The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

Wednesday, August 13, 2014 — 8:30 a.m.

MODEL RESPONSE SET

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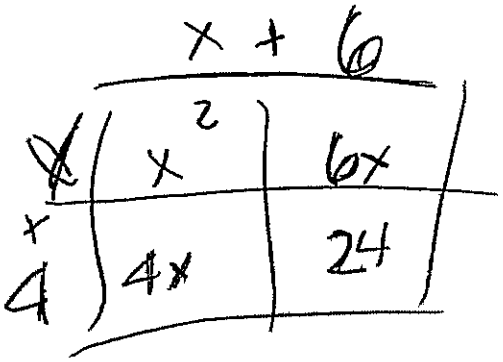
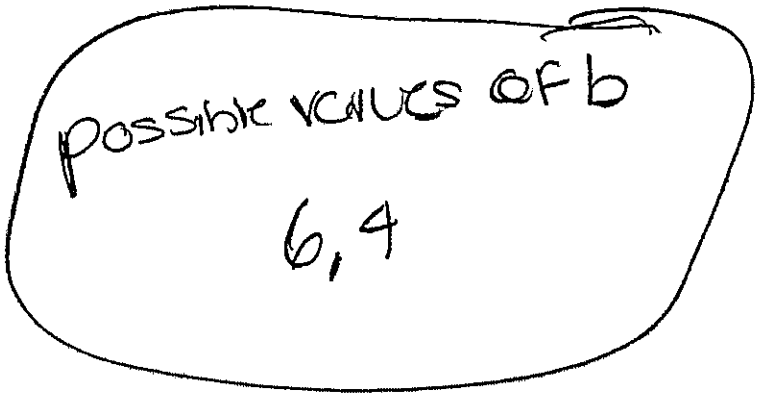
Question 25

25 In the equation $x^2 + 10x + 24 = (x + a)(x + b)$, b is an integer. Find algebraically *all* possible values of b.





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

Question 25

25 In the equation $x^2 + 10x + 24 = (x + a)(x + b)$, b is an integer. Find algebraically *all* possible values of b.

$x^2+10x+24=x^2+bx+ax+ab$

$(x+6)(x+4)=(x+a)(x+b)$

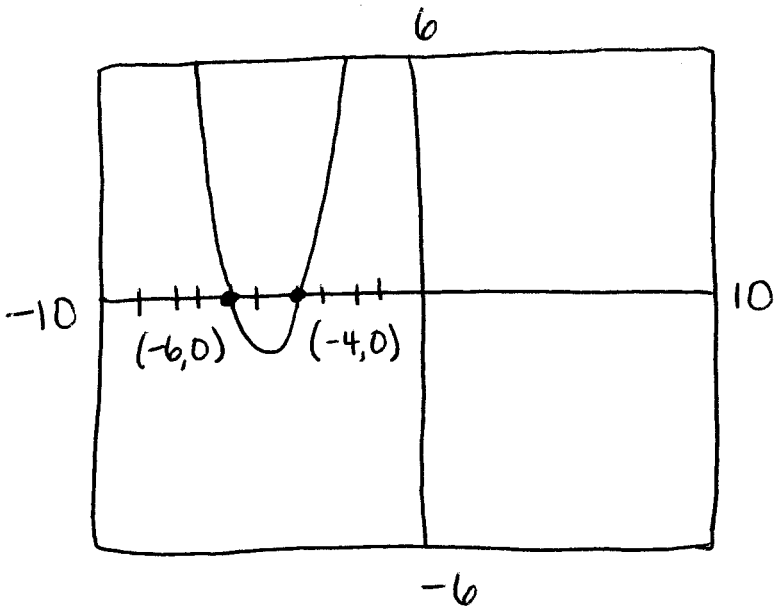
$(x+6)(x+4)=(x+6)(x+4)$

$b=4$

Score 1: The student made one error by not stating all possible values of b.

Question 25

25 In the equation $x^2 + 10x + 24 = (x + a)(x + b)$, b is an integer. Find algebraically *all* possible values of b.



b = 4
and
b = 6

Score 1: The student used a method other than algebraic to find possible b values.

Question 25

25 In the equation $x^2 + 10x + 24 = (x + a)(x + b)$, b is an integer. Find algebraically *all* possible values of b.

$x^2+10x+24=(x+a)(x+b)$

$x^2+10x+24=x^2+bx+ax+ab$

$-x^2 \quad -x^2$

$\frac{10x+24}{x} = \frac{bx+ax+ab}{b \quad x}$

$10+24=b+a+ab$

$34=b+a+ab$

$-a \quad -a$

$34-a=b+ab$

$-ab \quad -ab$

$34-2ab=b$

Score 0: The student's response contains at least two different errors.

Question 26

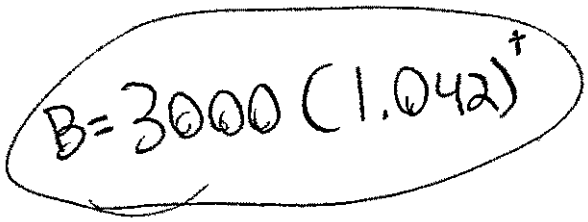
26 Rhonda deposited $3000 in an account in the Merrick National Bank, earning 4.2% interest, compounded annually. She made no deposits or withdrawals. Write an equation that can be used to find B, her account balance after t years.

$B = 3000(1 + .042)^t$

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

Question 26

26 Rhonda deposited $3000 in an account in the Merrick National Bank, earning 4.2% interest, compounded annually. She made no deposits or withdrawals. Write an equation that can be used to find B, her account balance after t years.



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

Question 26

26 Rhonda deposited $3000 in an account in the Merrick National Bank, earning 4.2% interest, compounded annually. She made no deposits or withdrawals. Write an equation that can be used to find B, her account balance after t years.

$3000(1.042)^t$

Score 1: The student made an error by not writing an equation.

Question 26

26 Rhonda deposited $3000 in an account in the Merrick National Bank, earning 4.2% interest, compounded annually. She made no deposits or withdrawals. Write an equation that can be used to find B, her account balance after t years.

$x = 3000(1+.042)^t$

Score 1: The student did not write an equation in terms of B and t.

Question 26

26 Rhonda deposited $3000 in an account in the Merrick National Bank, earning 4.2% interest, compounded annually. She made no deposits or withdrawals. Write an equation that can be used to find B, her account balance after t years.

$B = 3000(.042)^t$

Score 1: The student made an error by not including the 1 in the growth factor.

Question 26

26 Rhonda deposited $3000 in an account in the Merrick National Bank, earning 4.2% interest, compounded annually. She made no deposits or withdrawals. Write an equation that can be used to find B, her account balance after t years.

$B = 3000(.42)^t$

Score 0: The student made two errors by not including $(1 + r)$ and changing 4.2% to 0.42.

Question 27

27 Guy and Jim work at a furniture store. Guy is paid \$185 per week plus 3% of his total sales in dollars, x, which can be represented by $g(x) = 185 + 0.03x$. Jim is paid \$275 per week plus 2.5% of his total sales in dollars, x, which can be represented by $f(x) = 275 + 0.025x$. Determine the value of x, in dollars, that will make their weekly pay the same.

$185 + 0.03x = 275 + 0.025x$
$-0.025x \quad\quad -0.025x$

$185 + .005x = 275$
$-185 \quad\quad -185$

$.005x = 90$

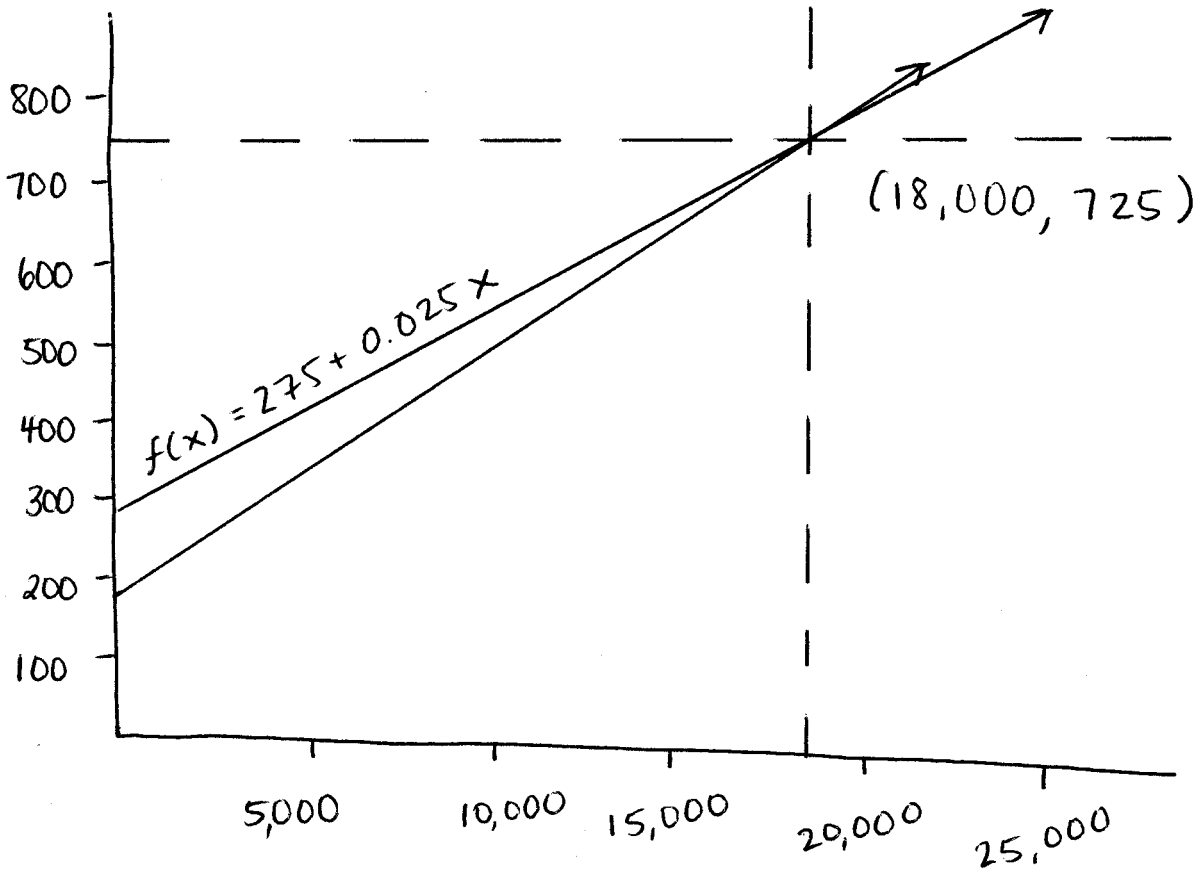
$x = 18000$

18,000

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

Question 27

27 Guy and Jim work at a furniture store. Guy is paid \$185 per week plus 3% of his total sales in dollars, x, which can be represented by $g(x) = 185 + 0.03x$. Jim is paid \$275 per week plus 2.5% of his total sales in dollars, x, which can be represented by $f(x) = 275 + 0.025x$. Determine the value of x, in dollars, that will make their weekly pay the same.

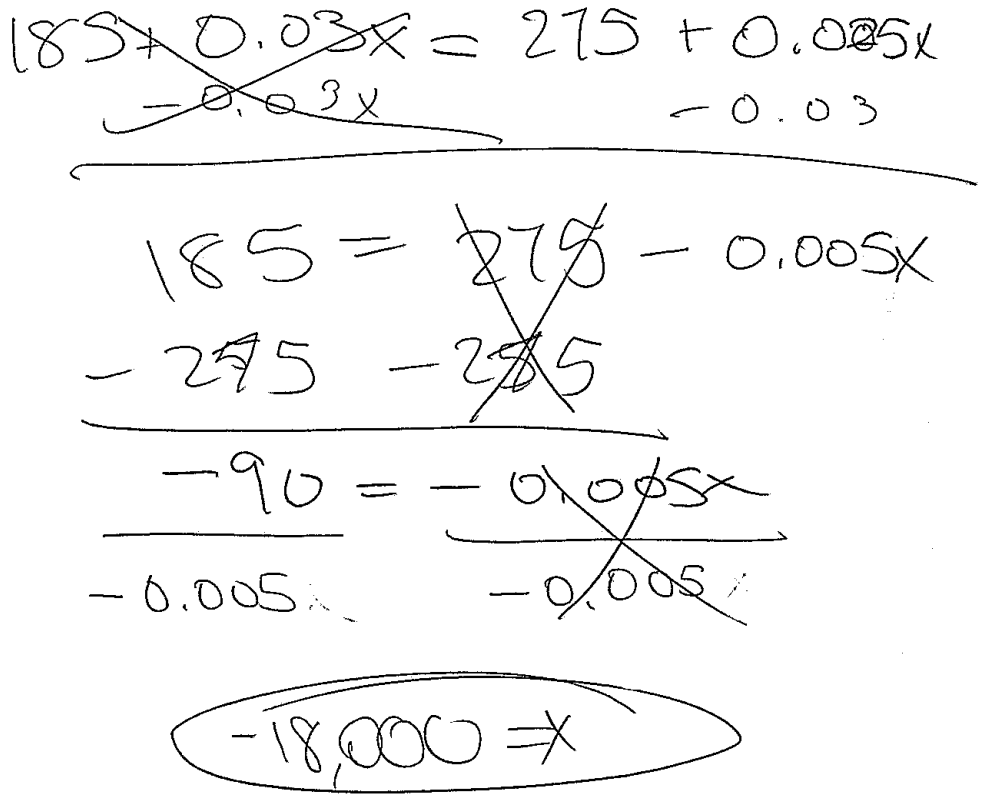


X = 18,000

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

Question 27

27 Guy and Jim work at a furniture store. Guy is paid \$185 per week plus 3% of his total sales in dollars, x, which can be represented by $g(x) = 185 + 0.03x$. Jim is paid \$275 per week plus 2.5% of his total sales in dollars, x, which can be represented by $f(x) = 275 + 0.025x$. Determine the value of x, in dollars, that will make their weekly pay the same.



Score 1: The student made one error when dividing by −0.005.

Question 27

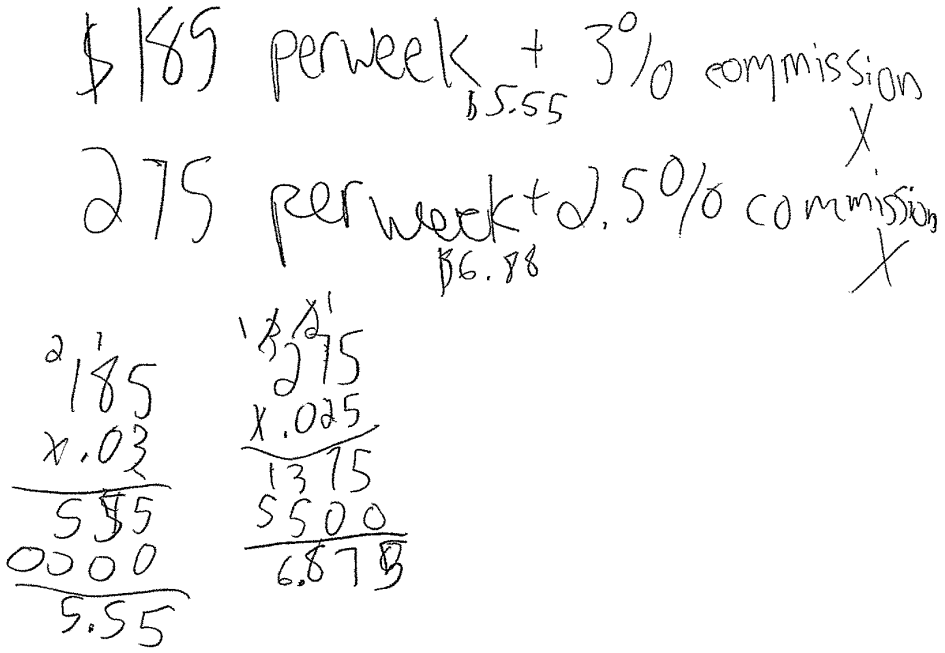
27 Guy and Jim work at a furniture store. Guy is paid \$185 per week plus 3% of his total sales in dollars, x, which can be represented by $g(x) = 185 + 0.03x$. Jim is paid \$275 per week plus 2.5% of his total sales in dollars, x, which can be represented by $f(x) = 275 + 0.025x$. Determine the value of x, in dollars, that will make their weekly pay the same.

$185 + 0.03x = 275 + 0.025x$

Score 0: The student set the expressions equal, but showed no further correct work.

Question 27

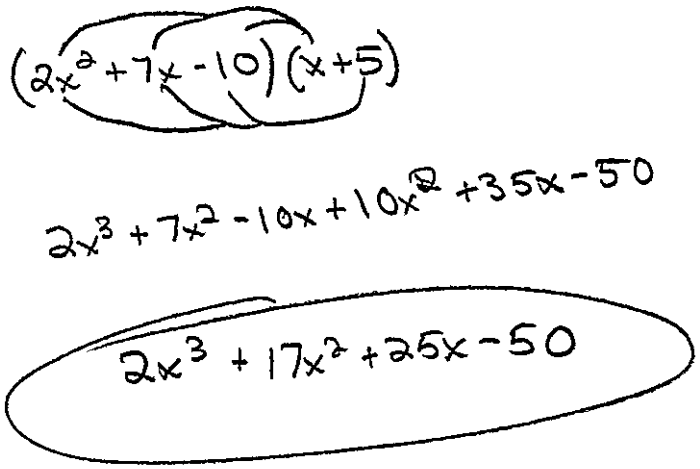
27 Guy and Jim work at a furniture store. Guy is paid \$185 per week plus 3% of his total sales in dollars, x, which can be represented by $g(x) = 185 + 0.03x$. Jim is paid \$275 per week plus 2.5% of his total sales in dollars, x, which can be represented by $f(x) = 275 + 0.025x$. Determine the value of x, in dollars, that will make their weekly pay the same.



Score 0: The student has a completely incorrect response.

Question 28

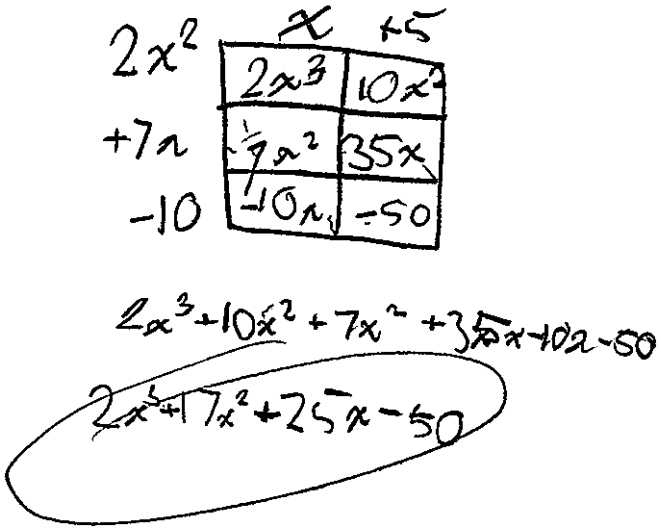
28 Express the product of $2x^2 + 7x - 10$ and $x + 5$ in standard form.



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

Question 28

28 Express the product of $2x^2 + 7x - 10$ and $x + 5$ in standard form.



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

Question 28

28 Express the product of $2x^2 + 7x - 10$ and $x + 5$ in standard form.

$(2x^2+7x-10)(x+5)$

$10x^2+35x-50+2x^3+7x^2-10x$

$-3x^3+17x^2+25x-50$

Score 1: The student made one error when multiplying $2x^2$ and x.

Question 28

28 Express the product of $2x^2 + 7x - 10$ and $x + 5$ in standard form.

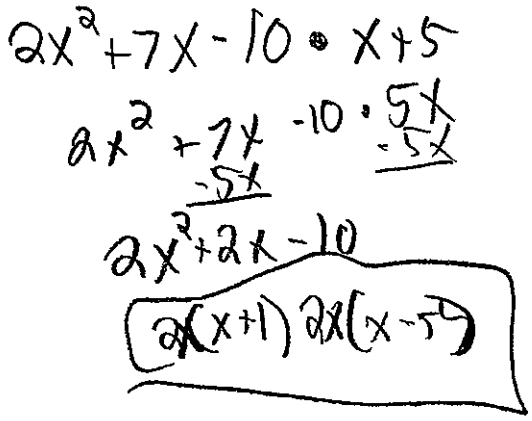
$(2x^2 + 7x - 10)(x + 5)$

$2x^3 + 10x^2 + 7x^2 + 35x - 10x - 50$

Score 1: The student did not express the product in standard form.

Question 28

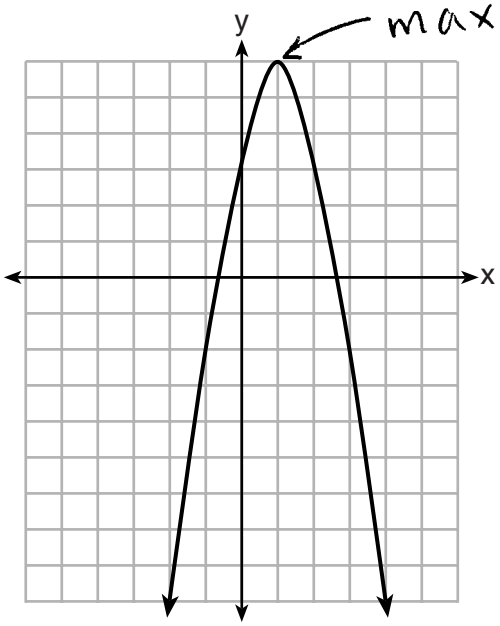
28 Express the product of $2x^2 + 7x - 10$ and $x + 5$ in standard form.



Score 0: The student made multiple errors.

Question 29

29 Let f be the function represented by the graph below.



Let g be a function such that $g(x) = -\frac{1}{2}x^2 + 4x + 3$.

Determine which function has the larger maximum value. Justify your answer.

g(x)

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

$x = \frac{-4}{-1} = 4$

$g(x) = -\frac{1}{2}(4)^2 + 4(4) + 3$

$= -\frac{1}{2}(16) + 16 + 3$

$= -8 + 16 + 3$

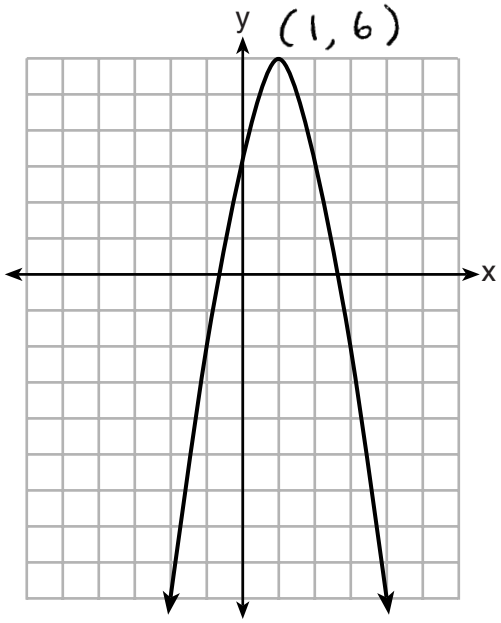
$= 11$

max → (4, 11)

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

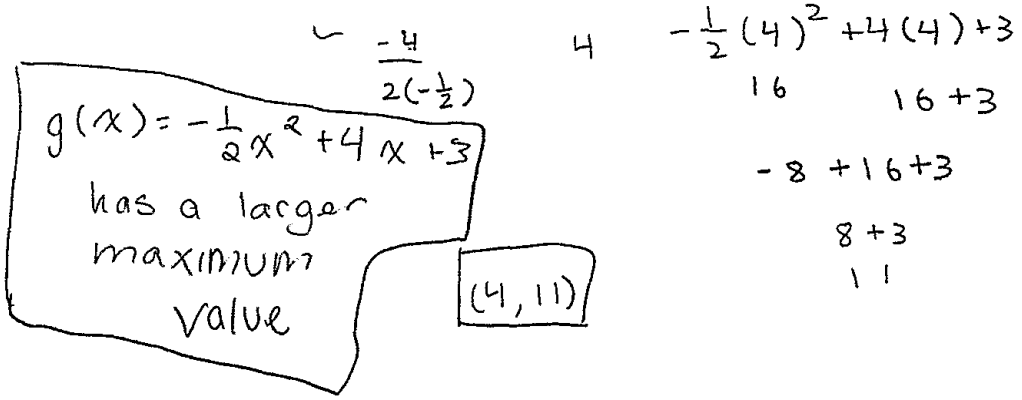
Question 29

29 Let f be the function represented by the graph below.



Let g be a function such that $g(x) = -\frac{1}{2}x^2 + 4x + 3$.

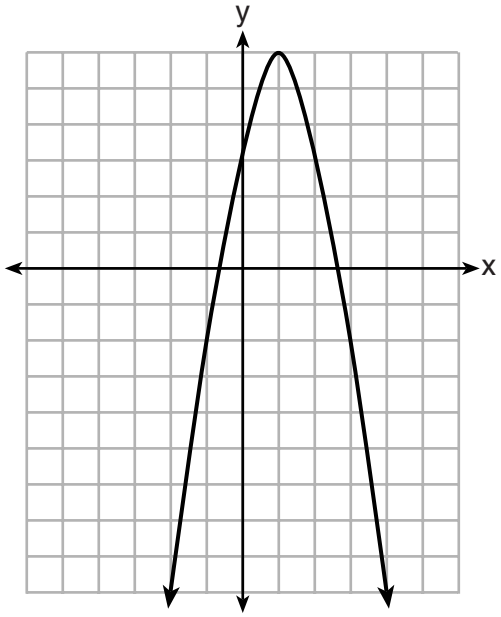
Determine which function has the larger maximum value. Justify your answer.



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

Question 29

29 Let f be the function represented by the graph below.



Let g be a function such that $g(x) = -\frac{1}{2}x^2 + 4x + 3$.

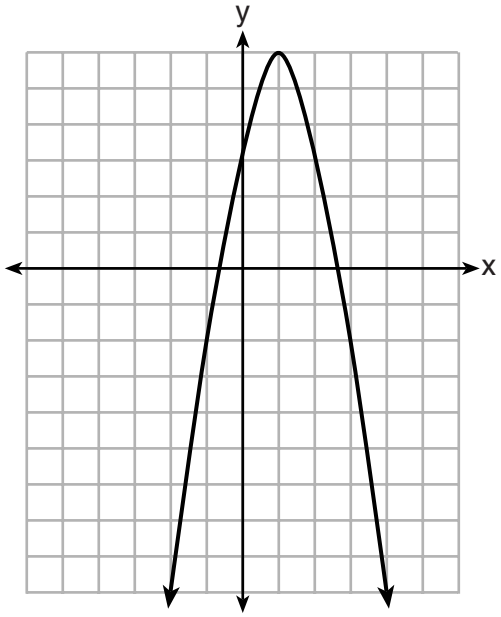
Determine which function has the larger maximum value. Justify your answer.

$g(x) = -\frac{1}{2}x^2 + 4x + 3$ has a greater maximum value because it goes higher.

Score 1: The student wrote an insufficient justification.

Question 29

29 Let f be the function represented by the graph below.



Let g be a function such that $g(x) = -\frac{1}{2}x^2 + 4x + 3$.

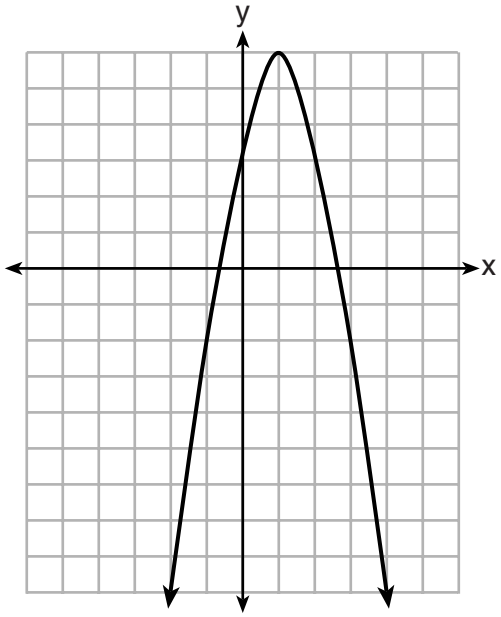
Determine which function has the larger maximum value. Justify your answer.

The maximum value is six because it is the highest point on the graph

Score 0: The student only found the maximum value of one function.

Question 29

29 Let f be the function represented by the graph below.



Let g be a function such that $g(x) = -\frac{1}{2}x^2 + 4x + 3$.

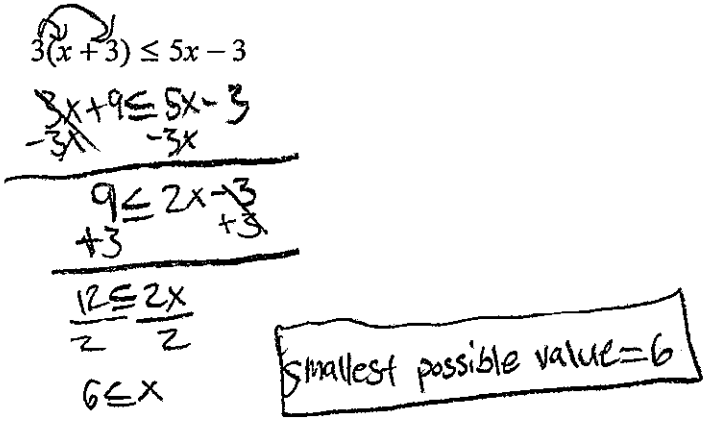
Determine which function has the larger maximum value. Justify your answer.

$g(x) = -\frac{1}{2}x^2 + 4x + 3$ is the function that has the larger maximum value.

Score 0: The student stated $g(x)$, but gave no justification.

Question 30

30 Solve the inequality below to determine and state the smallest possible value for x in the solution set.



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

Question 30

30 Solve the inequality below to determine and state the smallest possible value for x in the solution set.

$$3(x + 3) \leq 5x - 3$$

$3x + 9 \leq 5x - 3$
$+3 \quad +3$

$3x + 12 \leq 5x$
$-3x \quad -3x$

$\frac{12}{2} \leq \frac{2x}{2}$

$x = 6$

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

Question 30

30 Solve the inequality below to determine and state the smallest possible value for x in the solution set.

$$3(x + 3) \leq 5x - 3$$

$3x + 9 \leq 5x - 3$

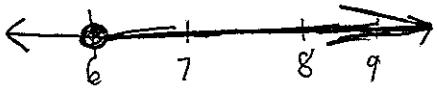
$-3x \quad -3x$

$9 \leq 2x - 3$

$+3 \quad +3$

$\frac{12}{2} \leq \frac{2x}{2}$

$6 \leq x$

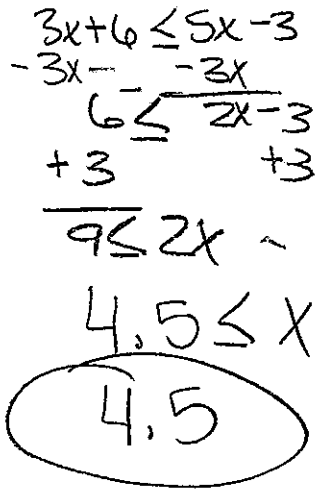


Score 1: The student did not state 6 as the smallest possible value.

Question 30

30 Solve the inequality below to determine and state the smallest possible value for x in the solution set.

$$3(x + 3) \leq 5x - 3$$



Score 1: The student made one computational error when distributing 3.

Question 30

30 Solve the inequality below to determine and state the smallest possible value for x in the solution set.

$$3(x + 3) \leq 5x - 3$$

$3x+9 \leq 5x-3$

$-3x \quad -3x$

$9 \leq 2x-3$

$+3 \quad +3$

$\frac{12}{2} \leq \frac{2x}{2}$

$1x \leq 6$

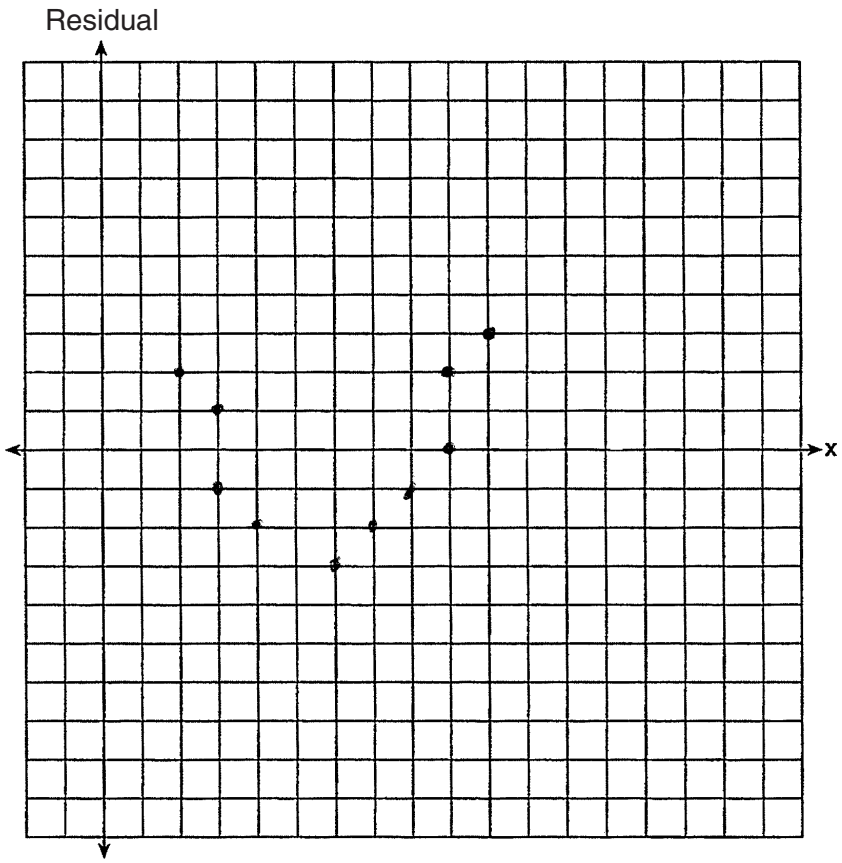
Score 0: The student made an error when solving the inequality and did not state that there is no smallest value of x possible.

Question 31

31 The table below represents the residuals for a line of best fit.

x	2	3	3	4	6	7	8	9	9	10
Residual	2	1	–1	–2	–3	–2	–1	2	0	3

Plot these residuals on the set of axes below.



Using the plot, assess the fit of the line for these residuals and justify your answer.

bad fit because there is pattern in the residuals

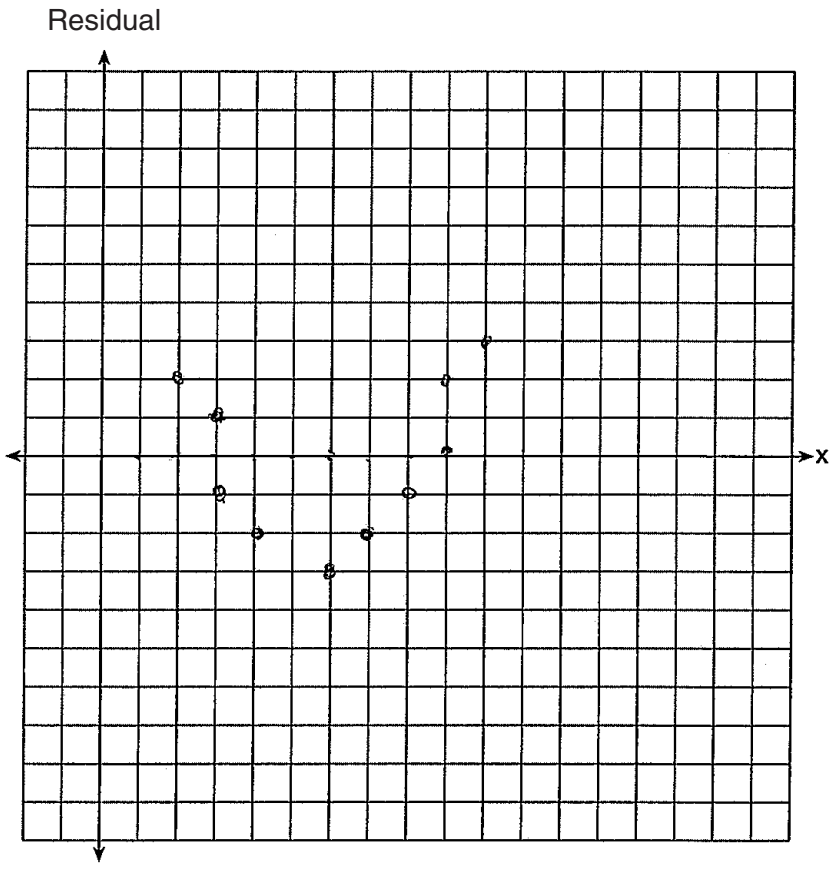
Score 2: The student has a complete and correct response.

Question 31

31 The table below represents the residuals for a line of best fit.

x	2	3	3	4	6	7	8	9	9	10
Residual	2	1	–1	–2	–3	–2	–1	2	0	3

Plot these residuals on the set of axes below.



Using the plot, assess the fit of the line for these residuals and justify your answer.

The is no pattern followed in the function

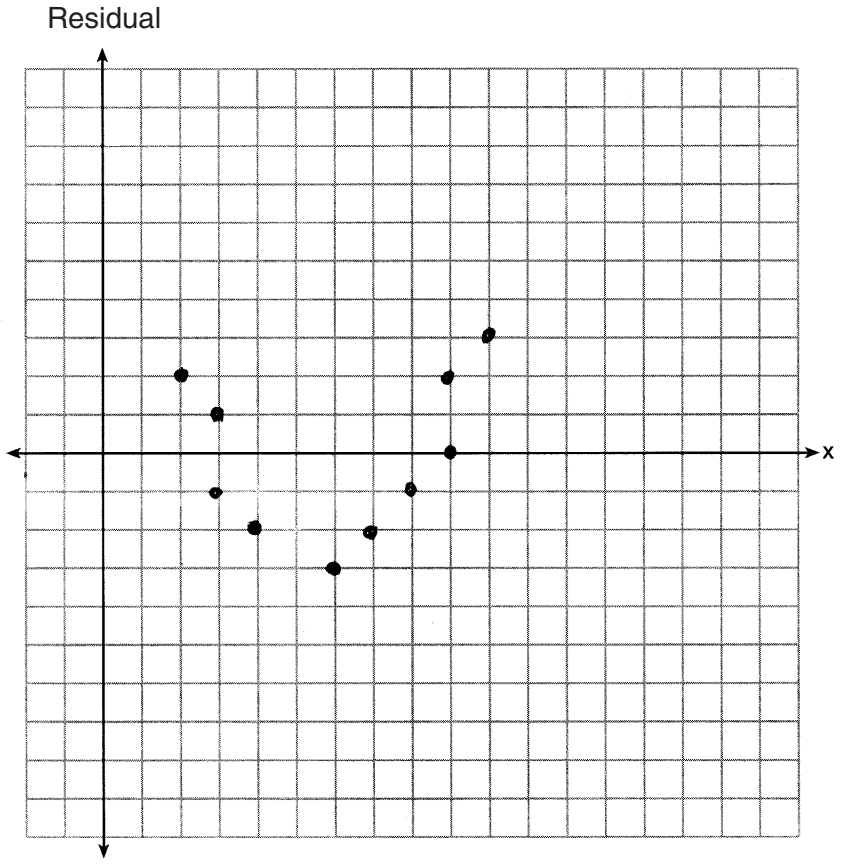
Score 1: The student drew a correct plot, but did not assess the fit of the line.

Question 31

31 The table below represents the residuals for a line of best fit.

x	2	3	3	4	6	7	8	9	9	10
Residual	2	1	–1	–2	–3	–2	–1	2	0	3

Plot these residuals on the set of axes below.



Using the plot, assess the fit of the line for these residuals and justify your answer.

Bad fit

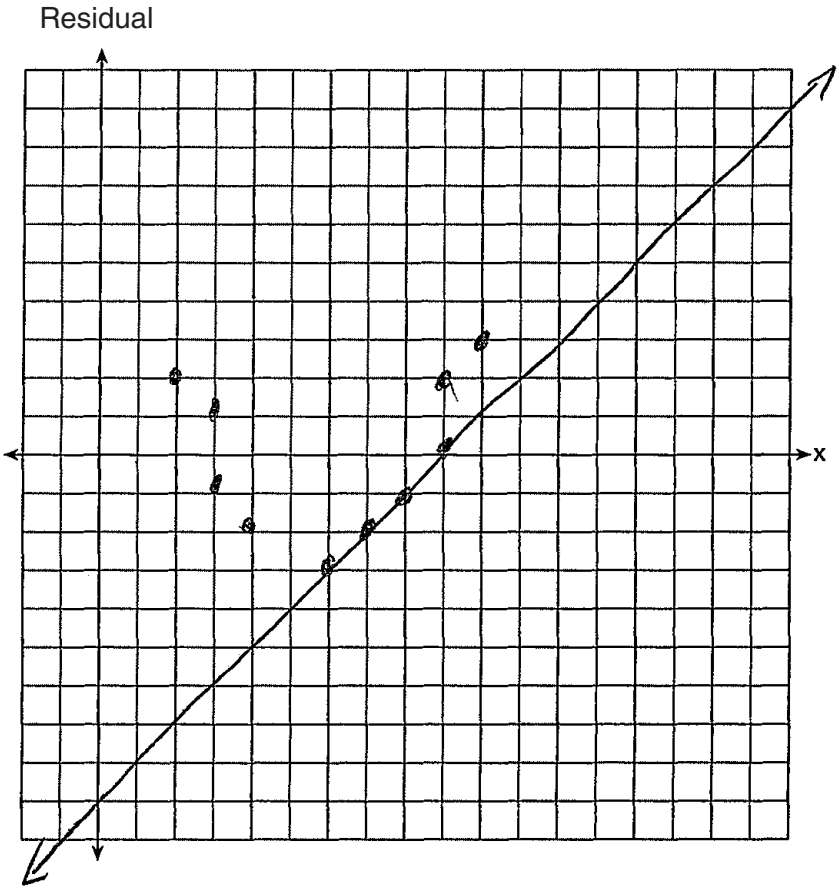
Score 1: The student drew a correct plot and correctly characterized the fit, but gave no justification.

Question 31

31 The table below represents the residuals for a line of best fit.

x	2	3	3	4	6	7	8	9	9	10
Residual	2	1	–1	–2	–3	–2	–1	2	0	3

Plot these residuals on the set of axes below.



Using the plot, assess the fit of the line for these residuals and justify your answer.

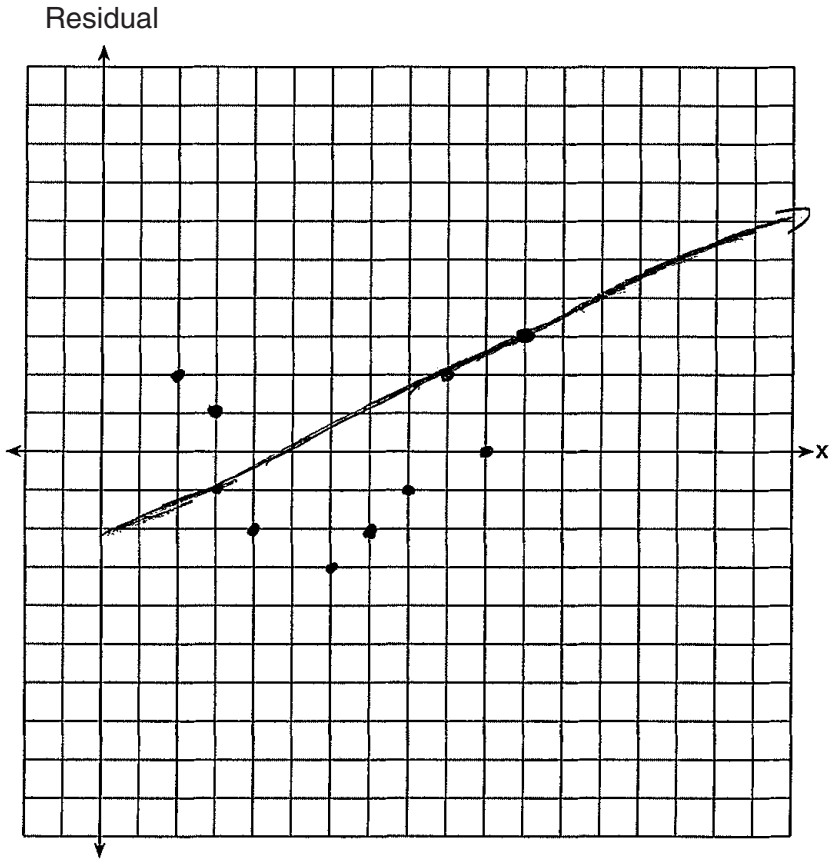
Score 1: The student plotted the residuals correctly, but showed no further correct work.

Question 31

31 The table below represents the residuals for a line of best fit.

x	2	3	3	4	6	7	8	9	9	10
Residual	2	1	–1	–2	–3	–2	–1	2	0	3

Plot these residuals on the set of axes below.



Using the plot, assess the fit of the line for these residuals and justify your answer.

The line of best fit is that because it's close to most of the points.

Score 0: The student drew an incorrect plot and wrote an incorrect justification.

Question 32

32 A student was given the equation $x^2 + 6x - 13 = 0$ to solve by completing the square. The first step that was written is shown below.

$$x^2 + 6x = 13$$

The next step in the student's process was $x^2 + 6x + c = 13 + c$.

State the value of c that creates a perfect square trinomial.

$c = (b/2)^2$ $c = (6/2)^2$ $c = (3)^2$

$c = 9$

Explain how the value of c is determined.

The value of c is determined by taking the "b" & dividing it by 2, then squaring it.

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

Question 32

32 A student was given the equation $x^2 + 6x - 13 = 0$ to solve by completing the square. The first step that was written is shown below.

$$x^2 + 6x = 13$$

The next step in the student's process was $x^2 + 6x + c = 13 + c$.

State the value of c that creates a perfect square trinomial.

c=9

Explain how the value of c is determined.

divide 6 in half then square that answer

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

Question 32

32 A student was given the equation $x^2 + 6x - 13 = 0$ to solve by completing the square. The first step that was written is shown below.

$$x^2 + 6x = 13$$

The next step in the student's process was $x^2 + 6x + c = 13 + c$.

State the value of c that creates a perfect square trinomial.

$c = 9$

$(x+3)(x+3)$

$x^2+3x+3x+9$

x^2+6x+9

Explain how the value of c is determined.

when $c = 9$, the trinomial is the product of $(x+3)^2$ a perfect square.

Score 1: The student found $c = 9$, but wrote an incorrect explanation.

Question 32

32 A student was given the equation $x^2 + 6x - 13 = 0$ to solve by completing the square. The first step that was written is shown below.

$$x^2 + 6x = 13$$

The next step in the student's process was $x^2 + 6x + c = 13 + c$.

State the value of c that creates a perfect square trinomial.

18

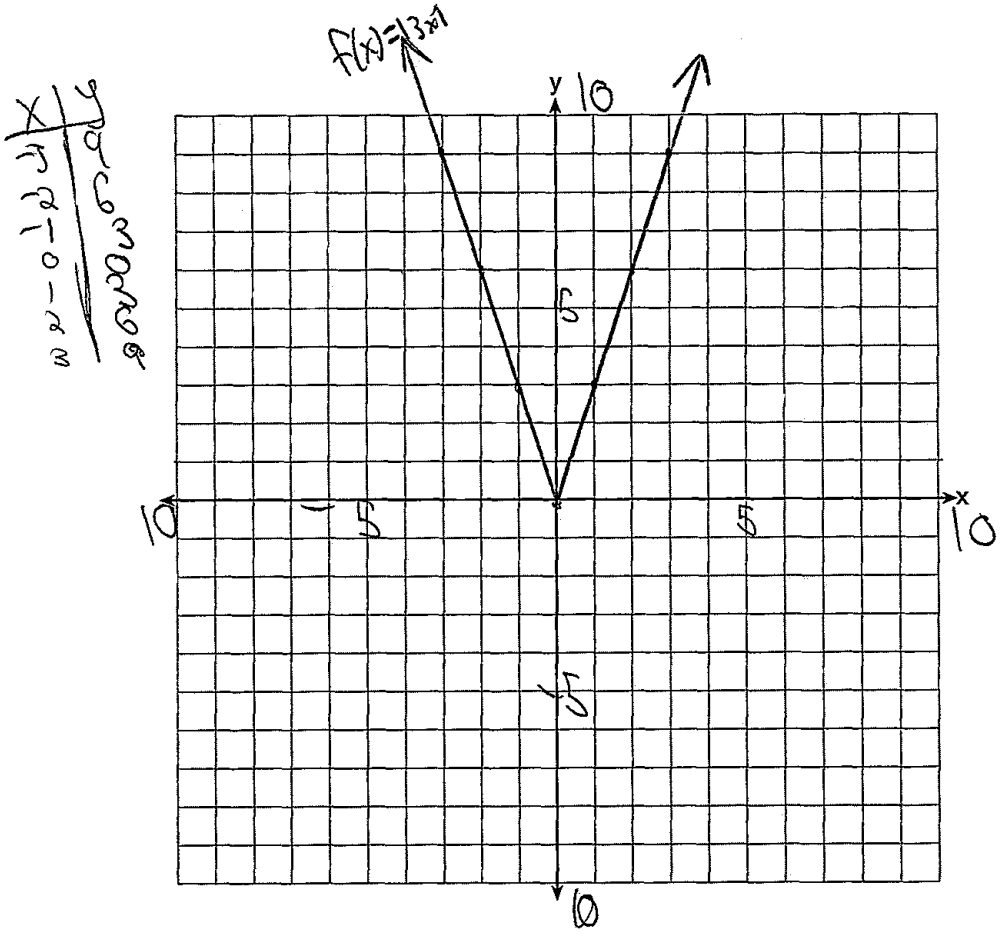
Explain how the value of c is determined.

Adding 5 to both sides of the equation.

Score 0: The student wrote an irrelevant response.

Question 33

33 On the axes below, graph $f(x) = |3x|$.



If $g(x) = f(x) - 2$, how is the graph of $f(x)$ translated to form the graph of $g(x)$?

graph g(x) would be two points below graph f(x)

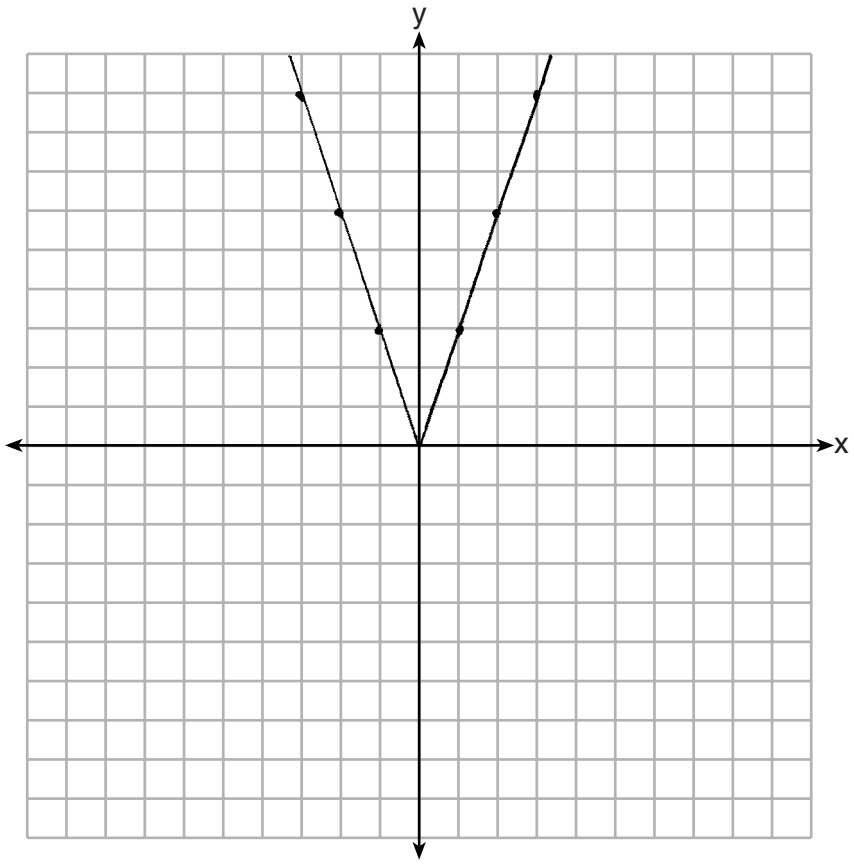
If $h(x) = f(x - 4)$, how is the graph of $f(x)$ translated to form the graph of $h(x)$?

h(x) would 4 points to the right

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

Question 33

33 On the axes below, graph $f(x) = |3x|$.



If $g(x) = f(x) - 2$, how is the graph of $f(x)$ translated to form the graph of $g(x)$?

2 down

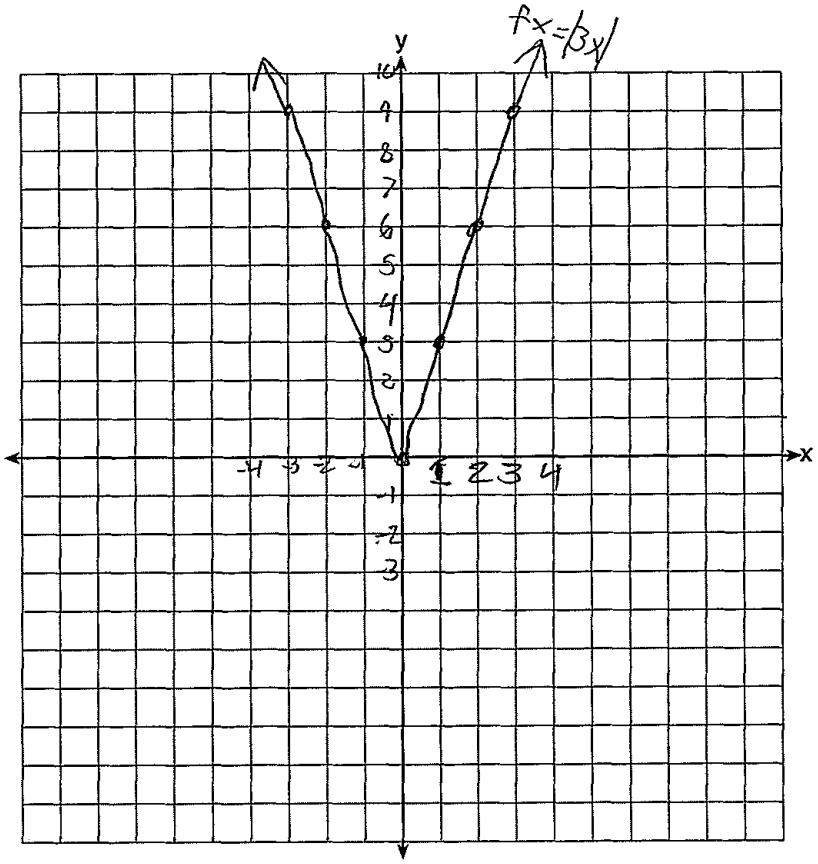
If $h(x) = f(x - 4)$, how is the graph of $f(x)$ translated to form the graph of $h(x)$?

4 right

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

Question 33

33 On the axes below, graph $f(x) = |3x|$.



If $g(x) = f(x) - 2$, how is the graph of $f(x)$ translated to form the graph of $g(x)$?

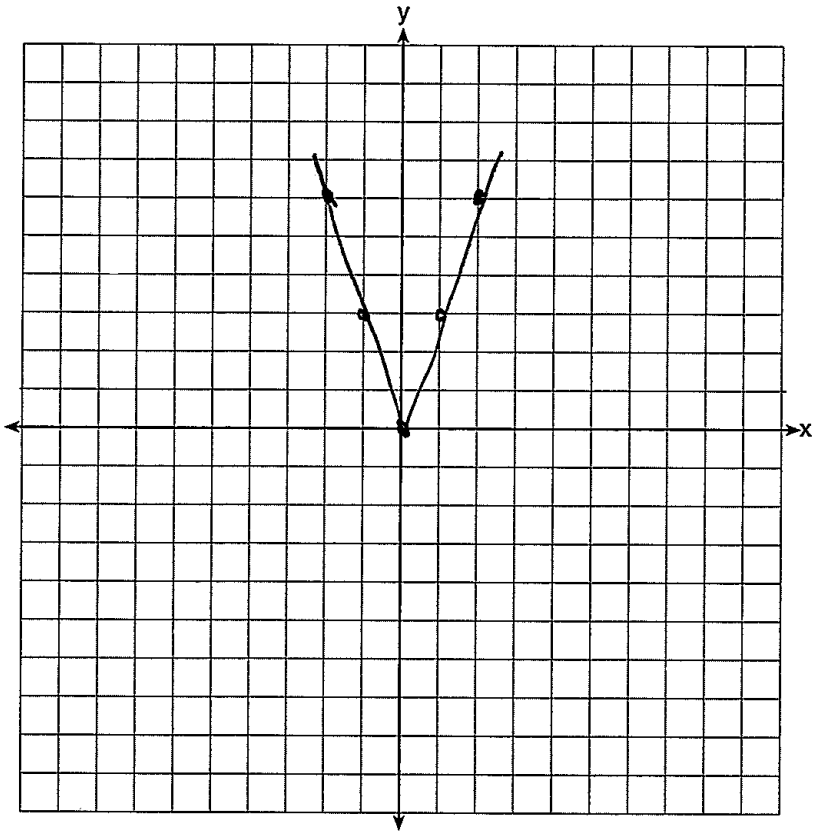
The dots would be two dots lower.

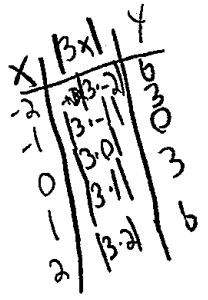
If $h(x) = f(x - 4)$, how is the graph of $f(x)$ translated to form the graph of $h(x)$?

Score 3: The student drew a correct graph, but only included a correct description for one relationship.

Question 33

33 On the axes below, graph $f(x) = |3x|$.





If $g(x) = f(x) - 2$, how is the graph of $f(x)$ translated to form the graph of $g(x)$?

The graph of g(x) is two spaces underneath the graph of f(x)

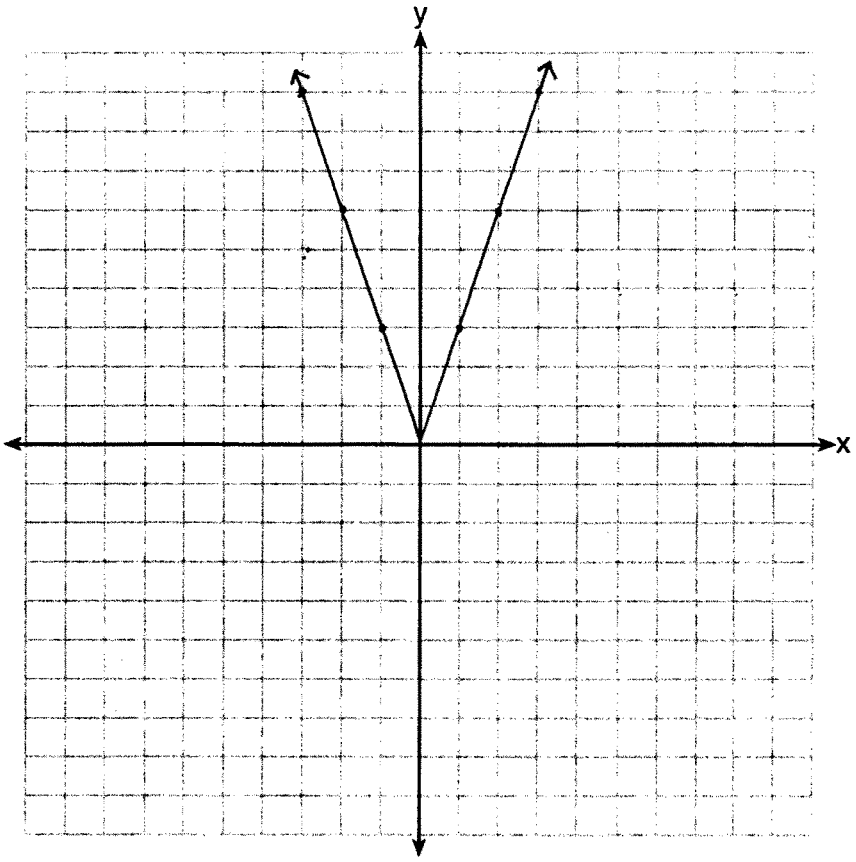
If $h(x) = f(x - 4)$, how is the graph of $f(x)$ translated to form the graph of $h(x)$?

h(x) The graph of h(x) is 4 spaces ~~under~~ to the left of the graph of f(x).

Score 2: The student did not show a complete graph for $f(x)$ (the graph must have either arrows or extend to the edge of the grid) and did not include a correct relationship describing how $h(x)$ is related to $f(x)$.

Question 33

33 On the axes below, graph $f(x) = |3x|$.



If $g(x) = f(x) - 2$, how is the graph of $f(x)$ translated to form the graph of $g(x)$?

2

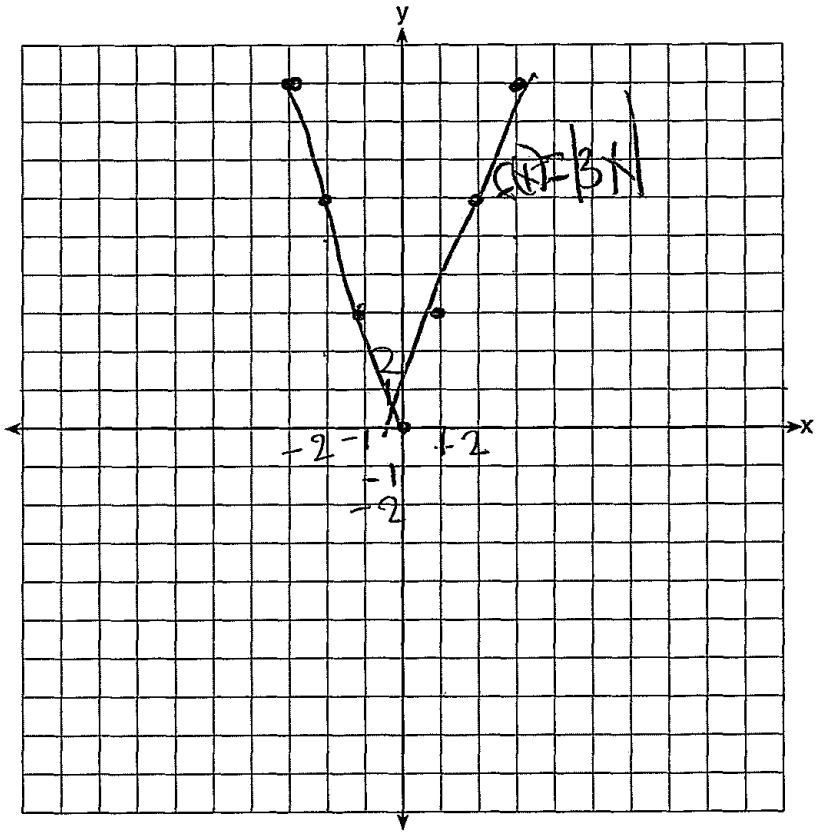
If $h(x) = f(x - 4)$, how is the graph of $f(x)$ translated to form the graph of $h(x)$?

4

Score 2: The student drew a correct graph, but did not state the direction of the translations.

Question 33

33 On the axes below, graph $f(x) = |3x|$.



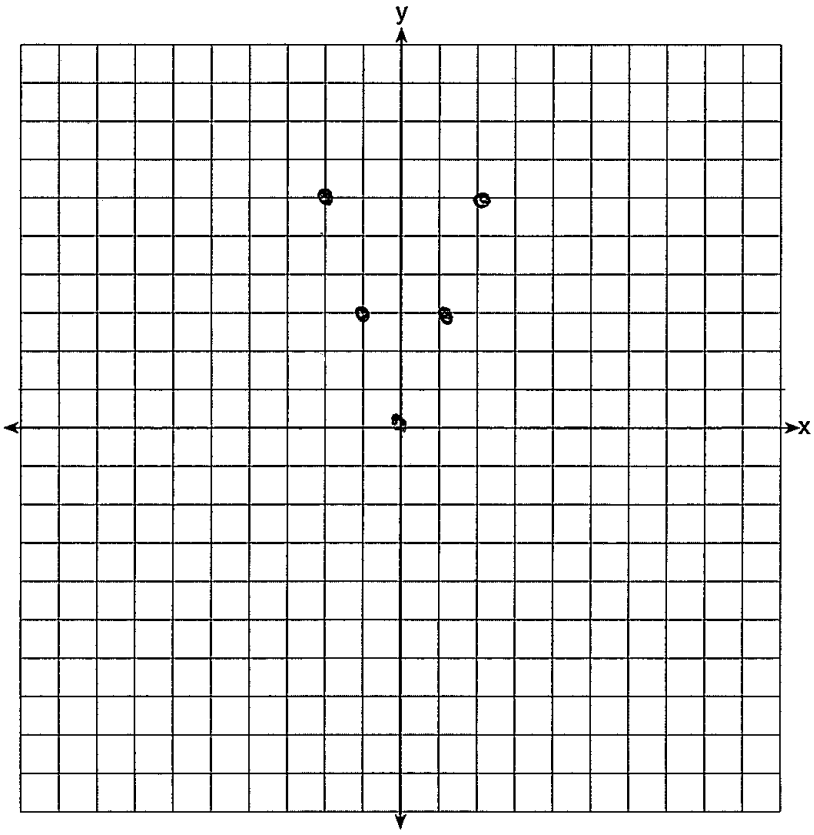
If $g(x) = f(x) - 2$, how is the graph of $f(x)$ translated to form the graph of $g(x)$?

If $h(x) = f(x - 4)$, how is the graph of $f(x)$ translated to form the graph of $h(x)$?

Score 1: The student did not draw a complete graph for $f(x)$ and did not describe how $g(x)$ and $h(x)$ are related to $f(x)$.

Question 33

33 On the axes below, graph $f(x) = |3x|$.



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

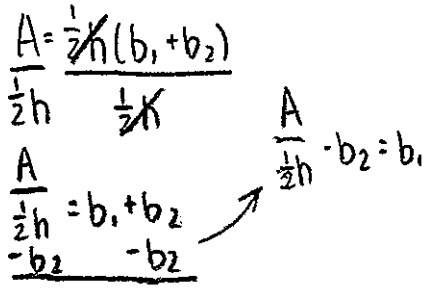
If $g(x) = f(x) - 2$, how is the graph of $f(x)$ translated to form the graph of $g(x)$?

If $h(x) = f(x - 4)$, how is the graph of $f(x)$ translated to form the graph of $h(x)$?

Score 0: The student did not show sufficient work.

Question 34

34 The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Express b_1 in terms of A, h, and b_2.



The area of a trapezoid is 60 square feet, its height is 6 ft, and one base is 12 ft. Find the number of feet in the other base.

$b_1 = \frac{2A}{h} - b_2$

$\frac{2(60)}{6} - 12$

$\frac{120}{6} - 12$

$20 - 12$

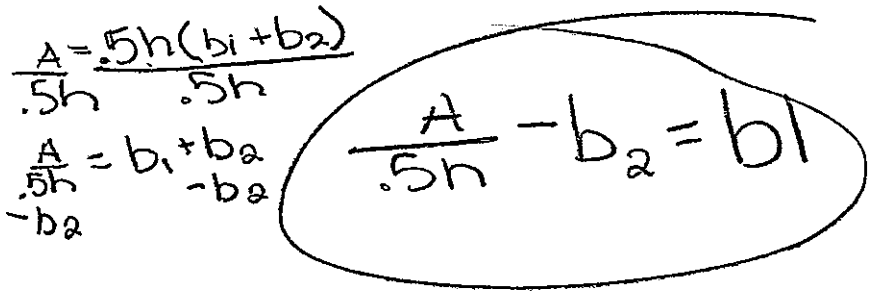
$b_1 = 8$

8 feet

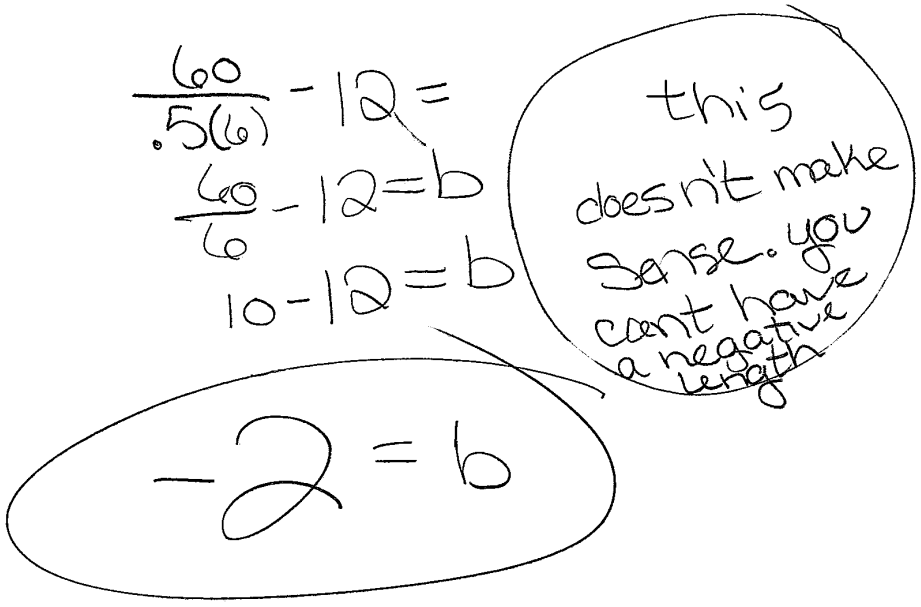
Score 4: The student has a complete and correct response.

Question 34

34 The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Express b_1 in terms of A, h, and b_2.



The area of a trapezoid is 60 square feet, its height is 6 ft, and one base is 12 ft. Find the number of feet in the other base.



Score 3: The student made one computational error when multiplying 0.5 and 6.

Question 34

34 The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Express b_1 in terms of A, h, and b_2.

$A - b_2 = b_1$

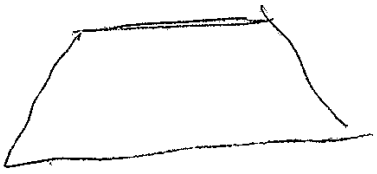
$A = \frac{1}{2}hb_1 + \frac{1}{2}hb_2$

$-i$

$b_1 = A - b_2$

$\frac{A - \frac{1}{2}hb_2 = \frac{1}{2}hb_1}{\frac{1}{2}h \qquad \frac{1}{2}h}$

The area of a trapezoid is 60 square feet, its height is 6 ft, and one base is 12 ft. Find the number of feet in the other base.



number of feet in other base = 24ft.

$60 = 3(12 + b)$

$60 = 36 + 3b$

$-36 \quad -36$

$24 = b_2$

Score 2: The student divided improperly when solving for b_1 and distributed the 3 improperly.

Question 34

34 The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Express b_1 in terms of A, h, and b_2.

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

$-b_2 \qquad -b_2$

$\frac{A - b_2}{\frac{1}{2}h} = \frac{\frac{1}{2}h(b_1)}{\frac{1}{2}h} \qquad \frac{A - b_2}{\frac{1}{2}h} = b_1$

The area of a trapezoid is 60 square feet, its height is 6 ft, and one base is 12 ft. Find the number of feet in the other base.

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

$60 = \frac{1}{2}(6)(12 + b_2)$

$3(12 + b_2)$

$60 = 36 + 3b$

$-36 \quad -36$

$\frac{24}{3} = \frac{3b}{3}$

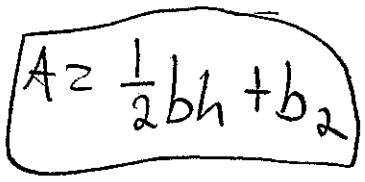
$8 = b$

The other base length is 8 ft.

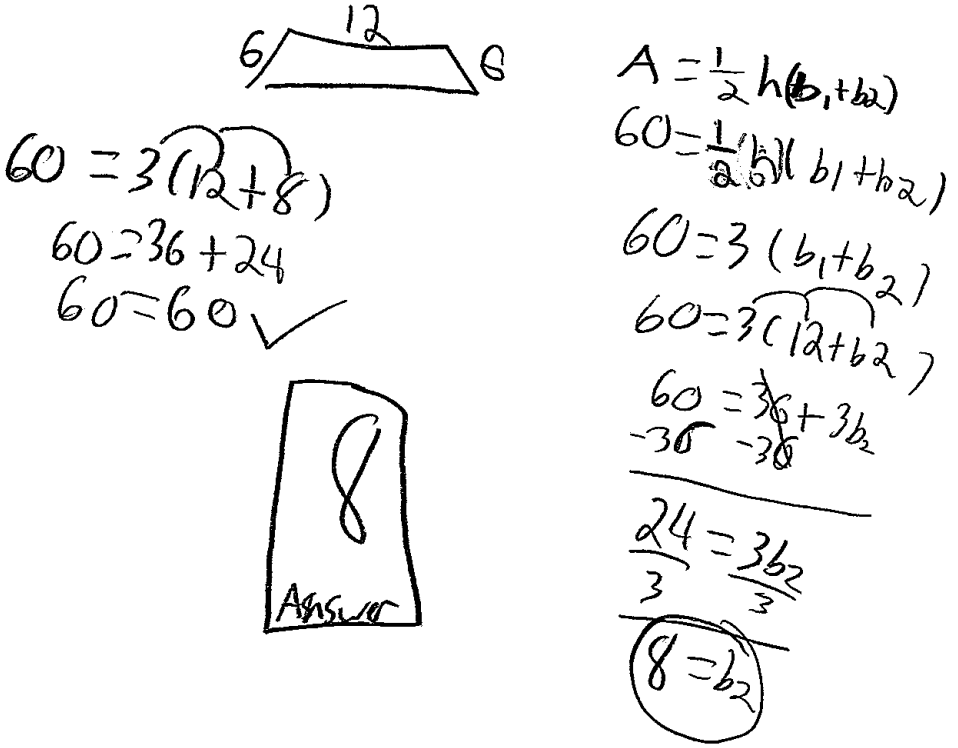
Score 2: The student made an error by subtracting b_2 rather than first using the distributive property.

Question 34

34 The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Express b_1 in terms of A, h, and b_2.



The area of a trapezoid is 60 square feet, its height is 6 ft, and one base is 12 ft. Find the number of feet in the other base.



Score 1: The student showed appropriate work to find 8, but showed no further correct work.

Question 34

34 The formula for the area of a trapezoid is $A = \frac{1}{2}h(b_1 + b_2)$. Express b_1 in terms of A, h, and b_2.

$60 = \frac{1}{2}6(12, + b_2)$

$60 = 3(12 + b)$

$60 = 36 + 24 \rightarrow 60 = 60$

The area of a trapezoid is 60 square feet, its height is 6 ft, and one base is 12 ft. Find the number of feet in the other base.

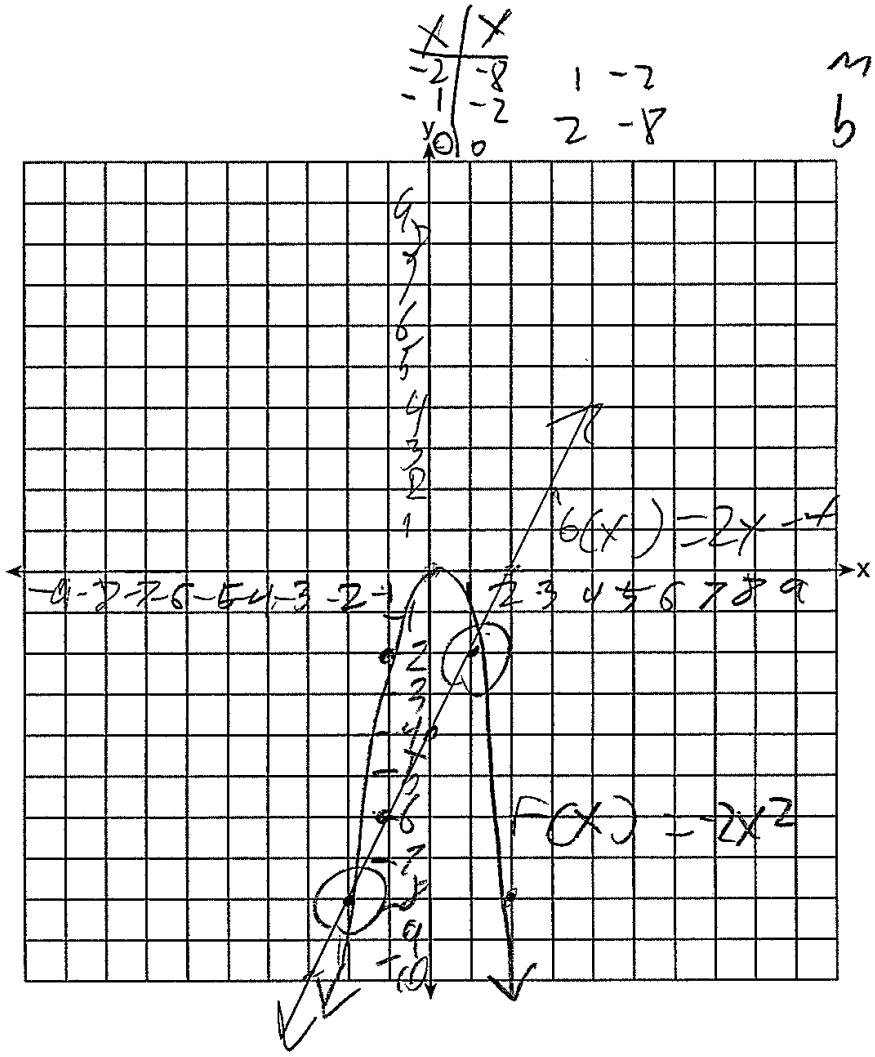
$60 = \frac{1}{2}(12 + 24)$

$B_2 = 24$

Score 0: The student has a completely incorrect response.

Question 35

35 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.



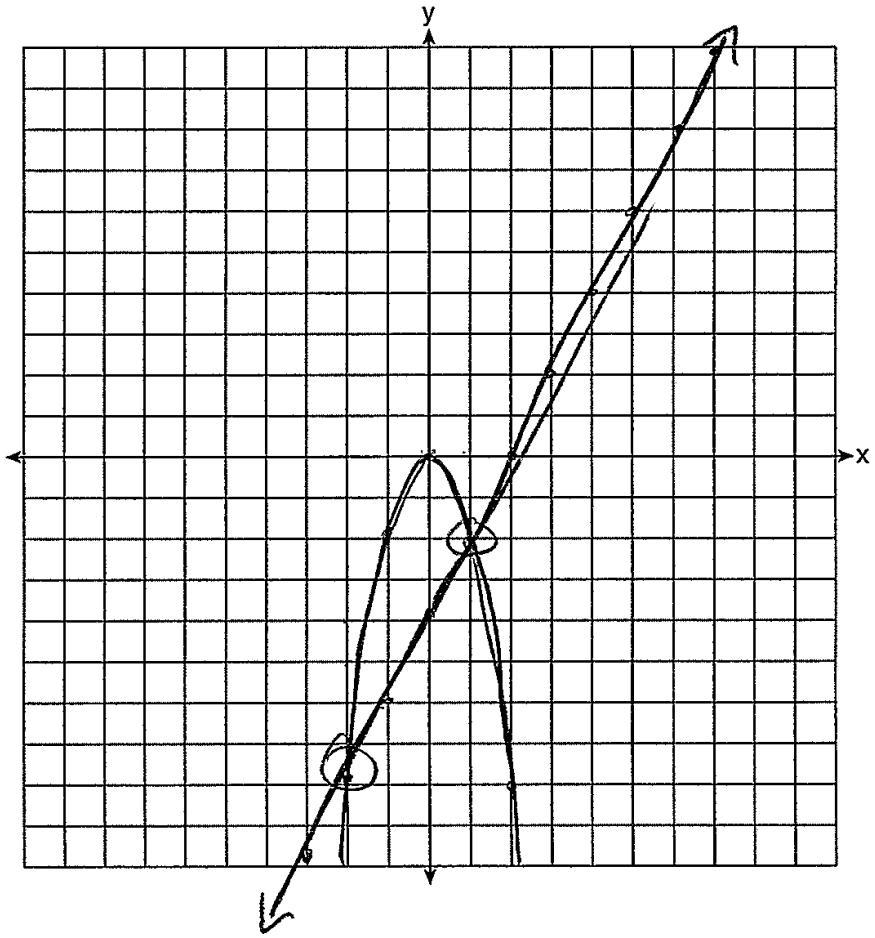
Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

-2, 1

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

Question 35

35 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.



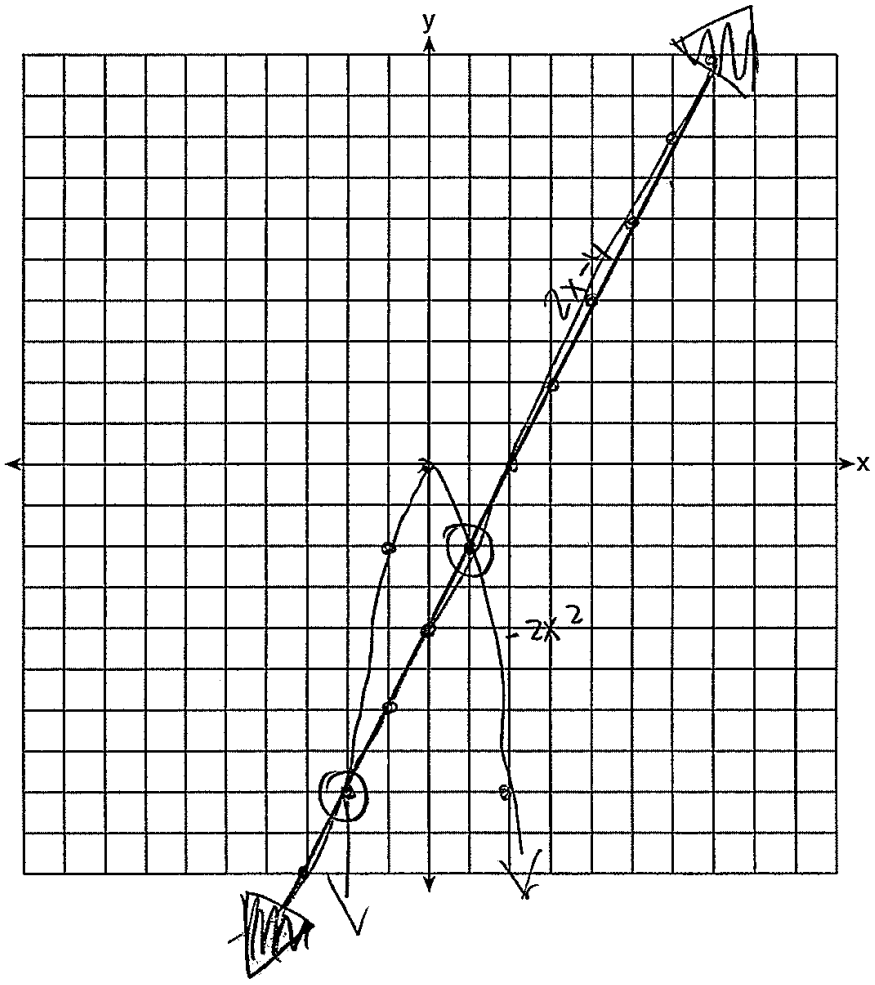
Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

x=1 x=-2

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

Question 35

35 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.



Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

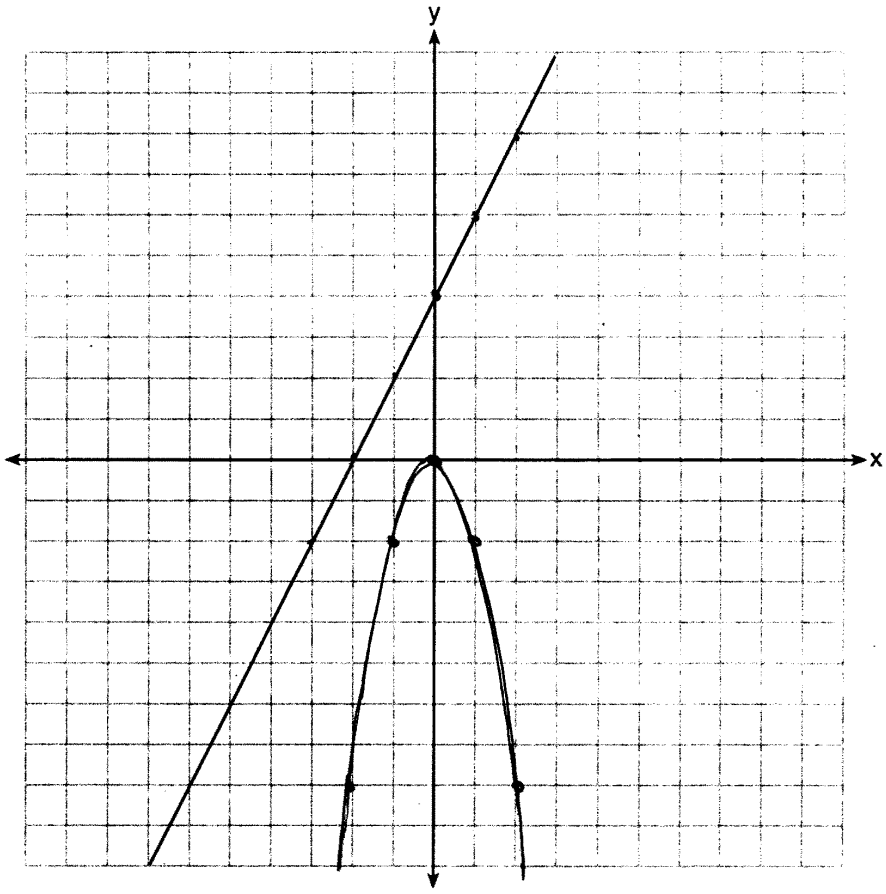
(1, -2)

(-2, -8)

Score 3: The student wrote the solution as coordinates.

Question 35

35 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.



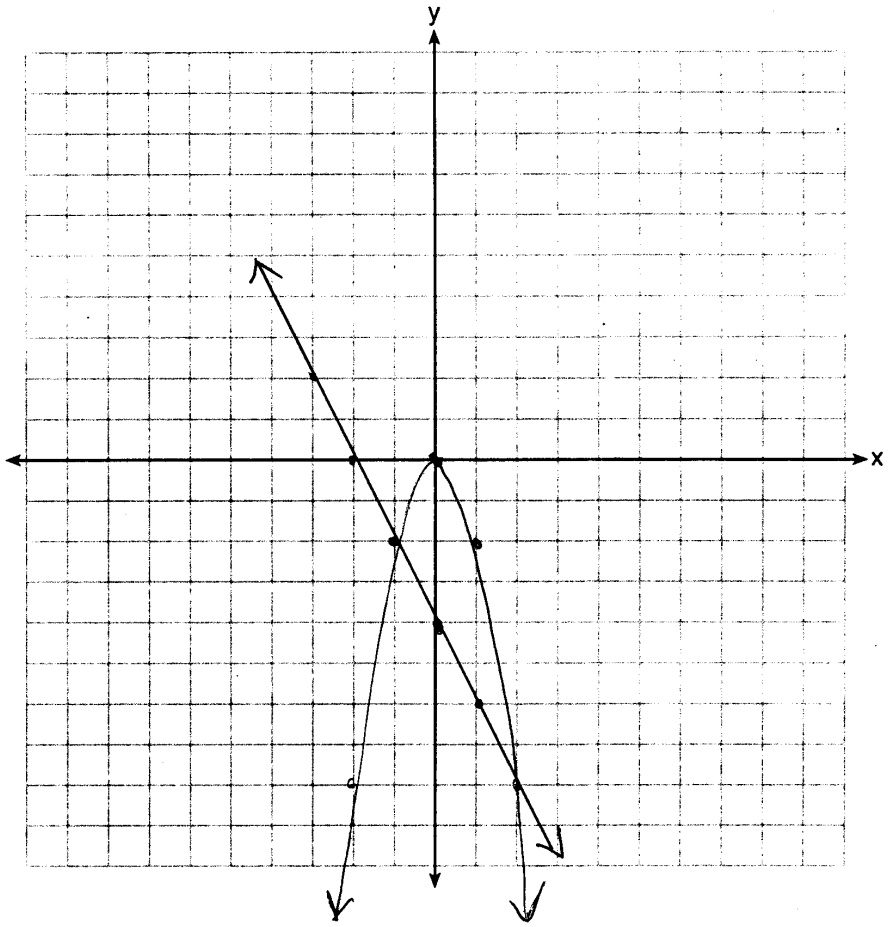
Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

There are no values of x

Score 3: The student made one graphing error by using +4 as the y-intercept. An appropriate response was stated.

Question 35

35 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.



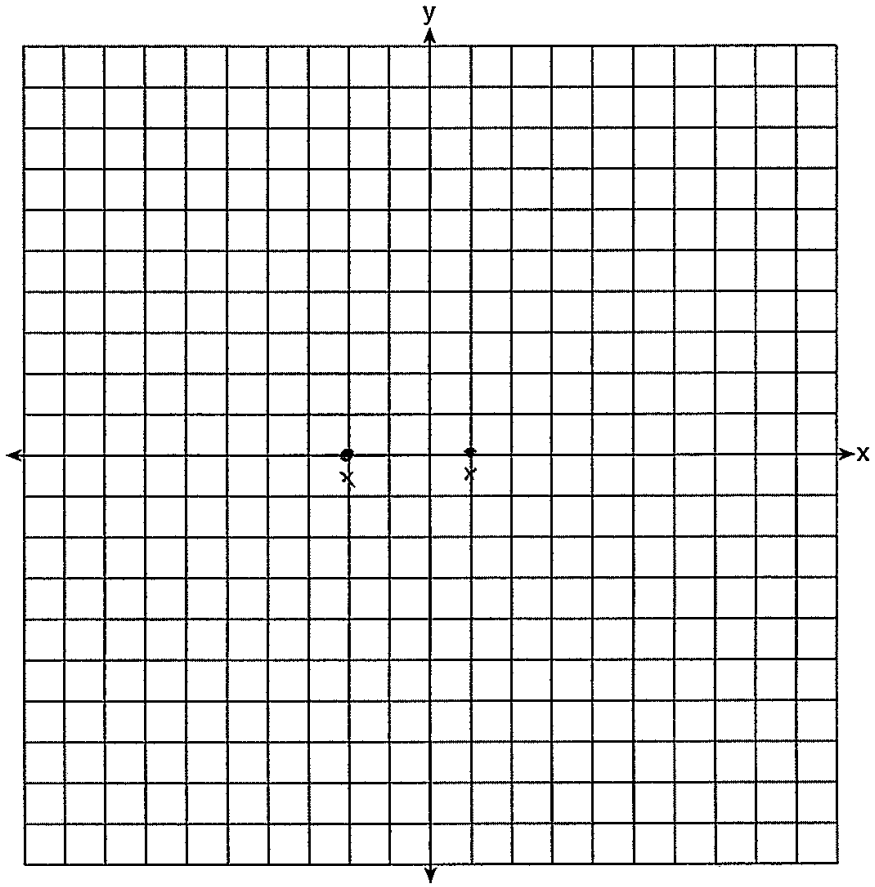
Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

−1 and 2

Score 3: The student made one graphing error by using the wrong slope. Appropriate values for x were stated.

Question 35

35 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.



Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

$-2x^2 = 2x - 4$

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

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

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

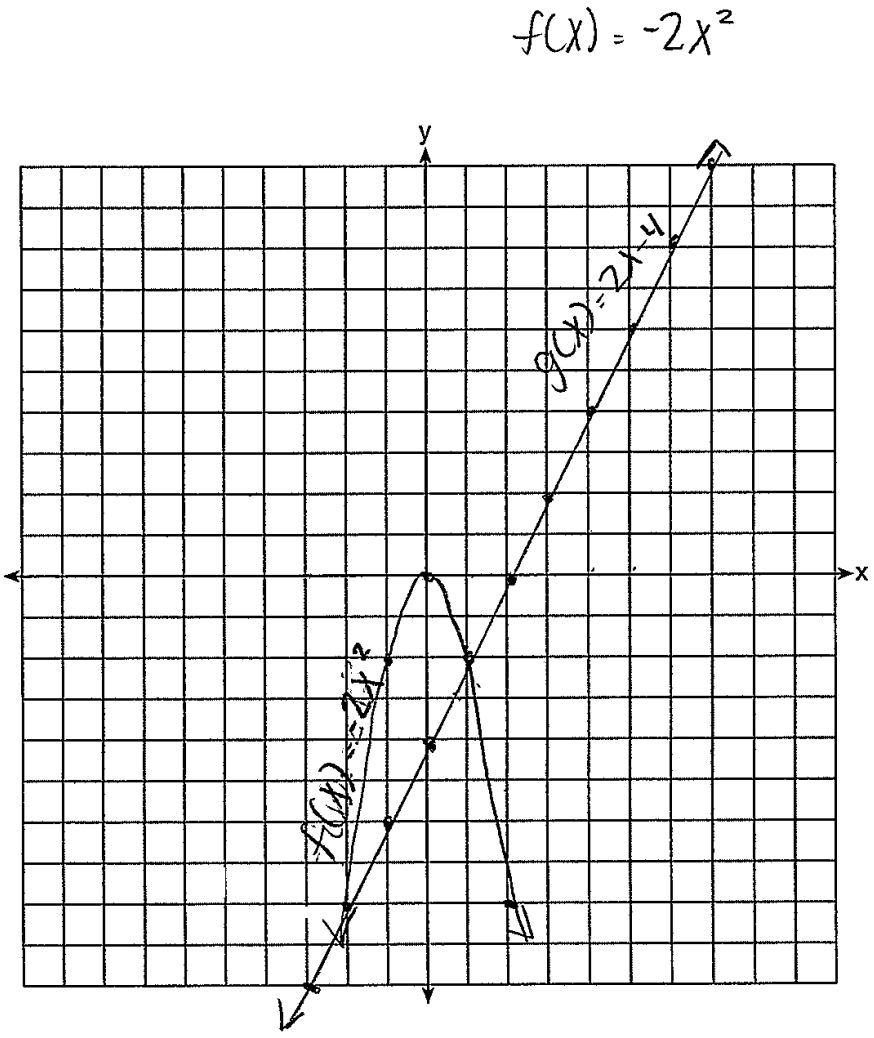
$2(x - 1)(x + 2) = 0$

$x = 1$ $x = -2$

Score 2: The student used a method other than graphic to determine the x-values.

Question 35

35 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.

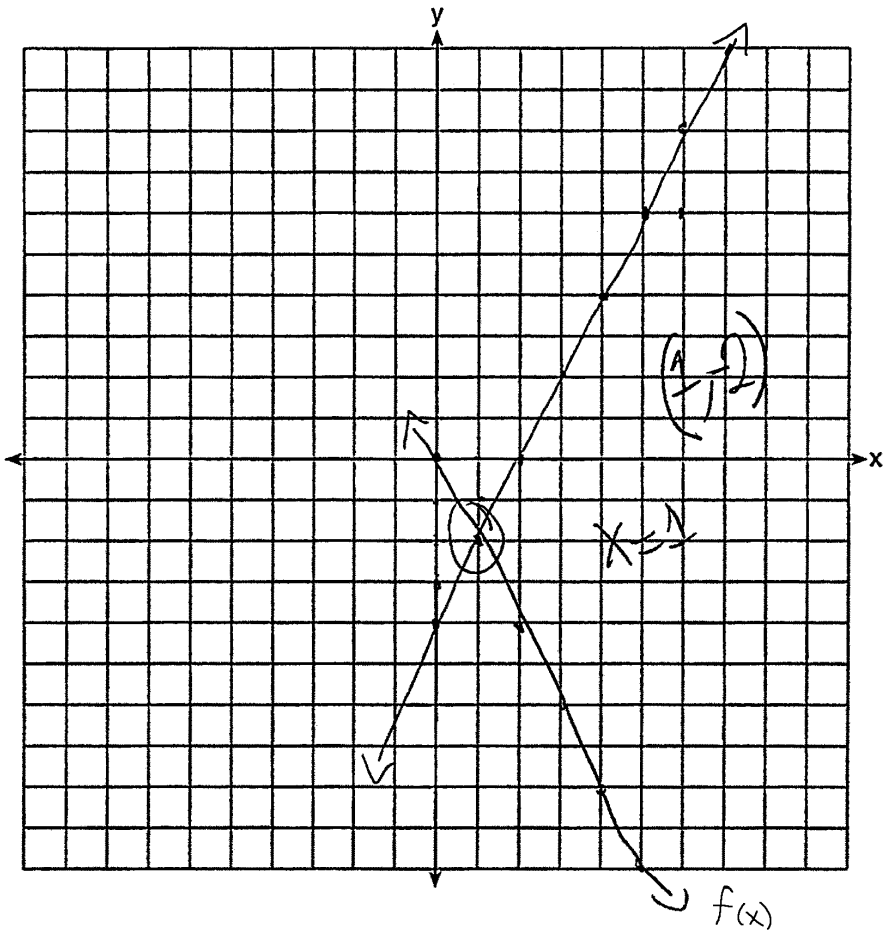


Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

Score 2: The student did not state the x-values.

Question 35

35 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.

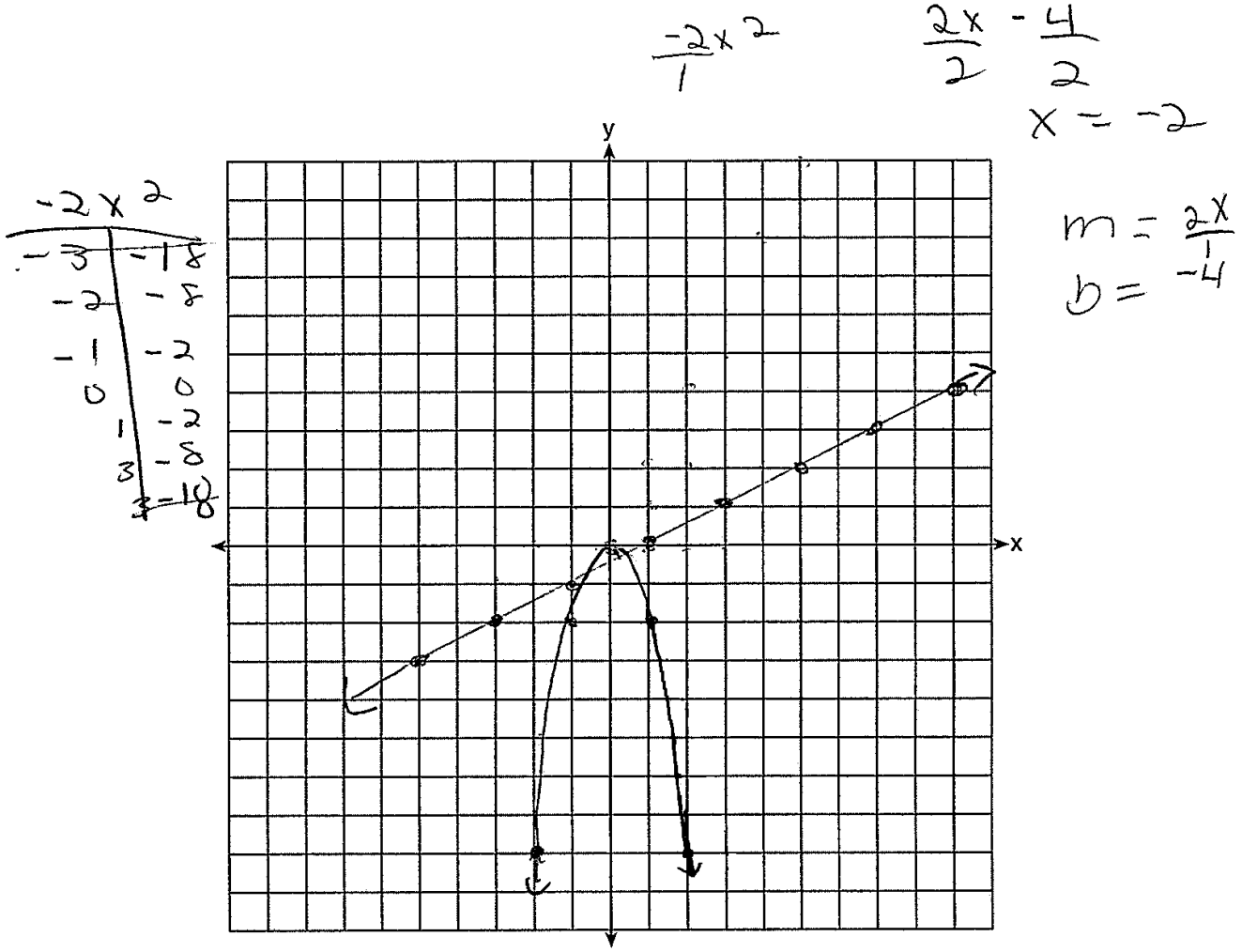


Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

Score 2: The student made a conceptual error by graphing $f(x) = -2x$ rather than $f(x) = -2x^2$, but graphed $g(x)$ correctly and found an appropriate x-value.

Question 35

35 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.

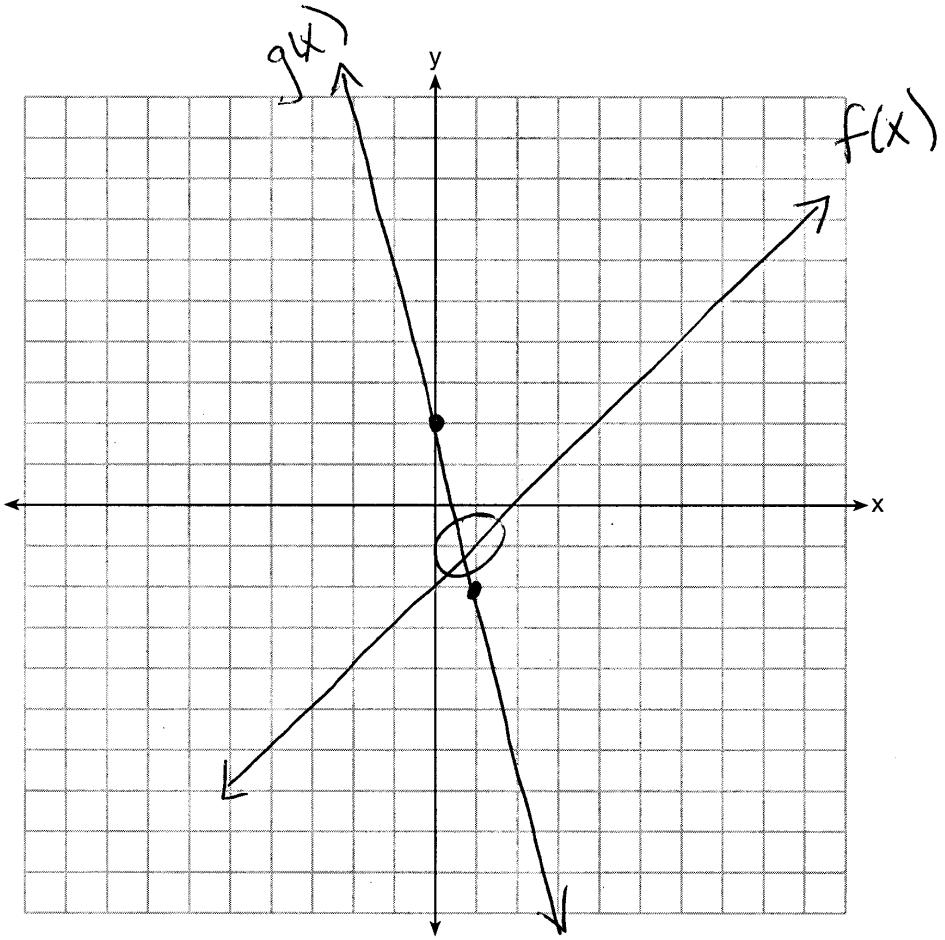


Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

Score 1: The student graphed $f(x)$ correctly, but showed no further correct work.

Question 35

35 Let $f(x) = -2x^2$ and $g(x) = 2x - 4$. On the set of axes below, draw the graphs of $y = f(x)$ and $y = g(x)$.

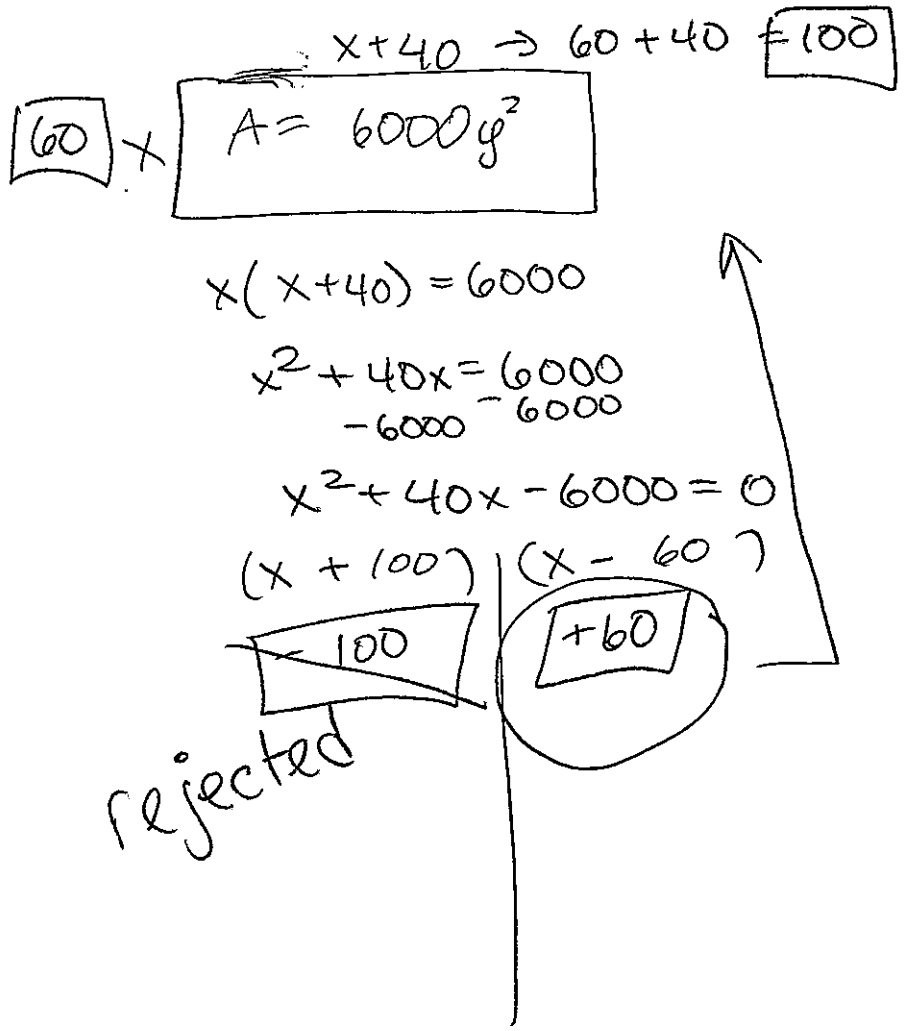


Using this graph, determine and state *all* values of x for which $f(x) = g(x)$.

Score 0: The student's work is completely incorrect.

Question 36

36 A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.



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

Question 36

36 A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.

$A = L \cdot W$

$6000 = x(x+40)$

$6000 = x^2 + 40x$

$-6000 \quad -6000$

$0 = x^2 + 40x - 6000$

$0 = (x-60)(x+100)$

$x-60=0 \quad | \quad x+100=0$

$+60 \quad +60 \quad | \quad -100 \quad -100$

$x = 60 \quad | \quad x = -100$

$x+40 = 100 \quad | \quad x+40 = -100+40$

$= -60$

Score 3: The student made an error by not rejecting the negative solution.

Question 36

36 A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.

Let x = width

$x + 40$ = length

$A = l \cdot w$

$6000 = x(x+40)$

$6000 = x^2 + 40x$

$-6000 \quad -6000$

$x^2 + 40x - 6000 = 0$

$(x+100)(x-60) = 0$

$x + 100 = 0 \quad | \quad x - 60 = 0$

$-100 \quad -100 \quad | \quad +60 \quad +60$

$x = -100 \quad | \quad x = 60$

$\{-100, 60\}$

-6000

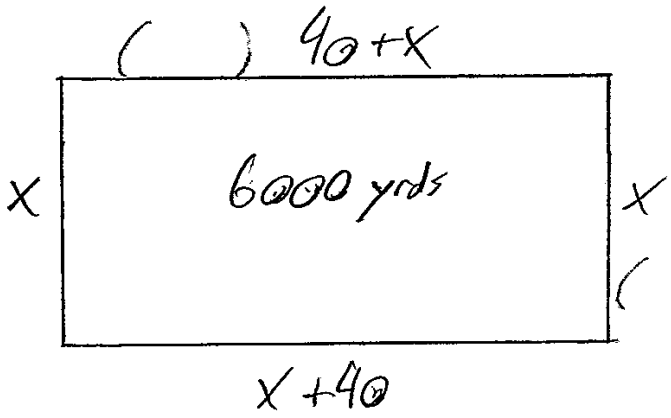
$100 \quad -60$

40

Score 2: The student did appropriate work to find 60, but did not find the length and did not reject the negative root.

Question 36

36 A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.



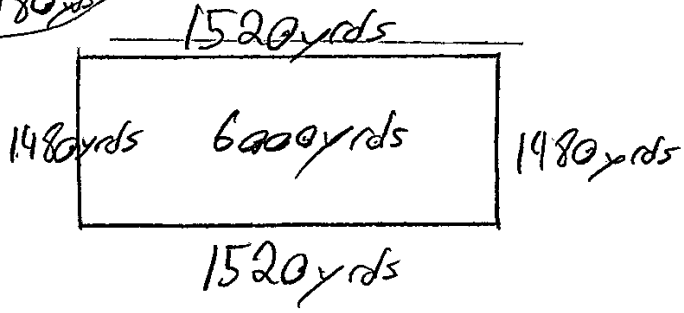
$x+x+x+40+x+40=6000$

$4x+80=6000$

$-80 \quad -80$

$\frac{4x}{4}=\frac{5920}{4}$

$x=1480$ yds



Score 2: The student made one conceptual error by using the perimeter rather than area formula.

Question 36

36 A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.

width = x
length = $x+40$

$x(x+40)=6000$

$x^2+40x=6000$
$-6000 \quad -6000$

$x^2+40x-6000$
$(x+100)(x-60)$

Score 1: The student factored the trinomial correctly, but did not set the factors equal to zero. The student showed no further correct work.

Question 36

36 A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.

wide long

$x(40x) = 6000$

$40x^2 = 6000$

$\sqrt{x^2} = \sqrt{150}$

$x = 12.25$

$40x = 490$

Score 1: The student made an error in expressing the length, and then made a rounding error.

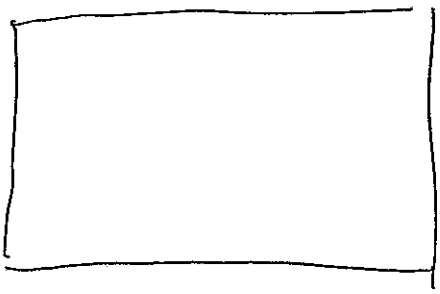
Question 36

36 A school is building a rectangular soccer field that has an area of 6000 square yards. The soccer field must be 40 yards longer than its width. Determine algebraically the dimensions of the soccer field, in yards.

$A = 6000$

$6000 = 2w \cdot l$ ~~$= w + 40$~~

$l = 40 + w$



$6000 = w \cdot 1(40 + w)$

$6000 = w \cdot 40 + w$

$\frac{6000}{40} = \frac{2w \cdot 40}{40}$

$150 = 2w$

$\frac{150}{2} = w$

$75 = w$

$l = 40 + 75$

$l = 115$

150
40 | 6000
−40
200
−200
0

$w = 75$
$l = 115$

Score 0: The student wrote the equation $6000 = w(40 + w)$, but showed no further correct work.

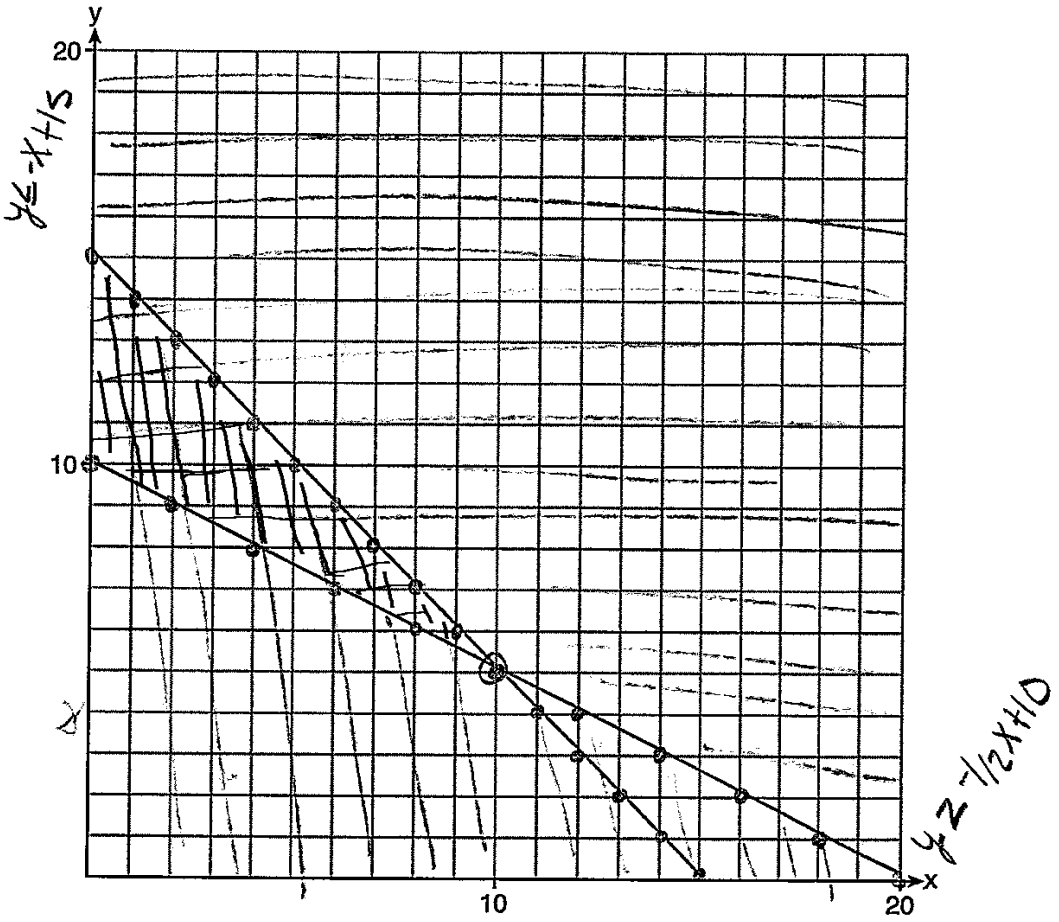
Question 37

37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

Write a system of inequalities that can be used to represent the situation.

$y \leq -x + 15$ $x + y \leq 15$ $4x + 8y \geq \$80$ $y \geq -\frac{1}{2}x + 10$

Graph these inequalities on the set of axes below.



Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

baby 1:10
(10, 5)

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

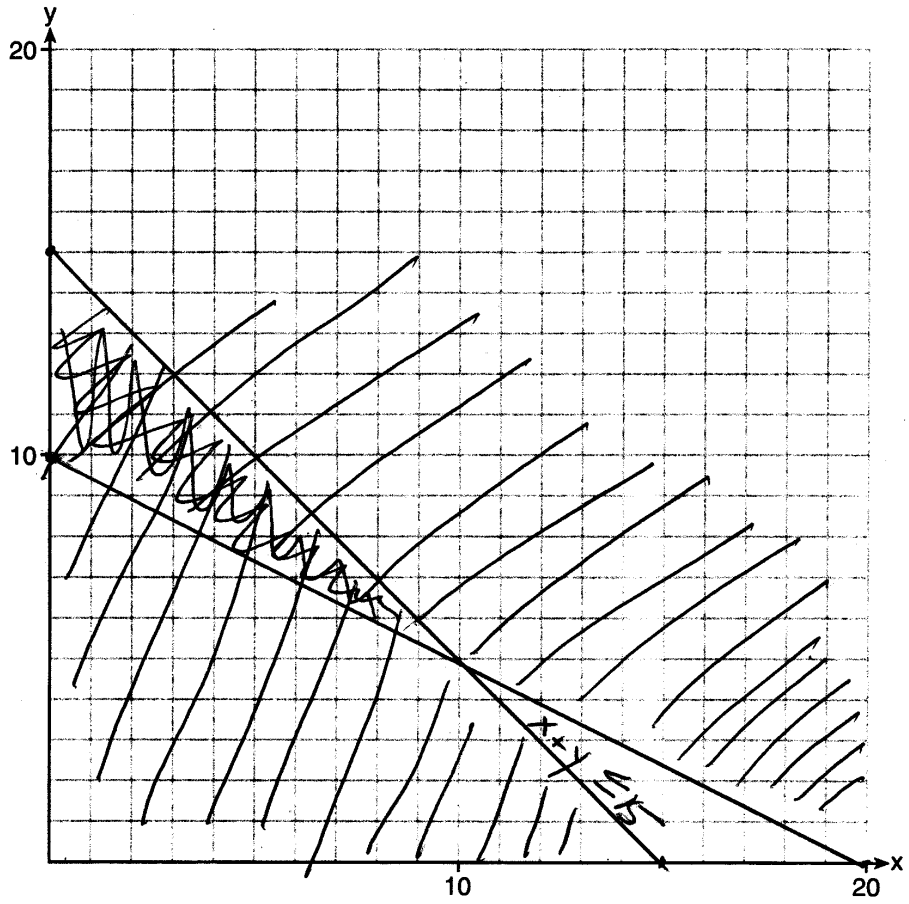
Question 37

37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

Write a system of inequalities that can be used to represent the situation.

$x + y \leq 15$ $\quad$ $4x + 8y \geq 80$

Graph these inequalities on the set of axes below.



Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

2 and 12

Score 5: The student did not indicate which choice of hours corresponds with which job.

Question 37

37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

Write a system of inequalities that can be used to represent the situation.

$x + y \leq 15$

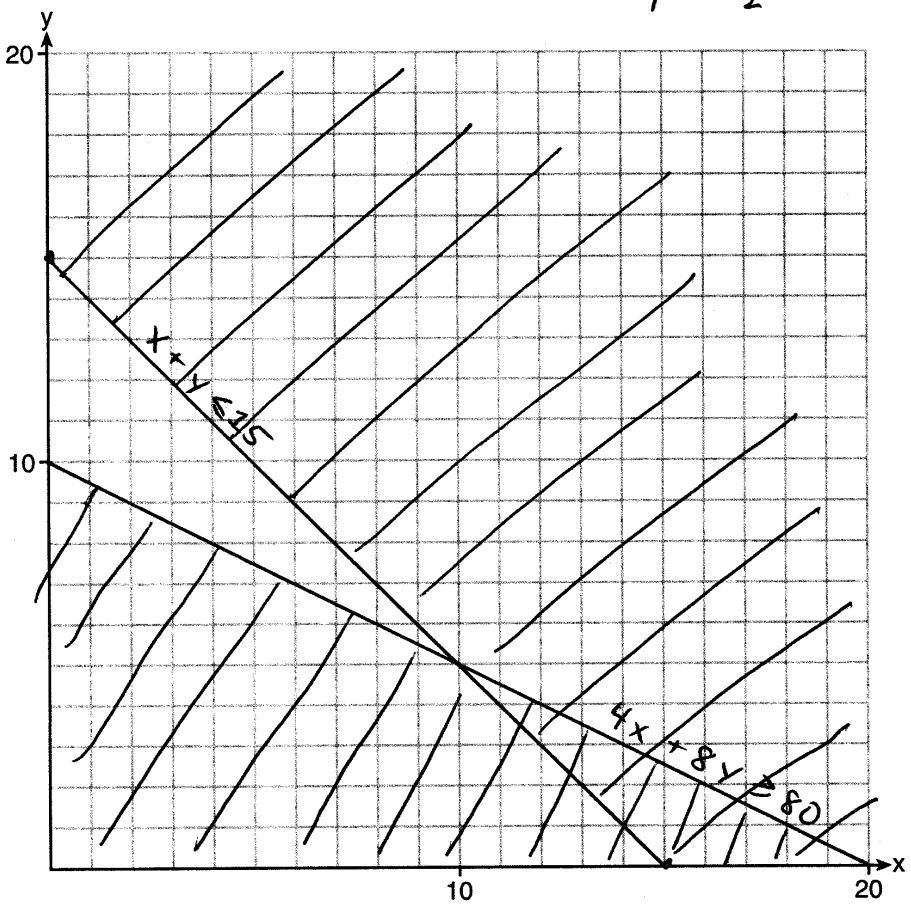
$y \leq -x + 15$

$4x + 8y \geq 80$

$8y \geq -4x + 80$

$y \geq -\frac{1}{2}x + 10$

Graph these inequalities on the set of axes below.



Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

$4(4) = 16$

$10(8) = 80$

96

Babysitting 4 hrs

Library 10 hrs

Score 5: The student made one graphing error by shading both lines in the wrong direction.

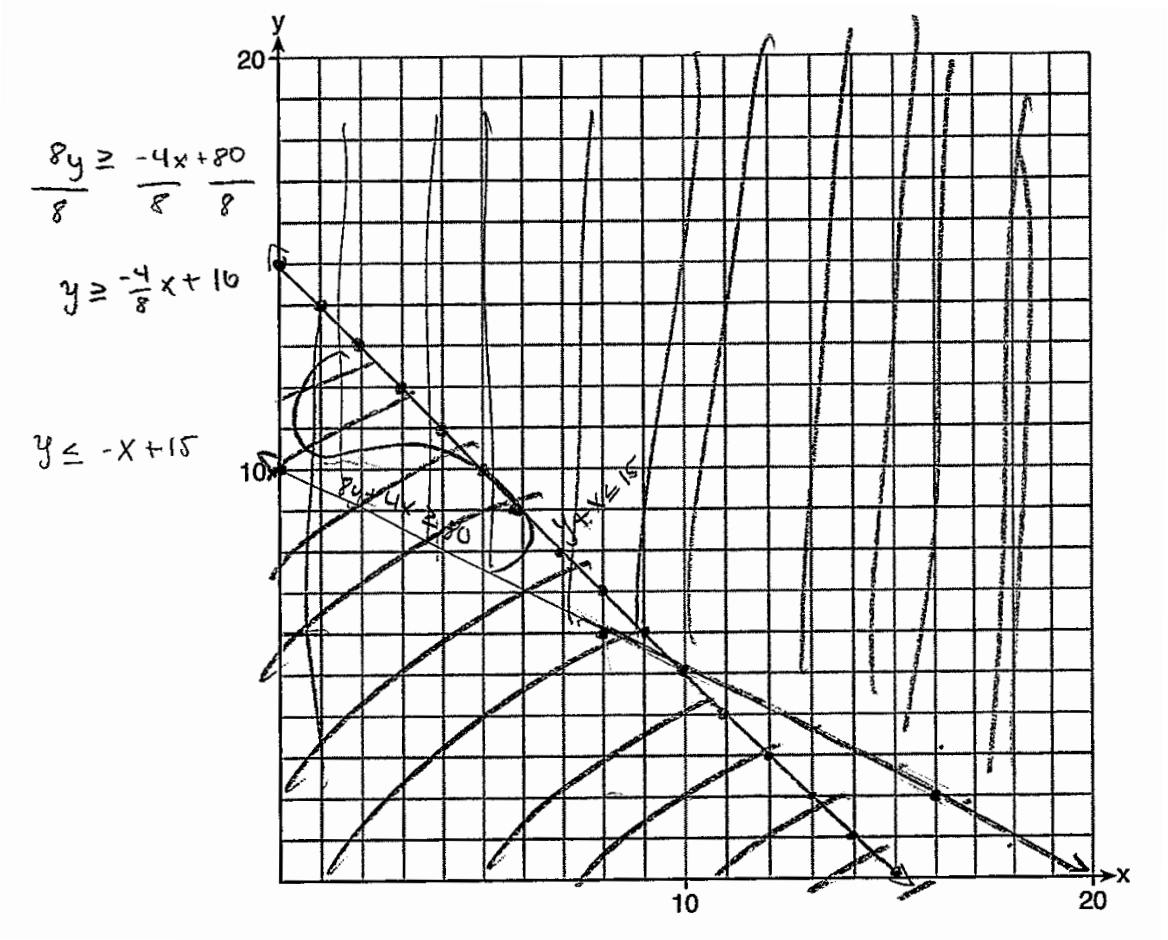
Question 37

37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

Write a system of inequalities that can be used to represent the situation.

$8y + 4x \geq 80$ $\quad\quad$ $y + x \leq 15$

Graph these inequalities on the set of axes below.



Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

(10, 3)

Score 5: The student stated an incorrect combination of hours.

Question 37

37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

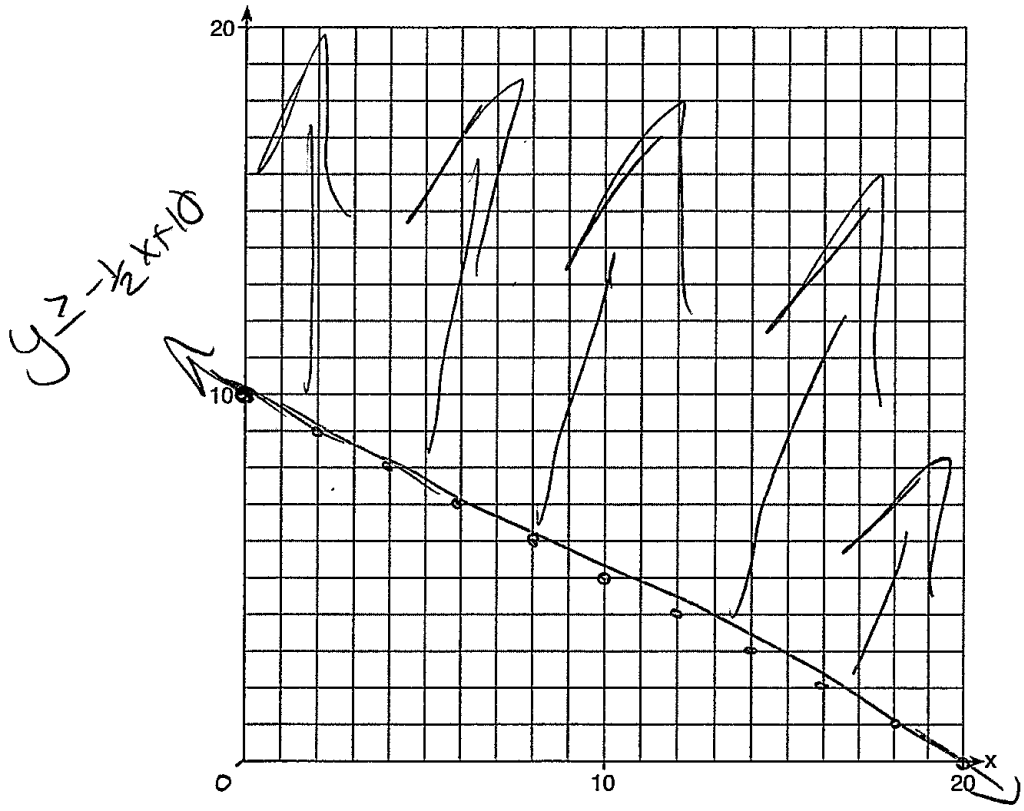
Write a system of inequalities that can be used to represent the situation.

$\frac{8}{8}y \geq -4x + 80$ $\quad x + y \leq 15$ $\quad 8y + 4x \geq 80$

8

$y \geq -\frac{1}{2}x + 10$

Graph these inequalities on the set of axes below.



Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

$8(8) + 4(5)$

$64 \quad 20$

84

library assitant - 8hours
babysit - 5hours

Score 4: The student stated both inequalities and a correct combination of hours, but did not graph both inequalities.

Question 37

37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

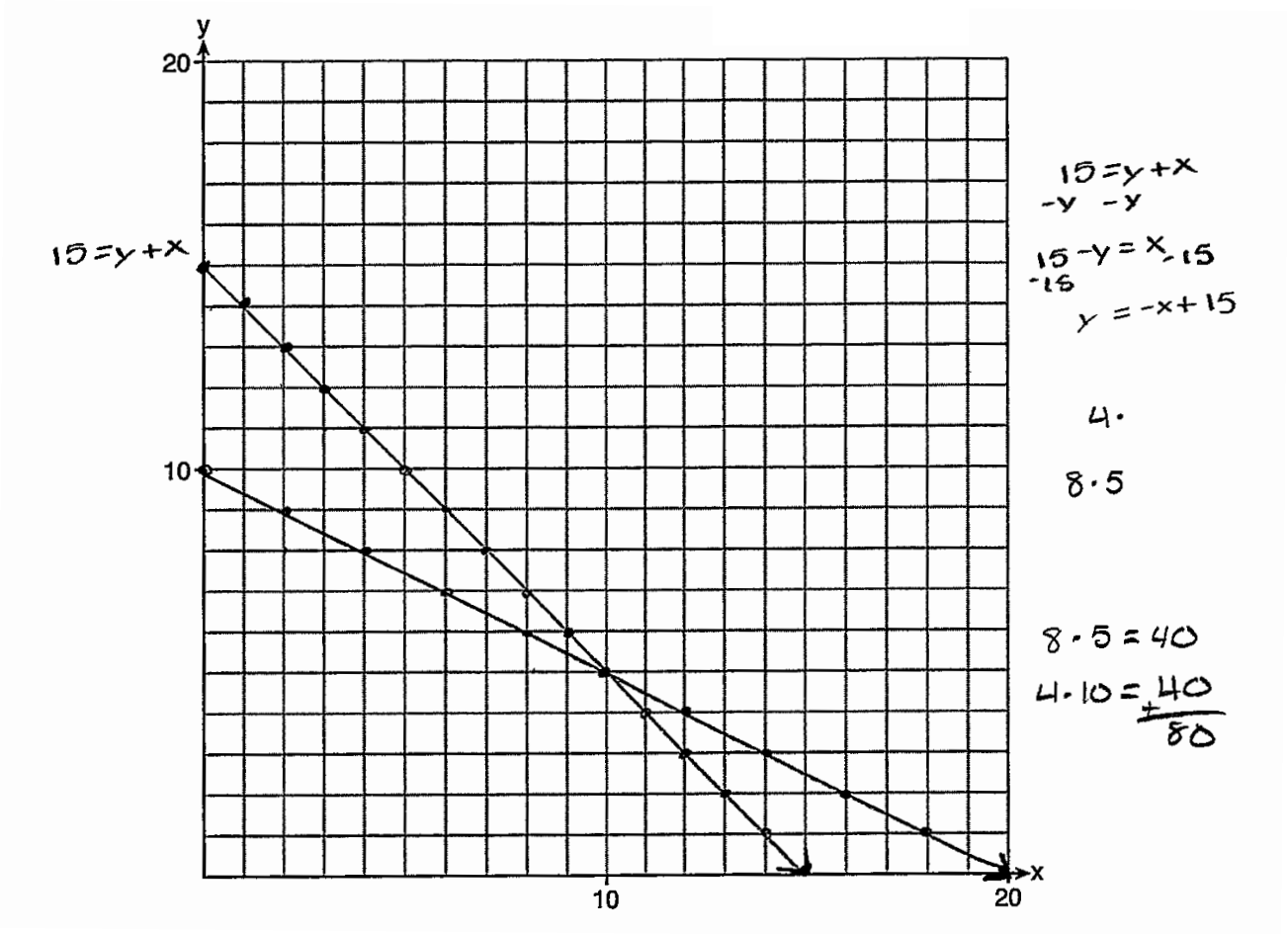
Write a system of inequalities that can be used to represent the situation.

$80 = 8y + 4x$

$15 = y + x$

$80 = 8y + 4x$
$-4x \quad -4x$
$\frac{8y}{8} = \frac{80}{8} - \frac{4x}{8}$
$y = 10 - .5x$

Graph these inequalities on the set of axes below.



$15 = y + x$
$-y \quad -y$
$15 - y = x$
$-15 \quad -15$
$y = -x + 15$

4.

8.5

$8.5 = 40$
$4.10 = 40$
80

Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

5 hours at the library and ten hours babysitting

Score 4: The student made one conceptual error in expressing inequalities as equations.

Question 37

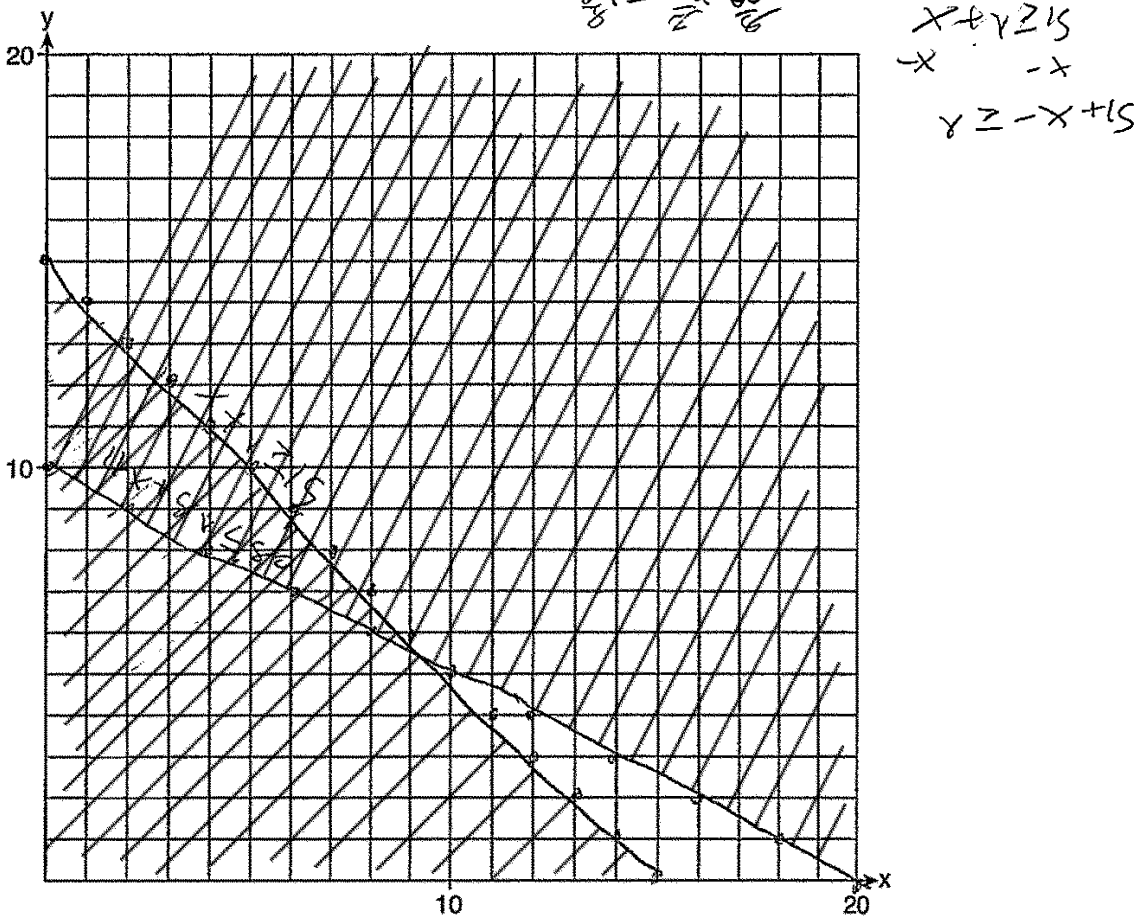
37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

Write a system of inequalities that can be used to represent the situation.

$4x + 8y \leq 80$

$x + y \geq 15$

Graph these inequalities on the set of axes below.



Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

If she works 9 hours as a library assistant and 2 hours as a baby sitter.

Score 3: The student made a conceptual error by writing both inequalities with an incorrect symbol. The student made a graphing error based on the system written. The student stated a correct combination of hours.

Question 37

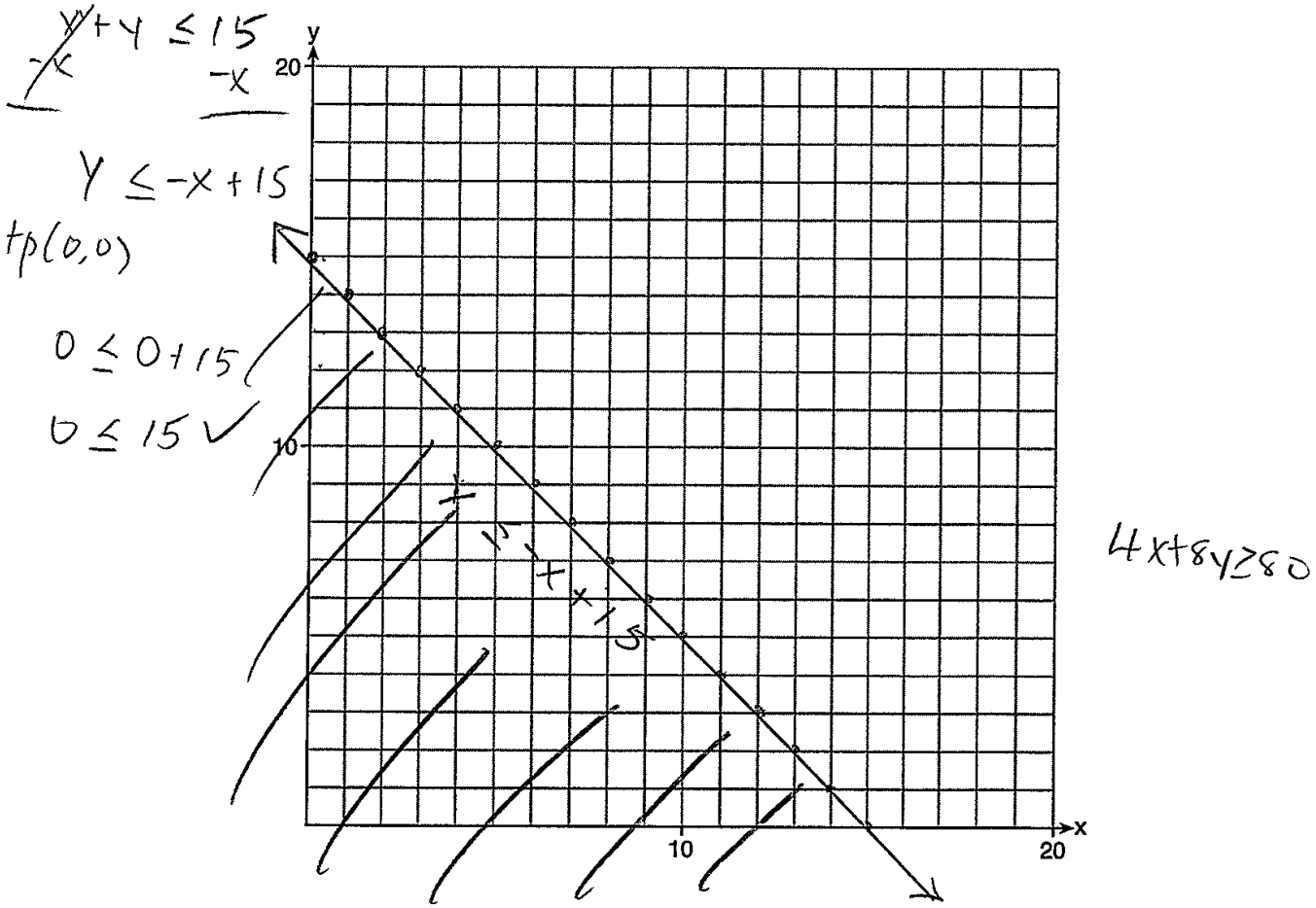
37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs. let x = # of hrs babysitting y = # of hrs @ library

Write a system of inequalities that can be used to represent the situation.

$4(x + y \leq 15)$
$4x + 8y \geq 80$

$-4x - 4y \geq -60$
$4x + 8y > 80$
$4y > 20$
$\frac{4y}{4} > \frac{20}{4}$
$y > 5$

Graph these inequalities on the set of axes below.



Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

Score 3: The student stated both inequalities correctly but only graphed, shaded, and labeled one correctly. A combination of hours was not stated.

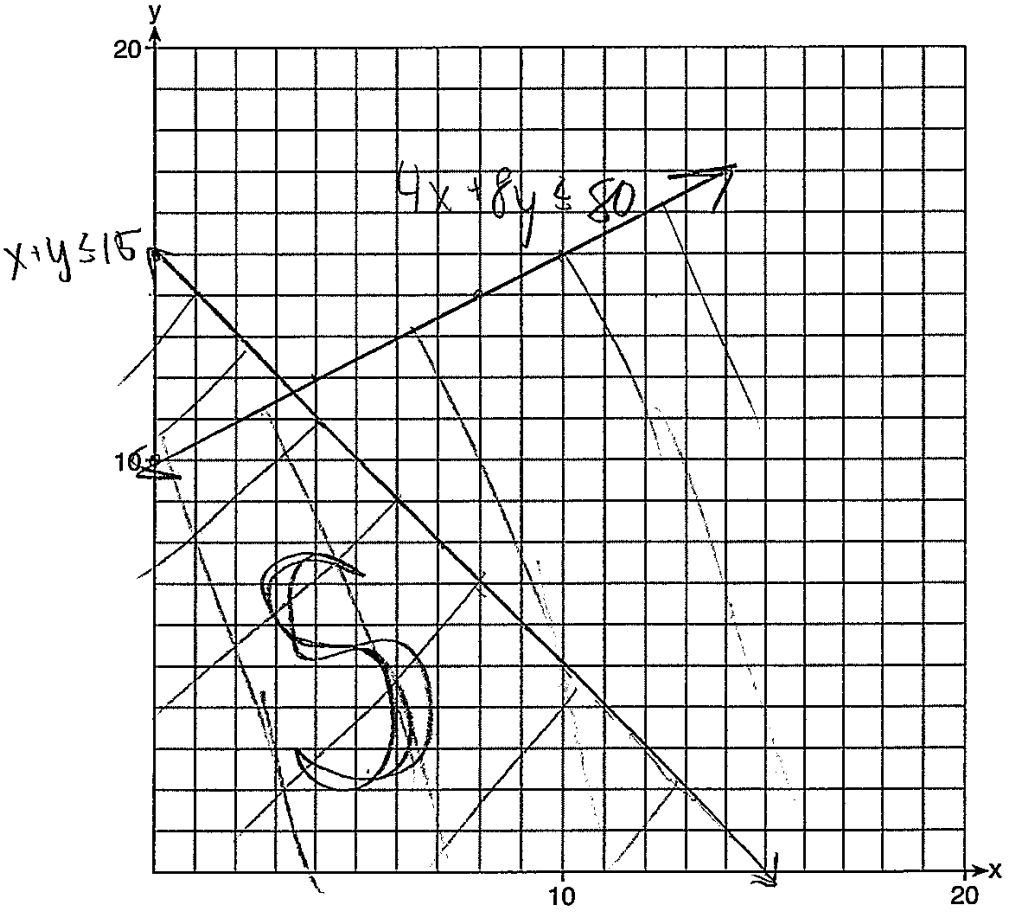
Question 37

37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

Write a system of inequalities that can be used to represent the situation.

$x + y \leq 15$ $\quad 4x + 8y \leq 80$ $\quad y \leq \frac{1}{2}x + 10$

Graph these inequalities on the set of axes below.



Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

$x = 2$

$y = 3$

Score 3: The student wrote only one inequality correctly, graphed it correctly, and stated and labeled an appropriate combination of hours based on the graph.

Question 37

37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

babysits hours: x $4 an hour
library hours: y $8 an hour
no more than 15 hours
at least $80

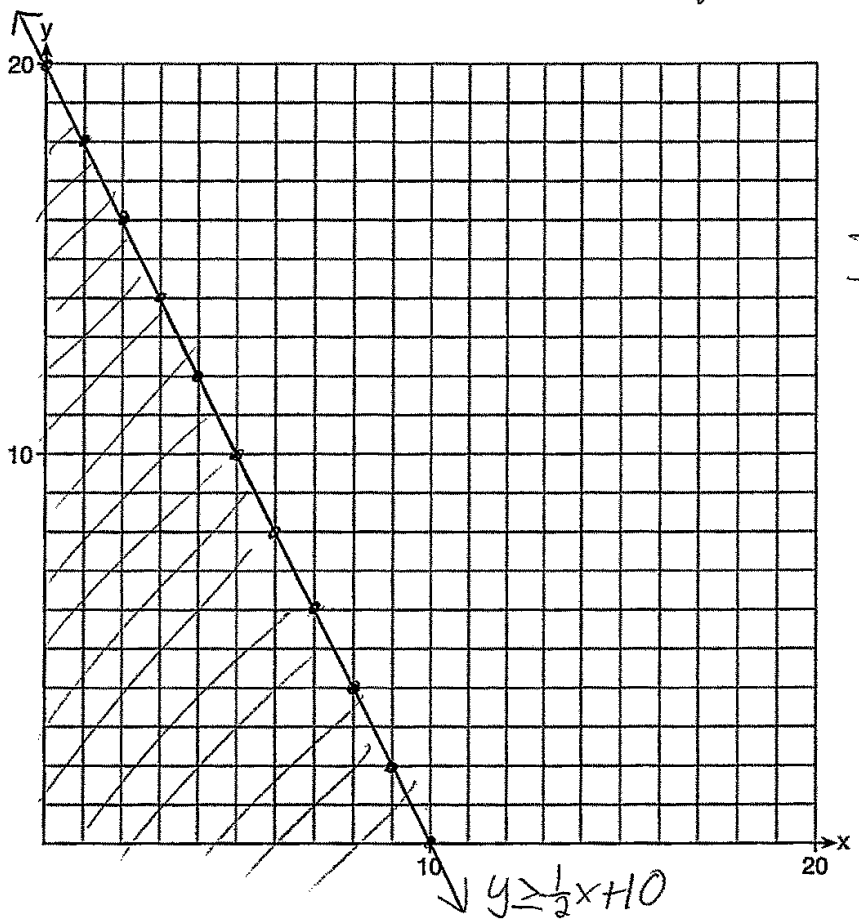
Write a system of inequalities that can be used to represent the situation.

$y \geq -\frac{1}{2}x + 10$

$4x + 8y \geq 80$
$-4x \quad -4x$
$8y \geq -4x + 80$

$y \geq \frac{1}{2}x + 10$

Graph these inequalities on the set of axes below.



x	y
-6	13
-4	12
-2	11
0	10
2	9
4	8
6	7

Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

10 hours in the library & 5 hours babysitting = $100

Score 2: The student wrote one inequality correctly and stated a correct combination of hours.

Question 37

37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

Write a system of inequalities that can be used to represent the situation.

$4x + 8y = 80$

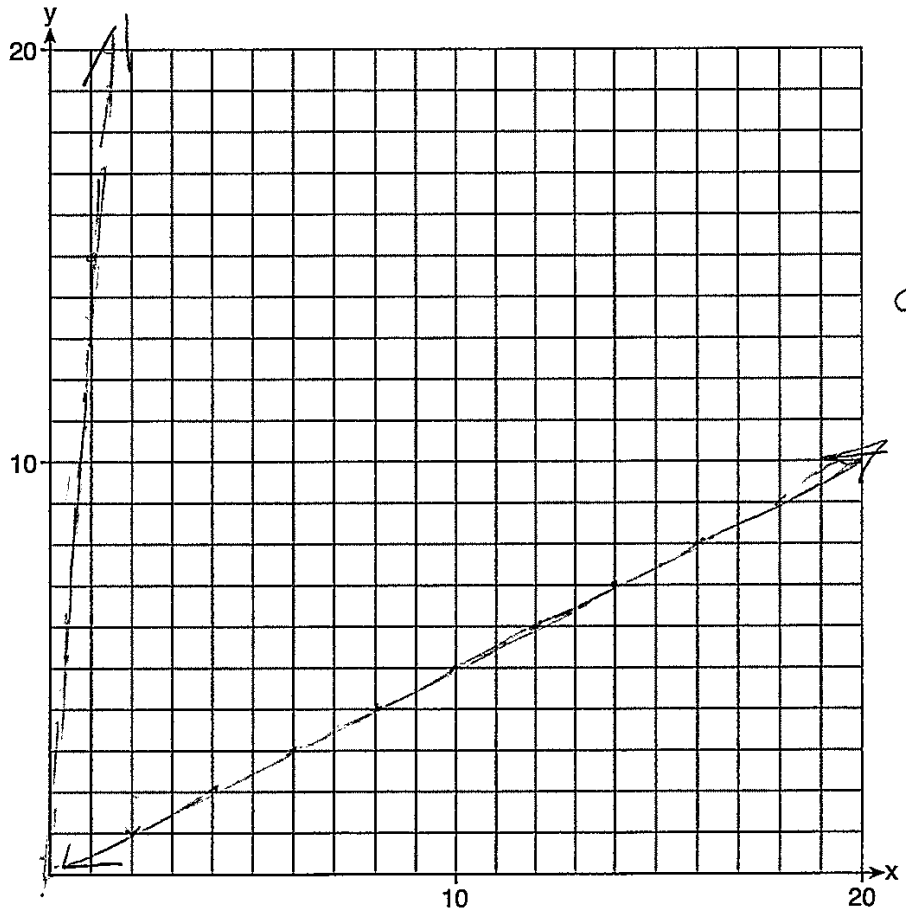
$x + y = 15$

$y = 15 - x$

$8y = 80 - 4x$

$y = 10 - \frac{1}{2}x$

Graph these inequalities on the set of axes below.



$y = -\frac{1}{2}x + 10$ rejected

$y = \frac{1}{2}x + 10$

Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

Score 1: The student stated two correct equations, but showed no further correct work.

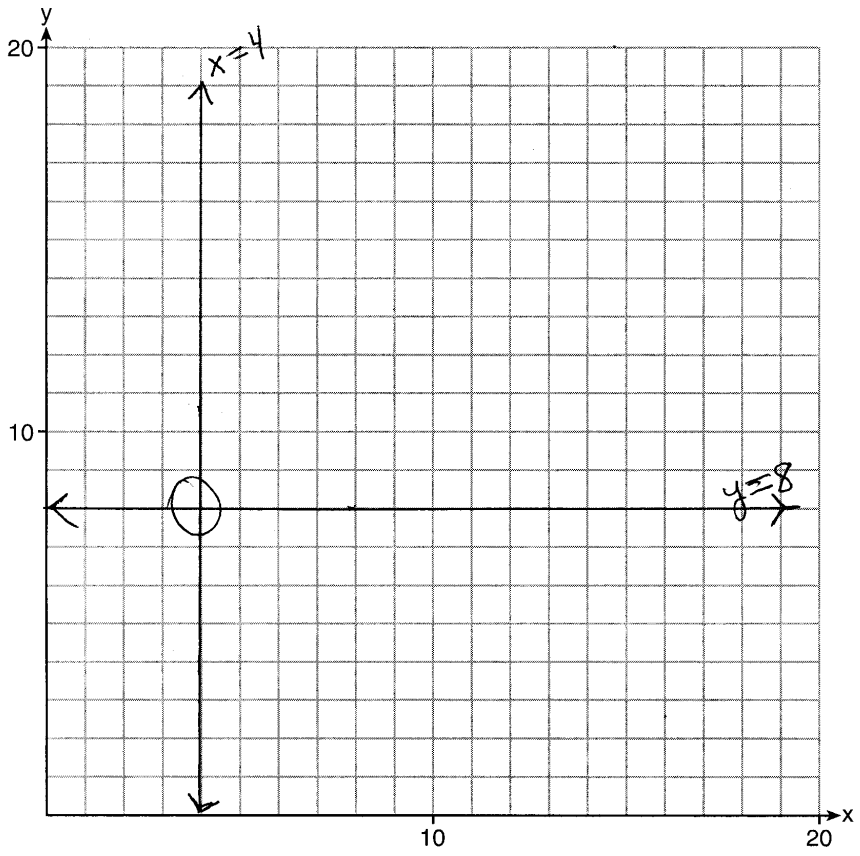
Question 37

37 Edith babysits for x hours a week after school at a job that pays \$4 an hour. She has accepted a job that pays \$8 an hour as a library assistant working y hours a week. She will work both jobs. She is able to work *no more than* 15 hours a week, due to school commitments. Edith wants to earn *at least* \$80 a week, working a combination of both jobs.

Write a system of inequalities that can be used to represent the situation.

$x = 4$ and $y = 8$

Graph these inequalities on the set of axes below.



Determine and state one combination of hours that will allow Edith to earn *at least* \$80 per week while working *no more than* 15 hours.

Score 0: The student has a completely incorrect response.