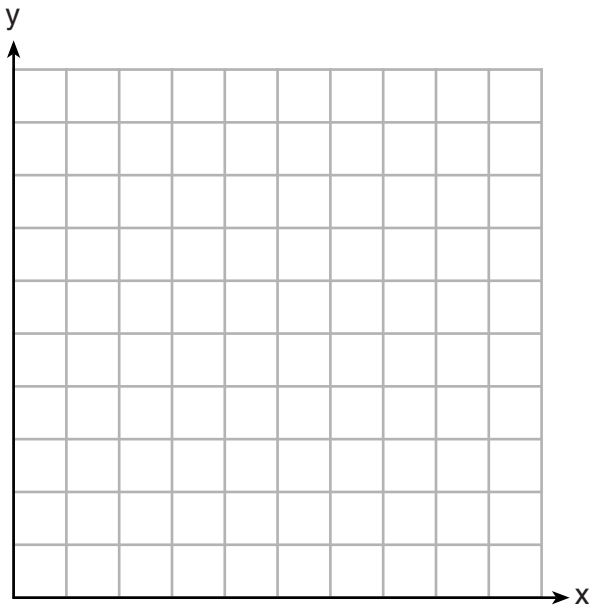
Question 37

37 Franco and Caryl went to a bakery to buy desserts. Franco bought 3 packages of cupcakes and 2 packages of brownies for \$19. Caryl bought 2 packages of cupcakes and 4 packages of brownies for \$24. Let x equal the price of one package of cupcakes and y equal the price of one package of brownies.

Write a system of equations that describes the given situation.

$3c + 2b = 19$

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



Determine the exact cost of one package of cupcakes and the exact cost of one package of brownies in dollars and cents. Justify your solution.

Score 0: The student wrote one equation, but not in terms of x and y.