The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

Thursday, January 26, 2017 — 1:15 to 4:15 p.m.

MODEL RESPONSE SET

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Question 25

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

No he is not correct because they are the same line so all points on $y=3x-2$ are on the line $6x-2y=4$

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

Question 25

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

$y = 3x - 2$ $\quad 6x - 2y = 4$

$6x - 4 = 2y$

$3x - 2 = y$

John is incorrect, because the equations are the same, the solution set is any point on the line.

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

Question 25

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

$6x - 2y = 4$
$6x - 4 = 2y$
$3x - 2 = y$

No, they are the same line

Score 1: The student wrote an incomplete explanation.

Question 25

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

The two lines are the same so there are an infinite number of solutions.

Score 1: The student wrote a correct explanation, but did not indicate he is incorrect.

Question 25

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

$6x-2y=4$
$-2y=4-6x$
$y=3x-2$

He is correct. Because this two equations is have same answer. Both is $y=3x-2$. That is why is only have one line.

Score 0: The student wrote an incomplete explanation, and stated "he is correct" instead of "he is incorrect."

Question 25

25 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

He is wrong

Score 0: The student did not write an explanation.

Question 26

26 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

1 mile = 1.609 kilometers

$\frac{1\text{ mi}}{1.609\text{km}} = \frac{26.2\text{ mi}}{X\text{ km}}$

$X = 42.1558$ km / marathon

$\frac{12\text{ km}}{1\text{ hr}} = \frac{42.1558}{X\text{ hrs.}}$

$12X = 42.1558$

$X = 3.5129\overline{83}$

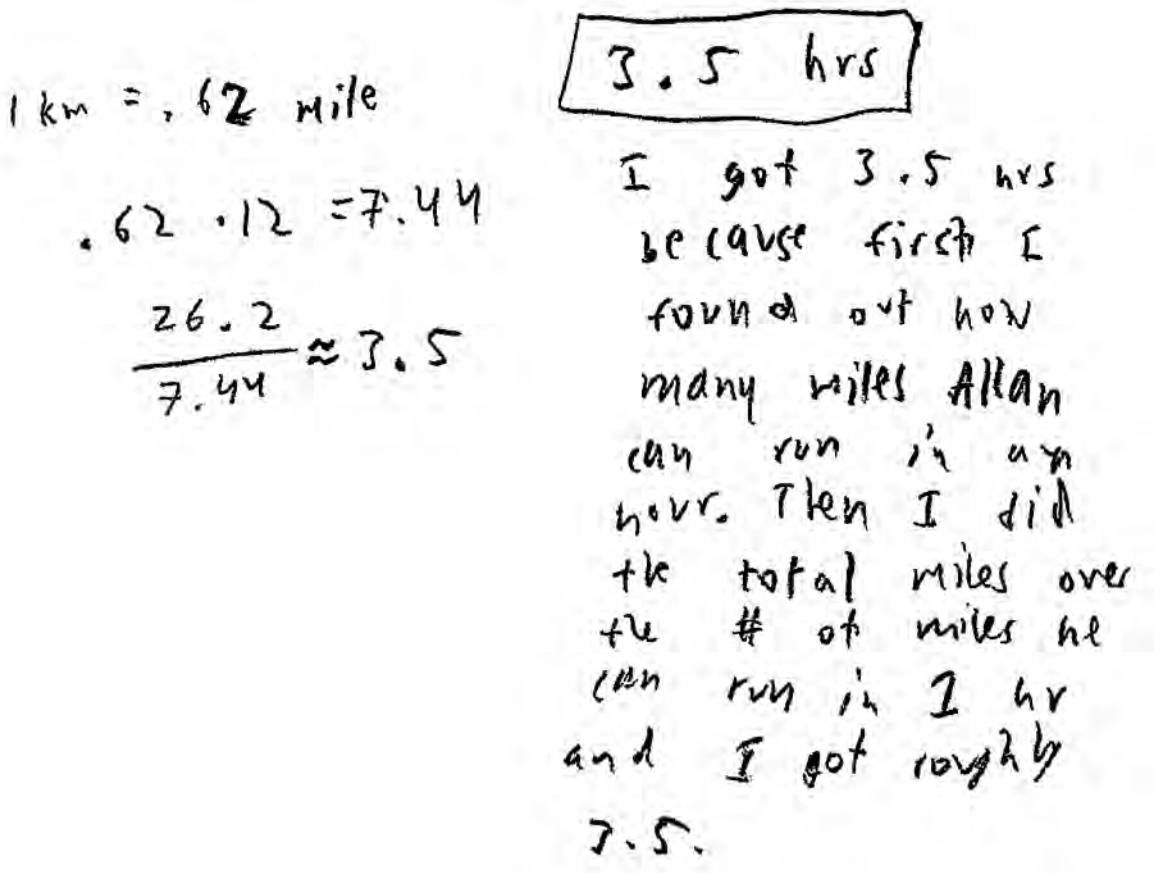
$X \approx$ 3.5 hrs.

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

Question 26

26 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

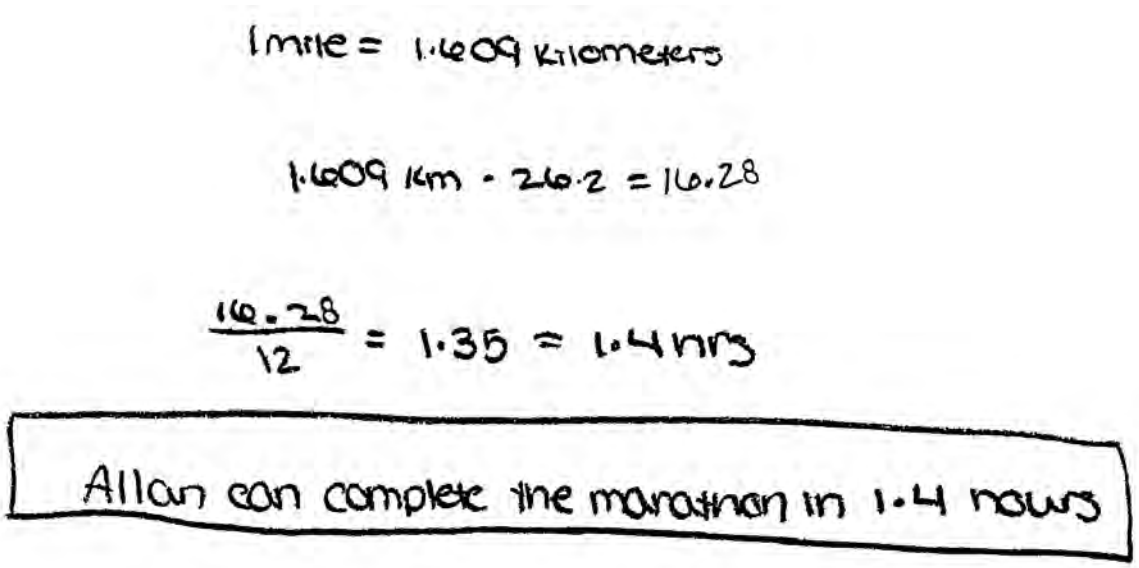


Score 2: The student gave a complete and correct response.

Question 26

26 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

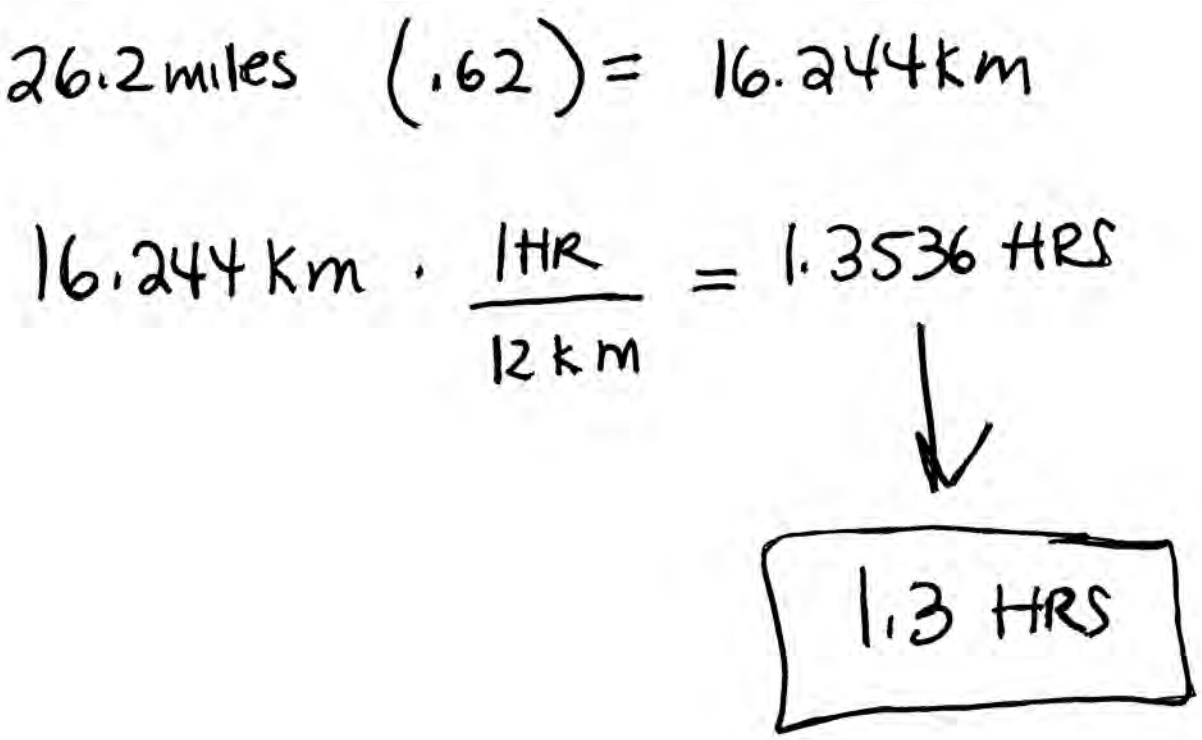


Score 1: The student made an error when converting 26.2 miles to km.

Question 26

26 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.



Score 0: The student made more than one error.

Question 27

27 Solve the inequality below:

$$1.8 - 0.4y \geq 2.2 - 2y$$

$1.8 - 0.4y + 2y \geq 2.2 - 2y + 2y$

$1.8 + 1.6y \geq 2.2$

$-1.8 \quad -1.8$

$1.6y \geq .4$

$\frac{1.6y}{1.6} \geq \frac{.4}{1.6}$

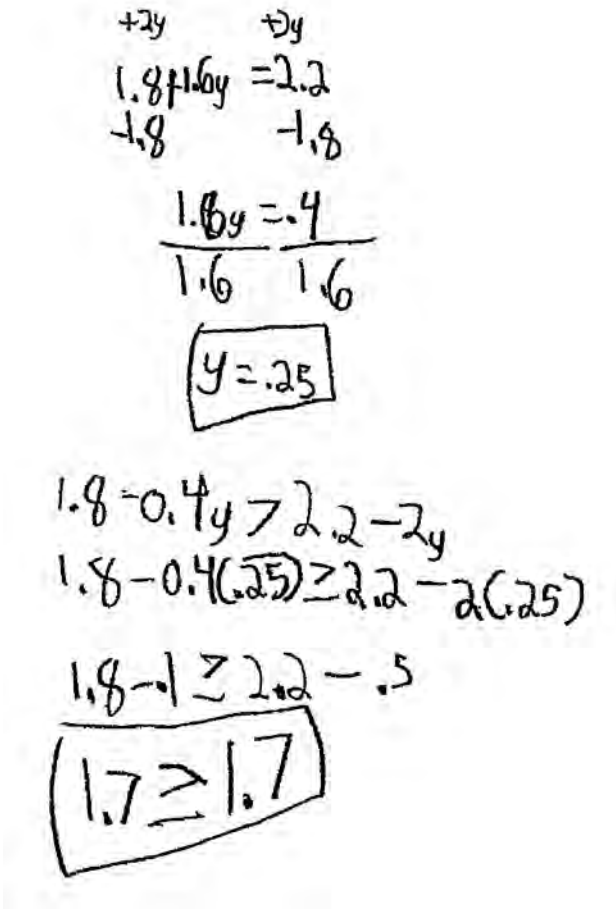
$y \geq .25$

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

Question 27

27 Solve the inequality below:

$$1.8 - 0.4y \geq 2.2 - 2y$$



Score 1: The student solved the inequality as an equation.

Question 27

27 Solve the inequality below:

$1.8 - 0.4y \geq 2.2 - 2y$

+2y +2y

1.8 + 1.6y ≥ 2.2

-1.8 -1.8

-1.6y ≥ .4

-1.6 -1.6

y ≤ -.25

Score 1: The student made an error when adding $+2y$ to both sides of the equation.

Question 27

27 Solve the inequality below:

$1.8 - 0.4y \geq 2.2 - 2y$

$+0.4y \quad +0.4y$

$1.8 \geq 2.2 - 1.6y$

$-2.2 \quad -2.2$

$-0.4 \geq -1.6y$

$-1.6 \quad -1.6$

$-0.25 \geq y$

Score 0: The student made more than one error.

Question 28

28 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

No Jacob is not correct because everytime a rational number and an irrational number are added the outcome is always irrational.

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

Question 28

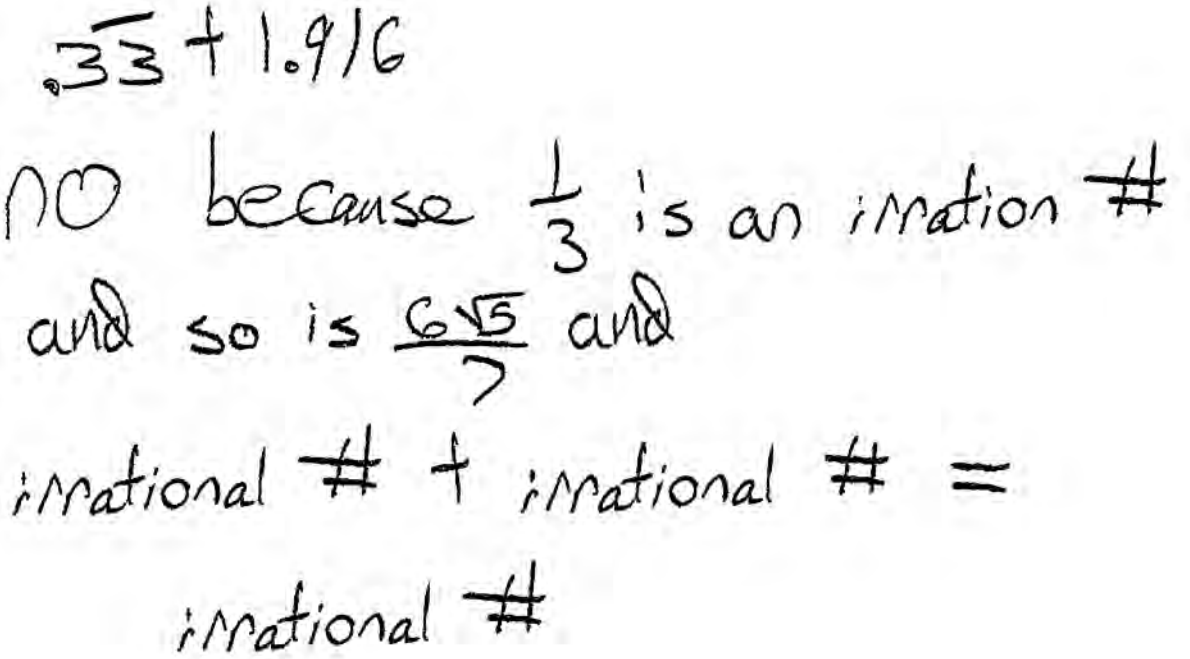
28 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

$\frac{1}{3} + \frac{6\sqrt{5}}{7} = \frac{7+18\sqrt{5}}{21}$ No Jakob is not correct

Score 1: The student wrote a justification, not an explanation.

Question 28

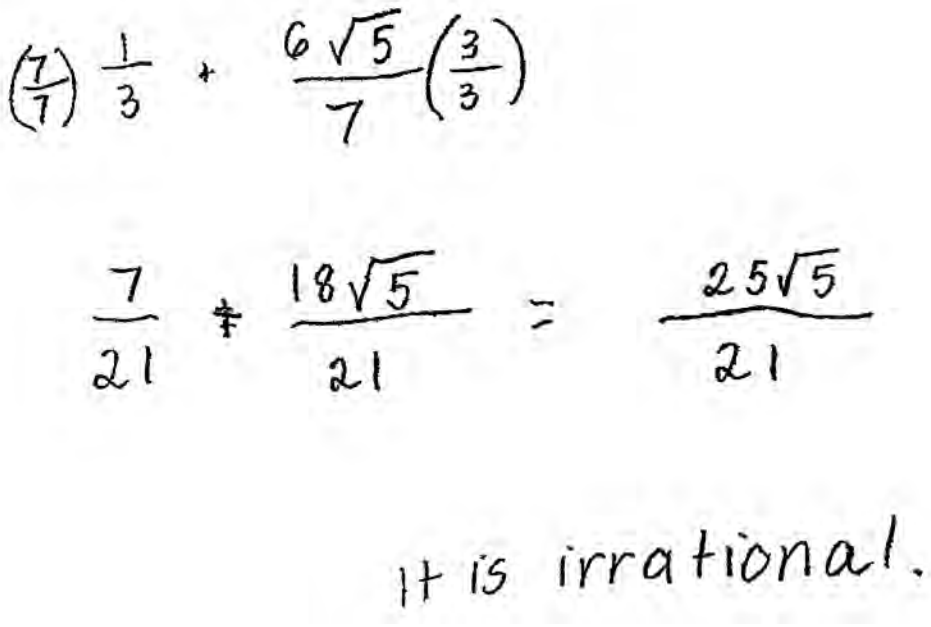
28 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.



Score 1: The student incorrectly identified $\frac{1}{3}$ as being an irrational number.

Question 28

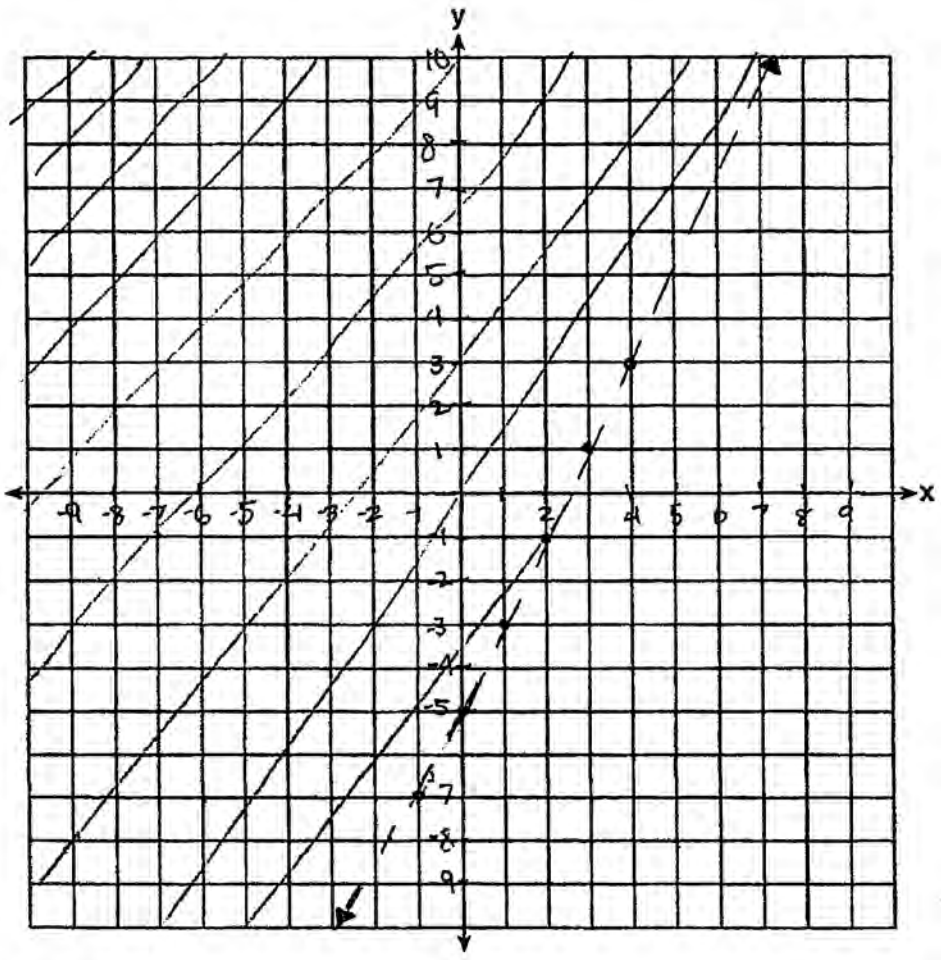
28 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.



Score 0: The student made an error adding the fractions and did not write an explanation or answer no.

Question 29

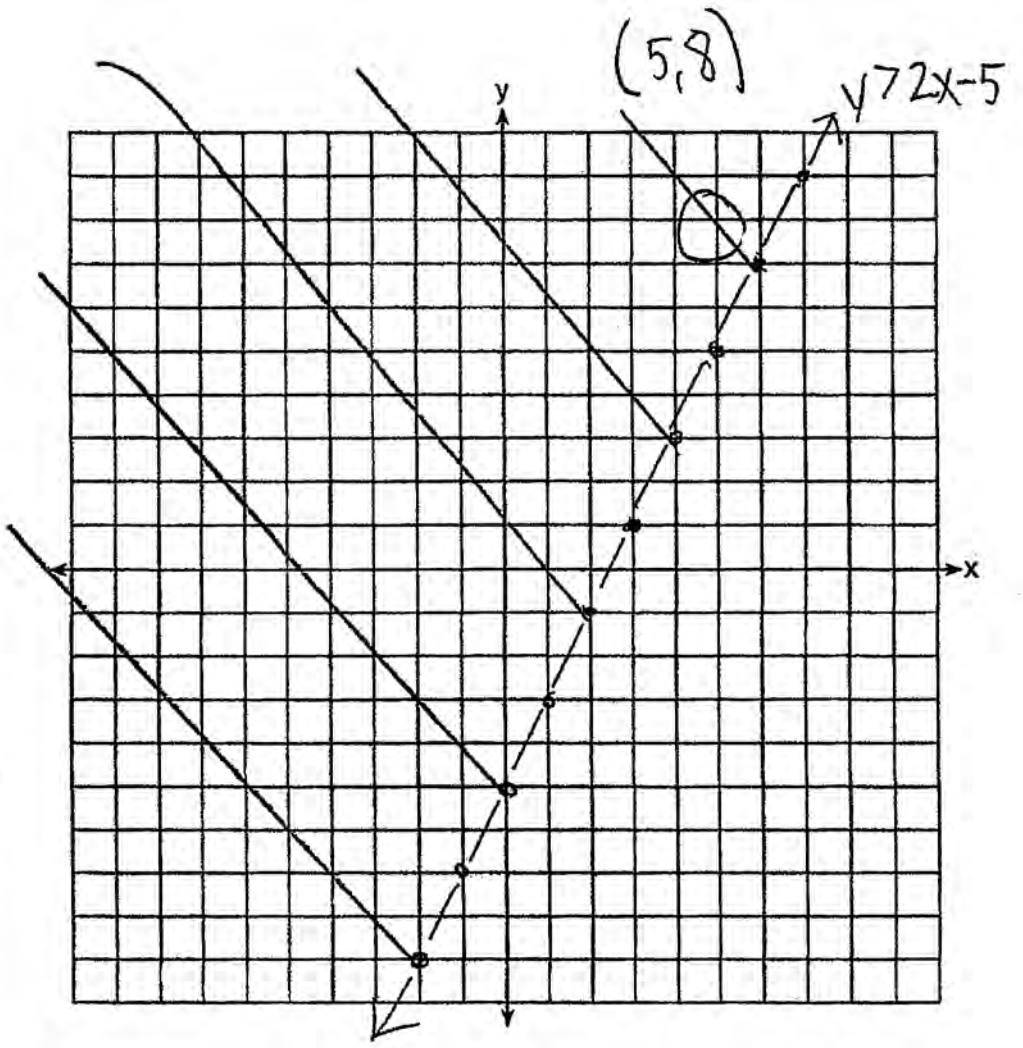
29 Graph the inequality $y > 2x - 5$ on the set of axes below.
State the coordinates of a point in its solution.



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

Question 29

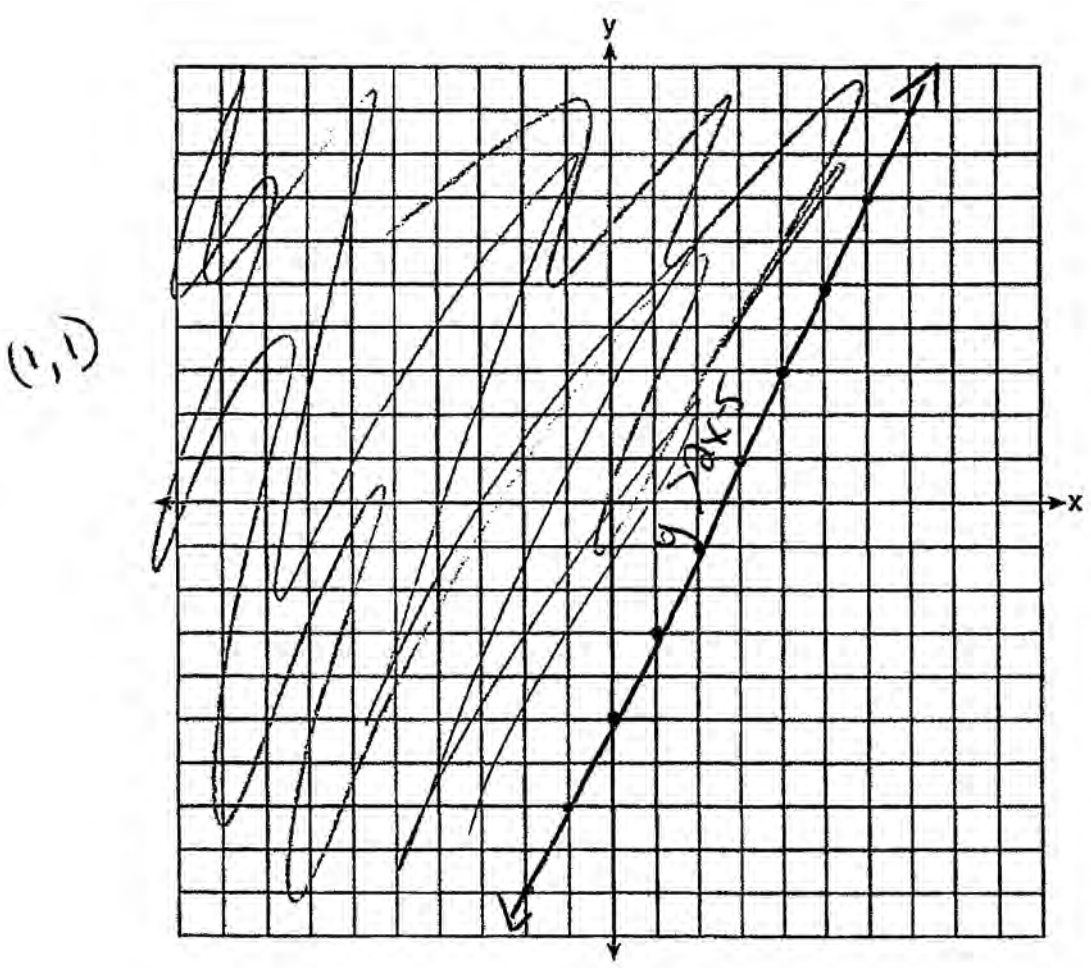
29 Graph the inequality $y > 2x - 5$ on the set of axes below.
State the coordinates of a point in its solution.



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

Question 29

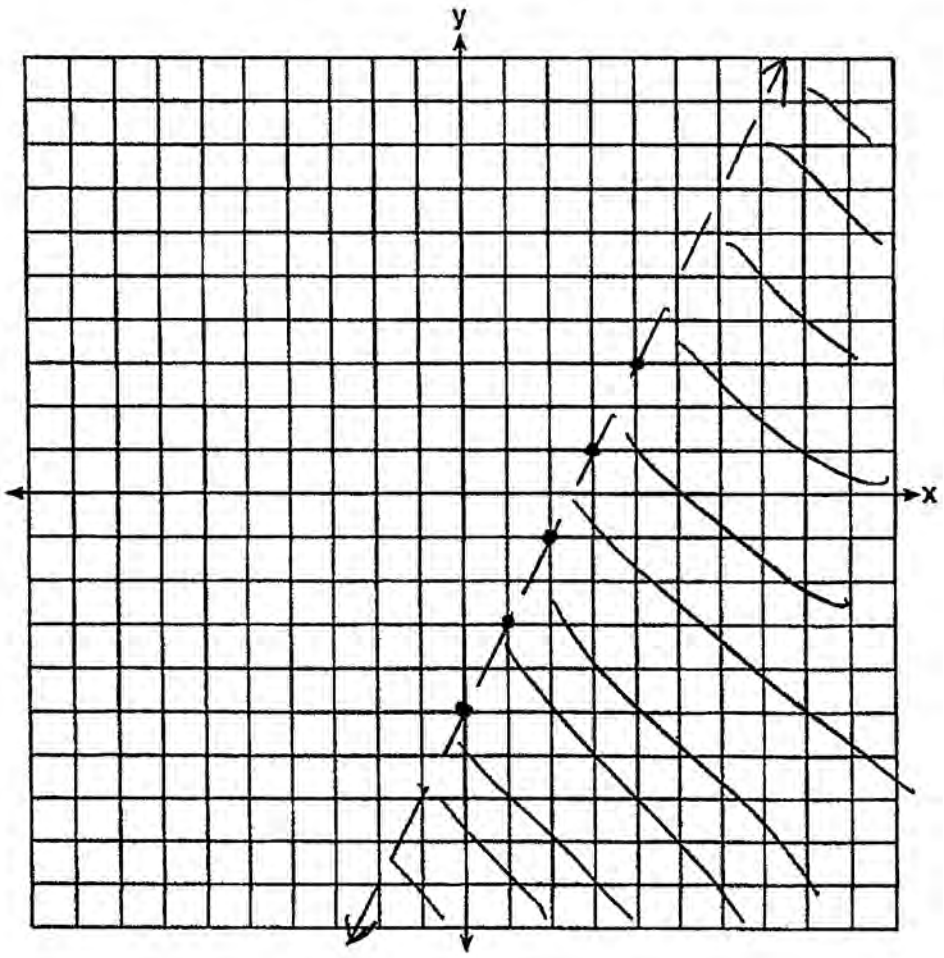
29 Graph the inequality $y > 2x - 5$ on the set of axes below.
State the coordinates of a point in its solution.



Score 1: The student graphed a solid line, but stated an appropriate point in the solution.

Question 29

29 Graph the inequality $y > 2x - 5$ on the set of axes below.
State the coordinates of a point in its solution.

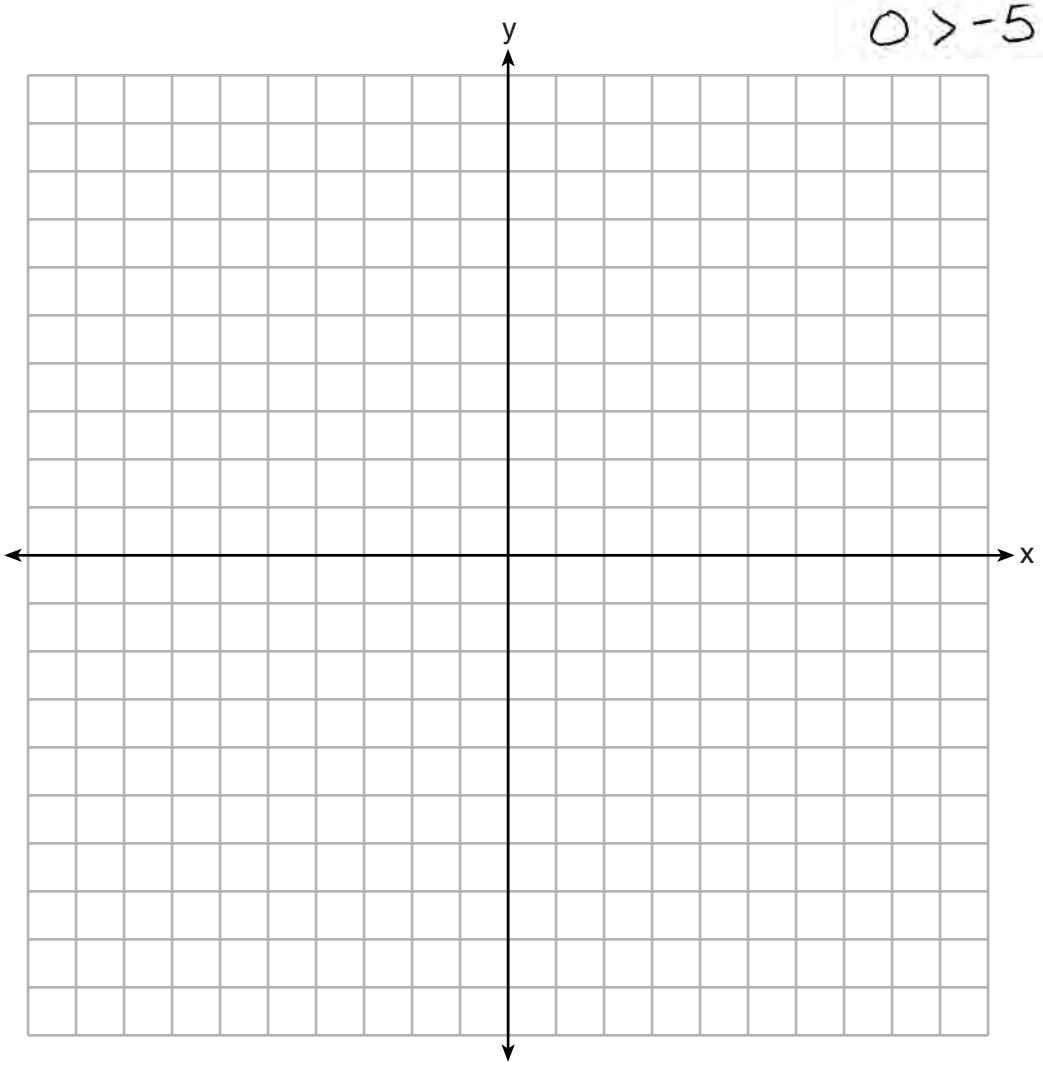


Score 1: The student shaded the wrong side, but stated an appropriate point in the solution.

Question 29

29 Graph the inequality $y > 2x - 5$ on the set of axes below.
State the coordinates of a point in its solution.

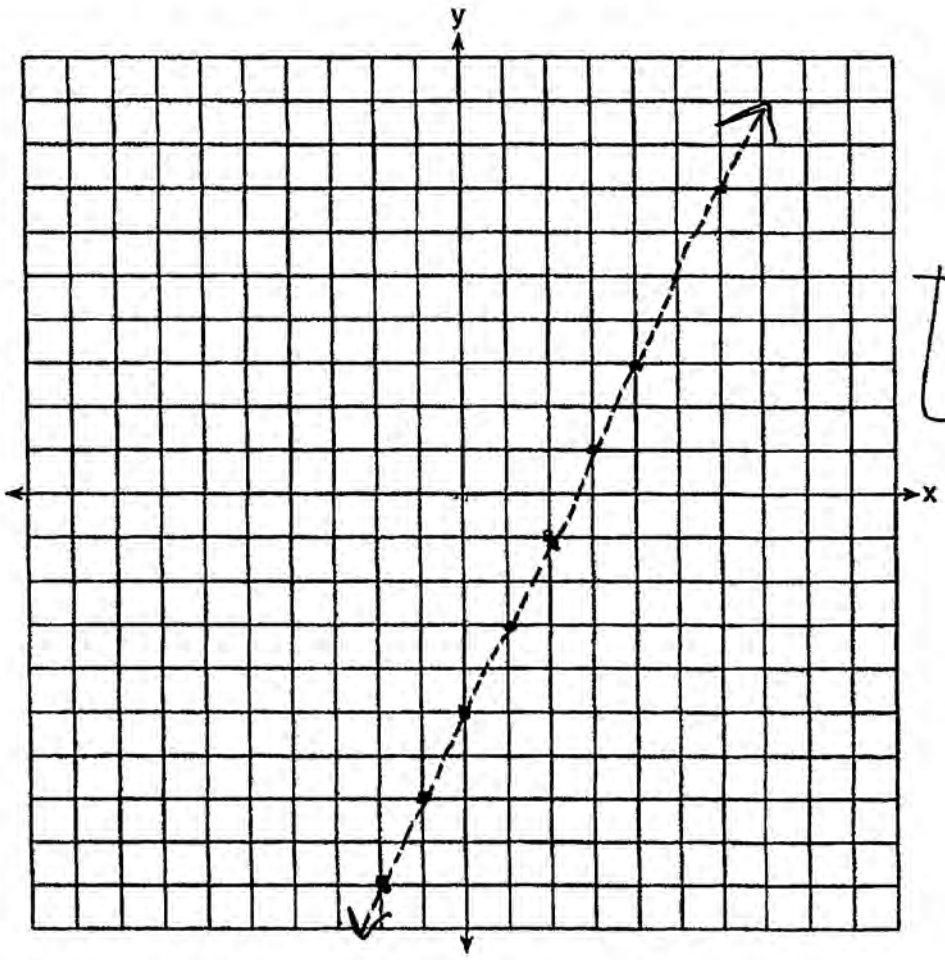
(0,0)
0 > 2·0 − 5
0 > −5 ✓



Score 1: The student stated a point in the solution set and checked it in the inequality.

Question 29

29 Graph the inequality $y > 2x - 5$ on the set of axes below.
State the coordinates of a point in its solution.



Score 0: The student graphed the inequality incorrectly and the point is not in the solution set.

Question 30

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$C = 1.29 + .99(s-1)$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$C = 1.29 + .99(52-1)$
$C = 1.29 + .99(51)$
$C = 1.29 + 50.49$
$C = 51.78$ NO

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

Question 30

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

y x

$y = 1.29 + .99(x-1)$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$y = 1.29 + .99(x-1)$

$y = 1.29 + .99(52-1)$

$y = 1.29 + .99(51)$

$y = 1.29 + 50.49$

$y = 51.78$ No

Score 2: The student redefined the variables and completed the response correctly.

Question 30

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$C = S - .01(S-30)$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$C = 52 - .01(52-30)$

$C = 52 - .22$

$C = \$51.78$

No She would pay $51.78 for 52 songs

Score 2: The student used an alternate appropriate equation.

Question 30

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

C=1.29+5·.99

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

This is not correct because the first song is $1.29 then the rest are 99¢ so 1.29 + 51.99 = $51.79 not $52.77.

Score 1: The student only wrote a correct justification indicating that Sandy was incorrect.

Question 30

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$C(s) = 129 + 99(s-1)$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$C(52) = 129 + 99(52-1)$
$= 129 + 99(51)$
$= 129 + 5049$
$= 5178$

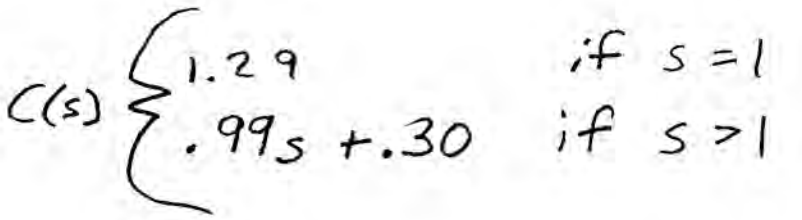
Score 1: The student wrote an appropriate function but did not state whether or not the amount is correct.

Question 30

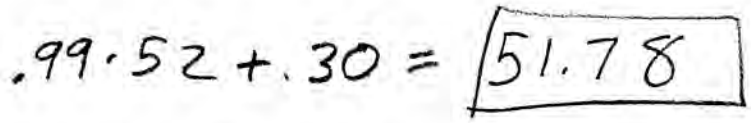
30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of \$1.29, then each additional song is \$.99.

State an equation that represents the cost, C, when s songs are downloaded.



Sandy figured she would be charged \$52.77 for 52 songs. Is this the correct amount? Justify your answer.



Score 1: The student wrote a correct piecewise function but did not state whether or not the amount is correct.

Question 30

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

$C = 1.29s + .99$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

$C \quad 1.29(52) + .99$

$C = 67.08 + .99$

$C = 68.07$

Score 0: The student wrote an incorrect equation and did not answer the question.

Question 31

31 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

$\frac{y_2 - y_1}{x_2 - x_1}$ = average rate of change

$\frac{480 - 140}{7 - 2} = \frac{340}{5}$

$\downarrow$

$= 68$

Average Rate of Change: 68 miles per hour

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

Question 31

31 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

$\frac{340}{5} = 68$ mph

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

Question 31

31 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

$$\frac{7-2}{480-140} = \frac{5}{340} = \frac{1}{68} \ \frac{hr}{mile}$$

Score 1: The student calculated hours per mile.

Question 31

31 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

Time (hrs)	0	2	5	7
Distance (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

$\frac{7\text{hrs} - 2\text{hrs}}{480\text{mi} - 140\text{mi}} = \frac{5\text{hrs}}{340\text{mi}} = 0.015$

Score 0: The student made more than one error.

Question 32

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

Determine if either one is correct, and justify your answer completely.

Both are incorrect, though the circle is not a function because it fails the vertical line test. Just because a line is continuous doesn't mean it is a function. Multiple x-values can match up to one y-value, but not vice-versa.

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

Question 32

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

Determine if either one is correct, and justify your answer completely.

Nora is incorrect because even though she can draw a circle without picking up her pencil it fails the vertical line test.

Mia is correct that it isn't a function but the x and y's are switched in her explanation

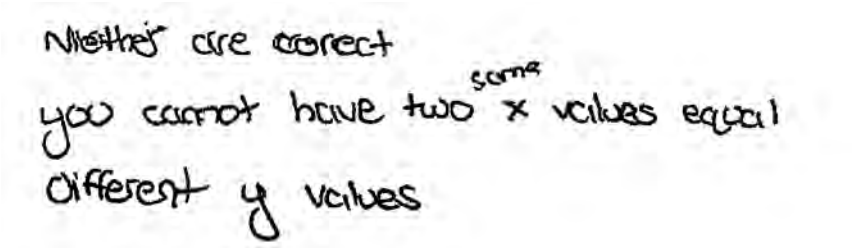
Score 2: The student gave a complete and correct response.

Question 32

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

Determine if either one is correct, and justify your answer completely.



Score 1: The student did not justify why Nora was not correct.

Question 32

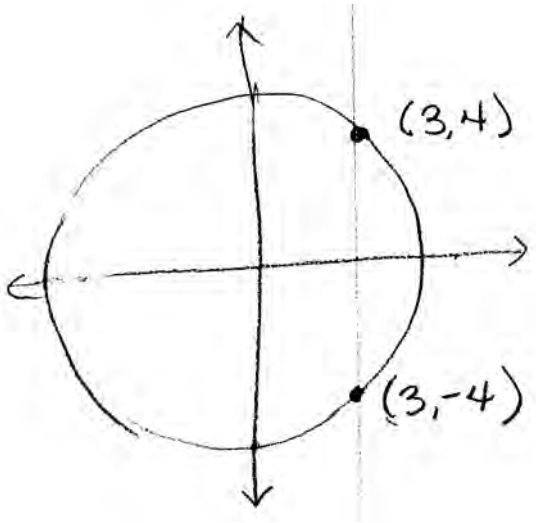
32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

Determine if either one is correct, and justify your answer completely.

Neither is correct.

It is not a function because it fails the vertical line test



Score 1: The student wrote an incomplete justification.

Question 32

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

Determine if either one is correct, and justify your answer completely.

Nora is incorrect because tracing a graph without picking up a pencil is not a function test

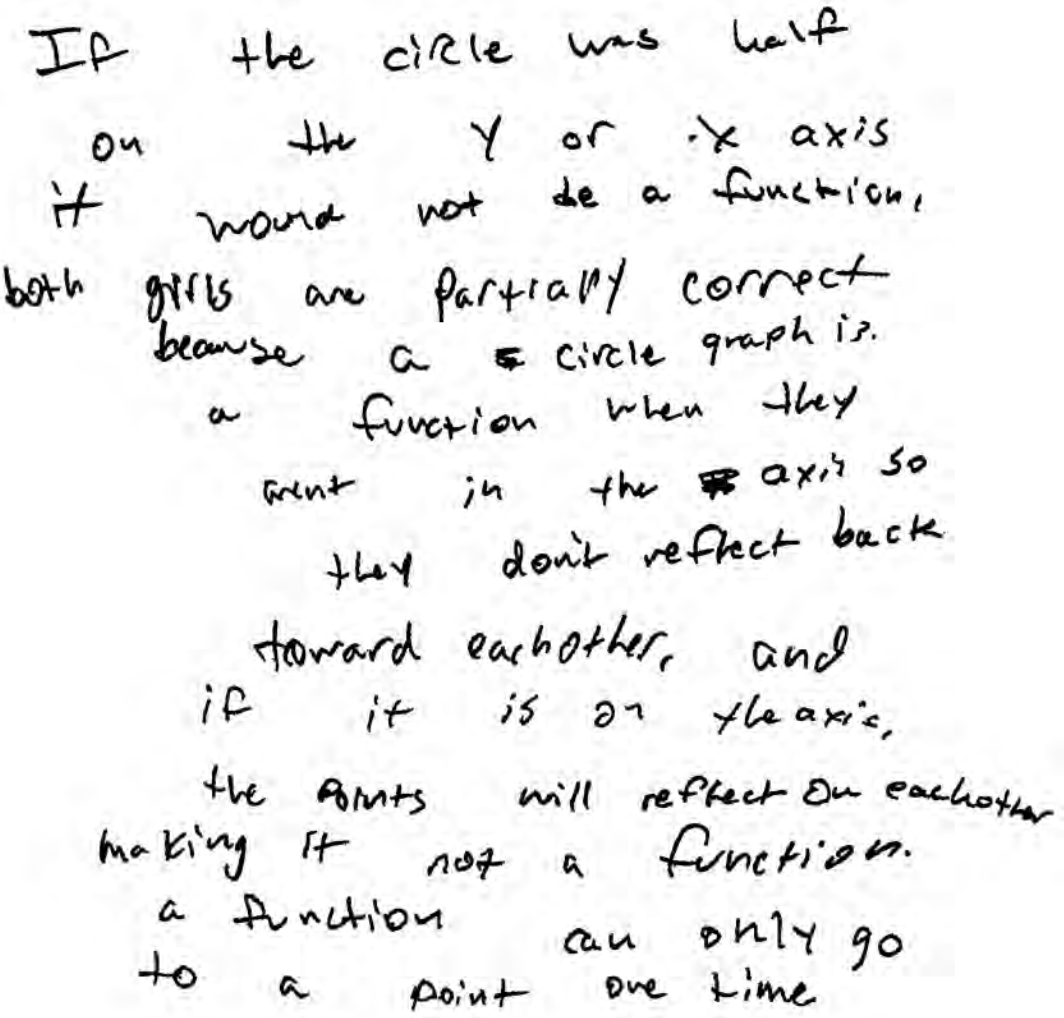
Score 1: The student only justified Nora's error in reasoning.

Question 32

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

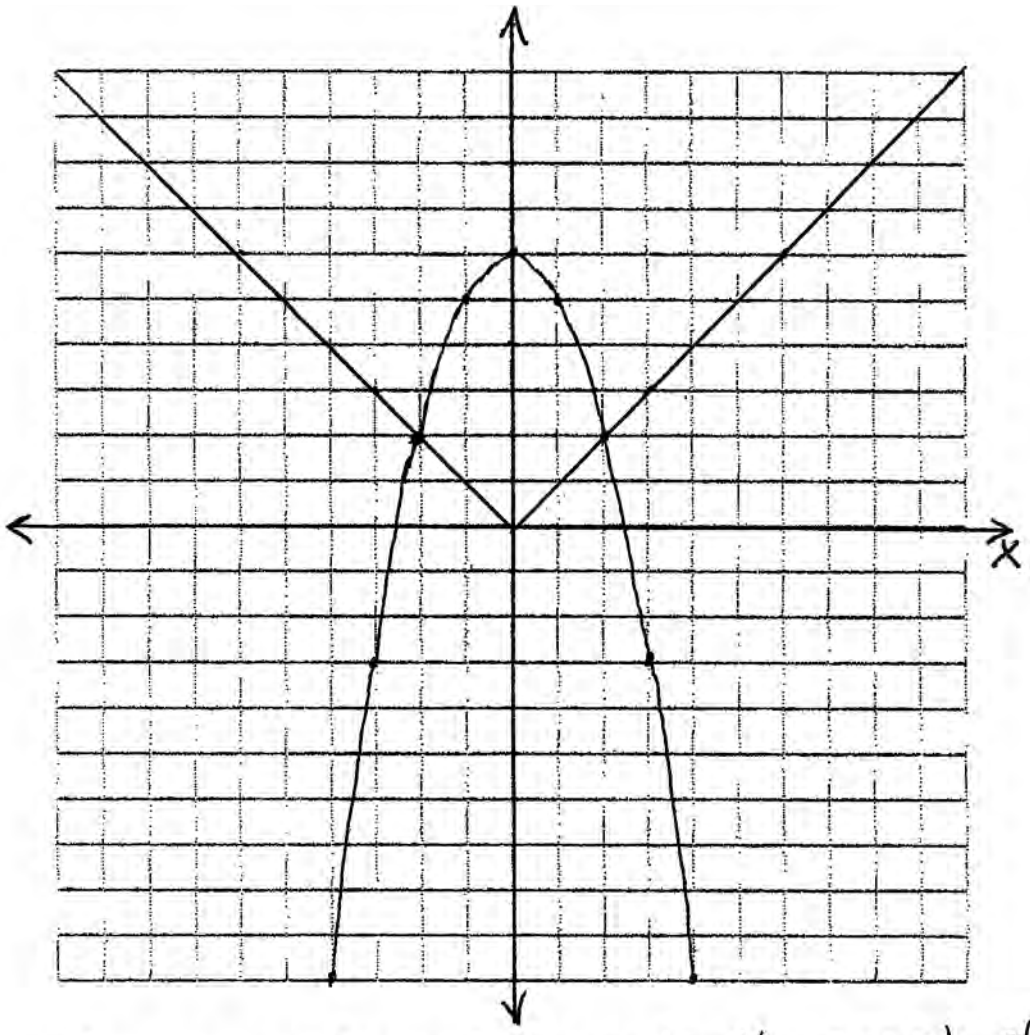
Determine if either one is correct, and justify your answer completely.



Score 0: The student gave an incorrect response.

Question 33

33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

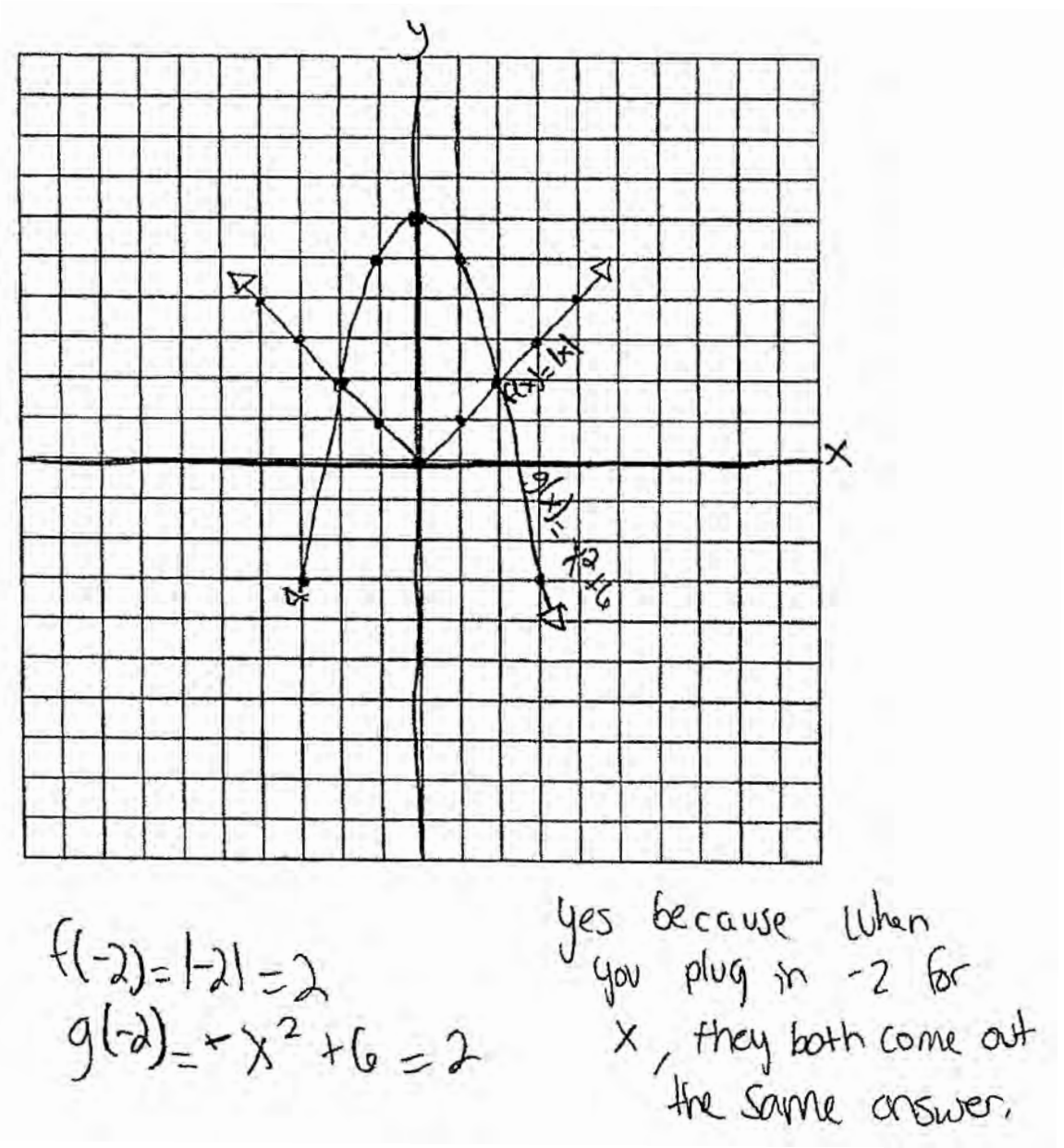


The graph of f(x) intersects the graph of g(x) at x = -2, so f(-2) = g(-2).

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

Question 33

33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.



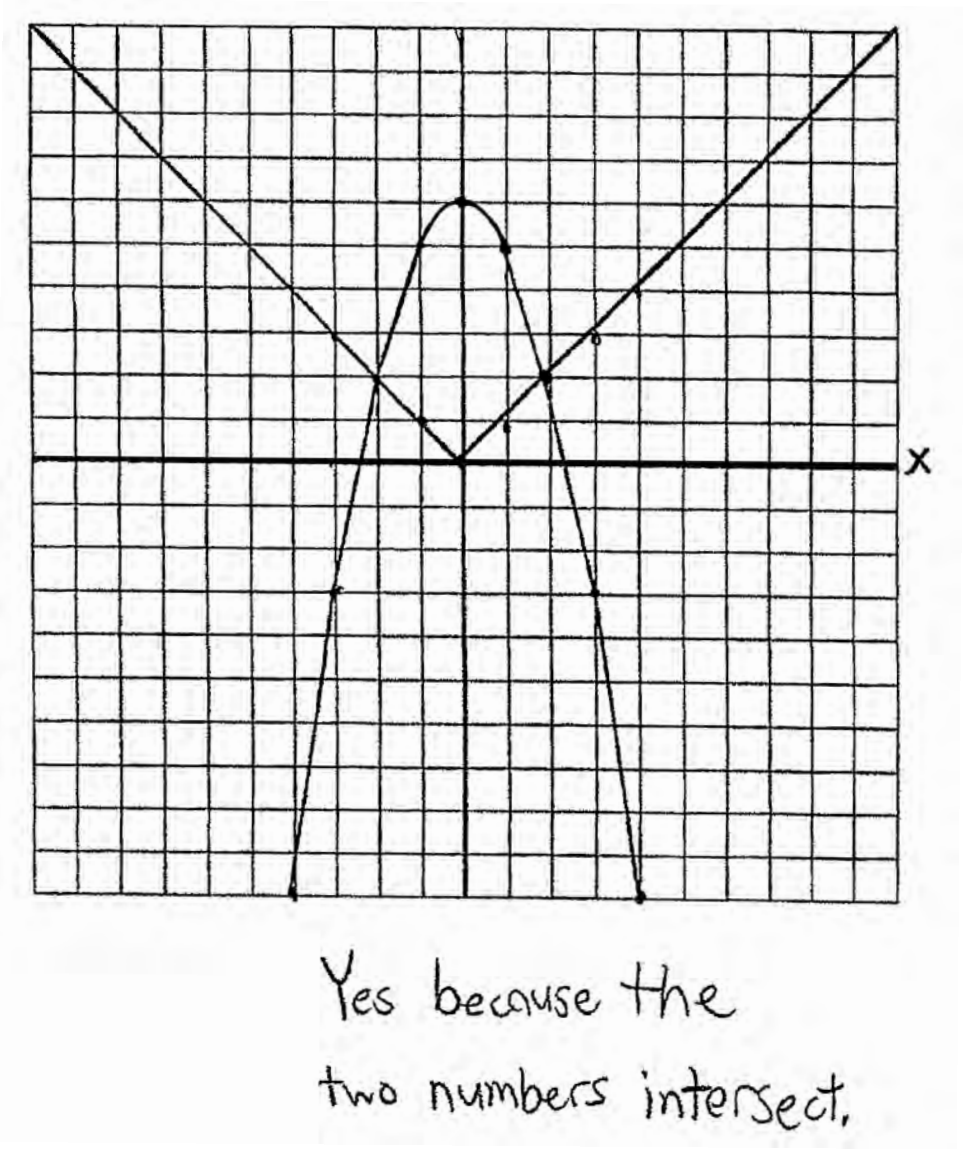
$f(-2) = |-2| = 2$
$g(-2) = -x^2 + 6 = 2$

Yes because when you plug in -2 for x, they both come out the same answer.

Score 3: The student justified $f(-2) = g(-2)$ algebraically.

Question 33

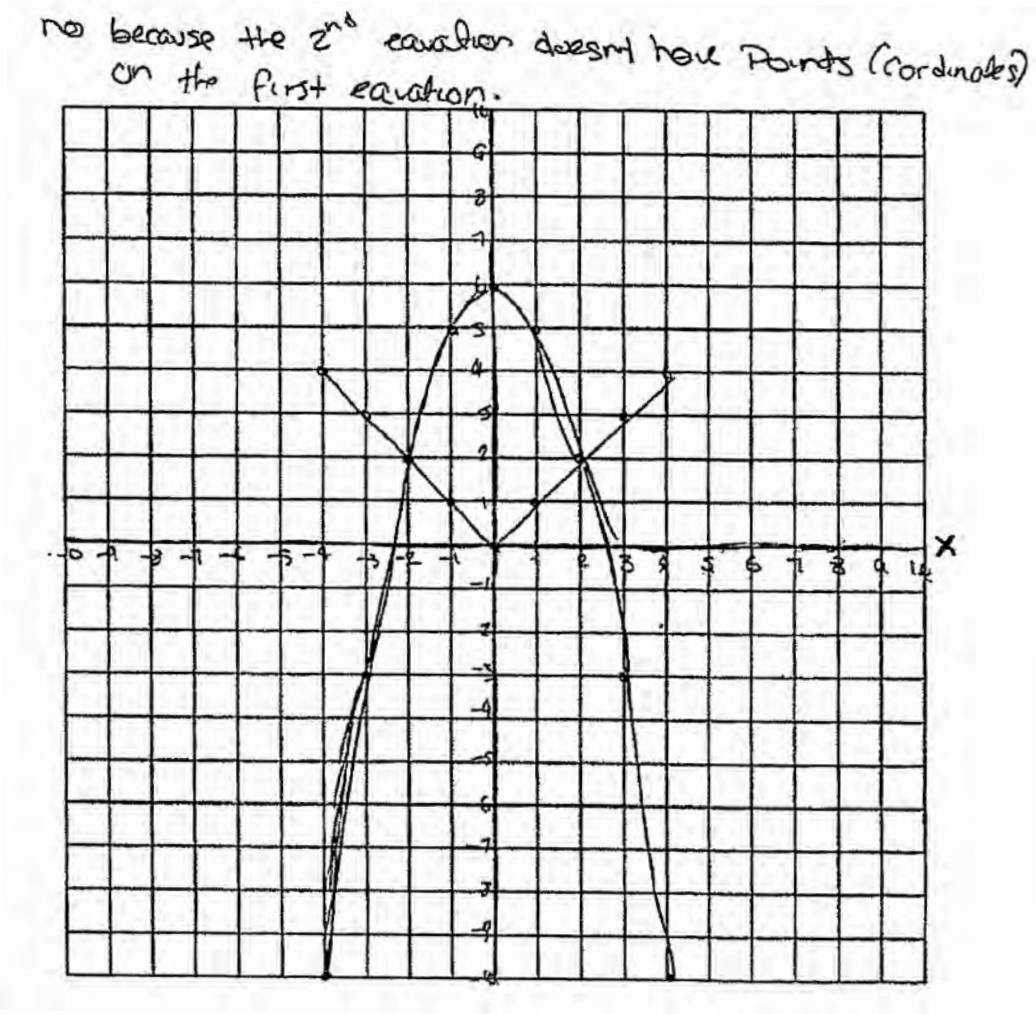
33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.



Score 3: Both graphs are drawn correctly.

Question 33

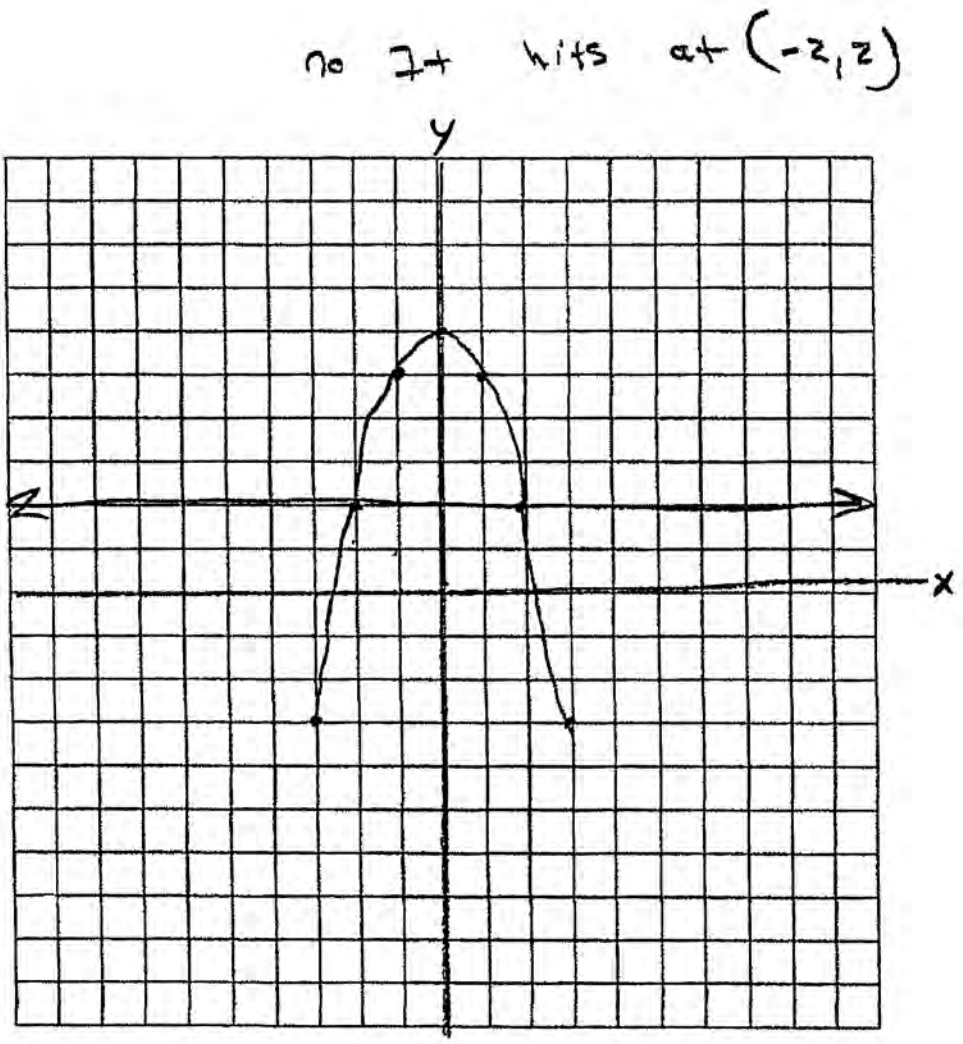
33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.



Score 2: The student graphed the parabola correctly. The arrows were missing on the graph of the absolute value.

Question 33

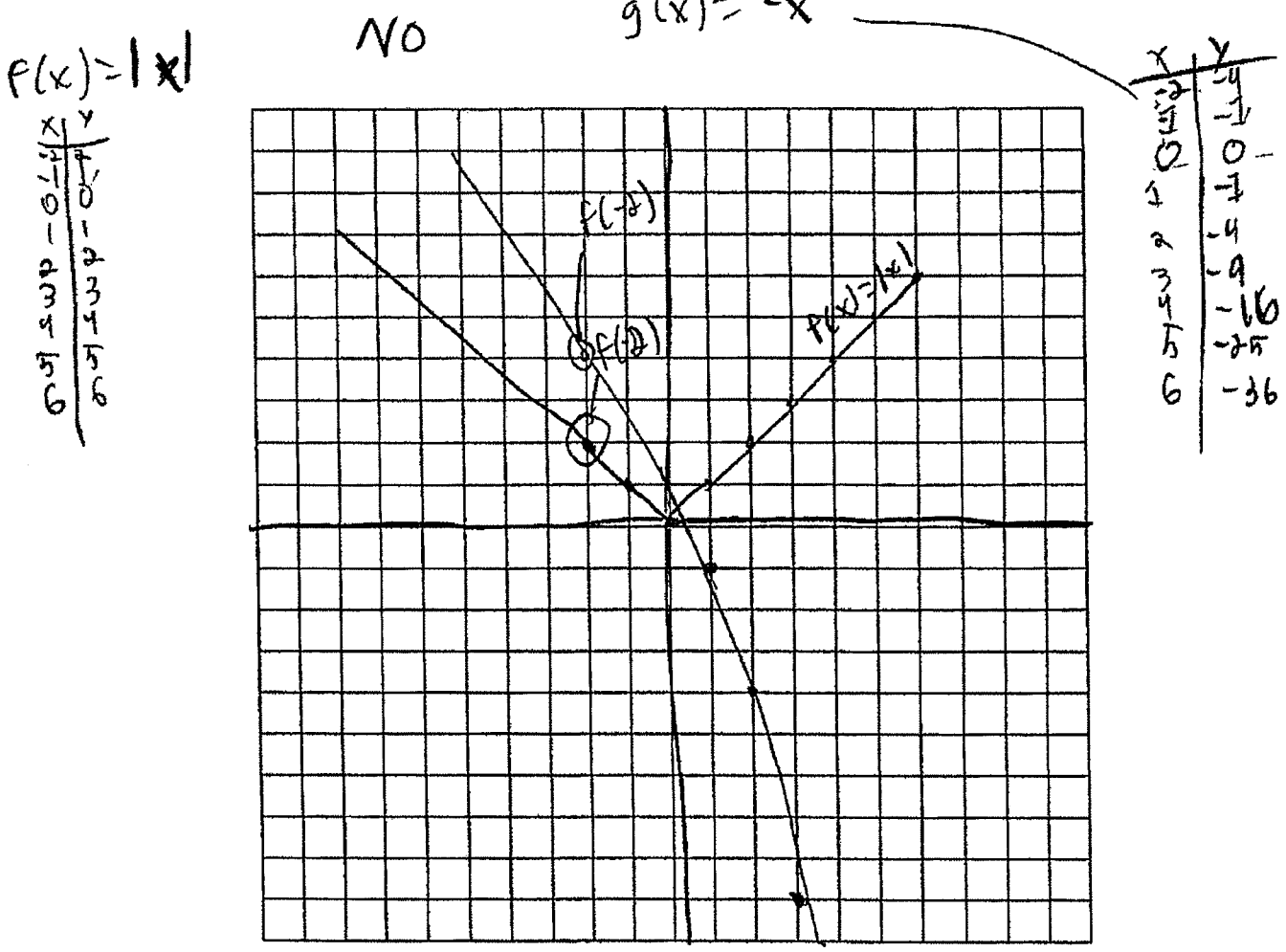
33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.



Score 1: The student did not put arrows on the graph of the parabola.

Question 33

33 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

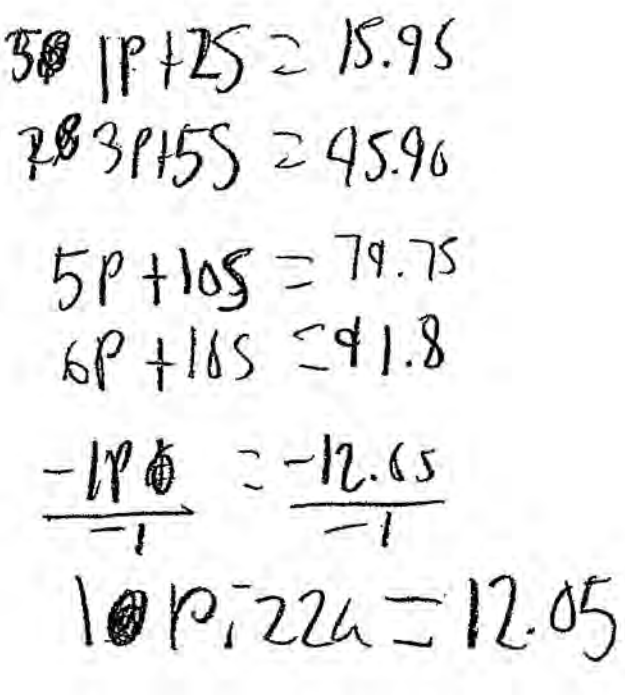


Score 0: The student did not put arrows on the graph of the absolute value, did not explain their "no" response, and graphed $g(x)$ incorrectly.

Question 34

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]



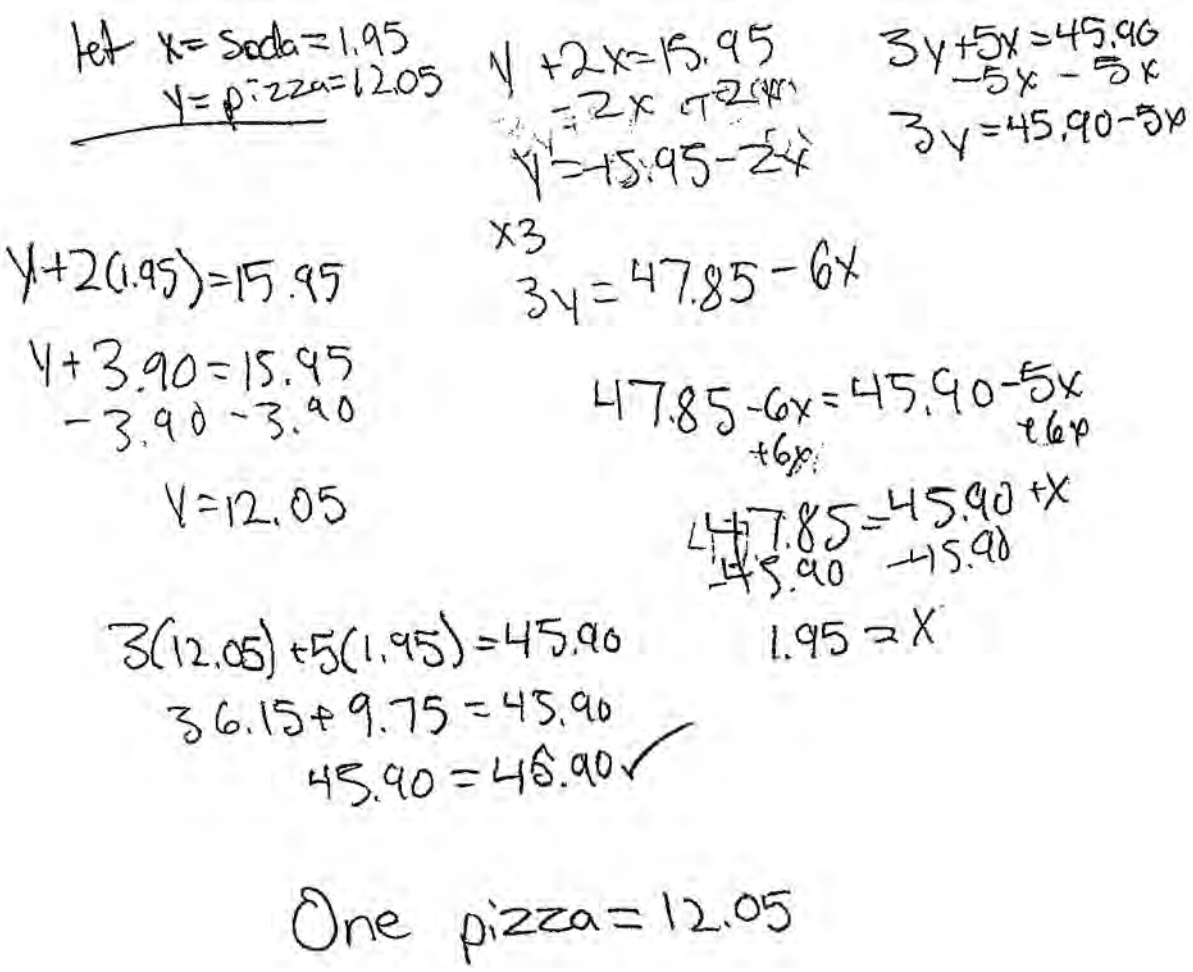
Score 4: The student gave a complete and correct response.

Question 34

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled \$15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled \$45.90.

5 sodas

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

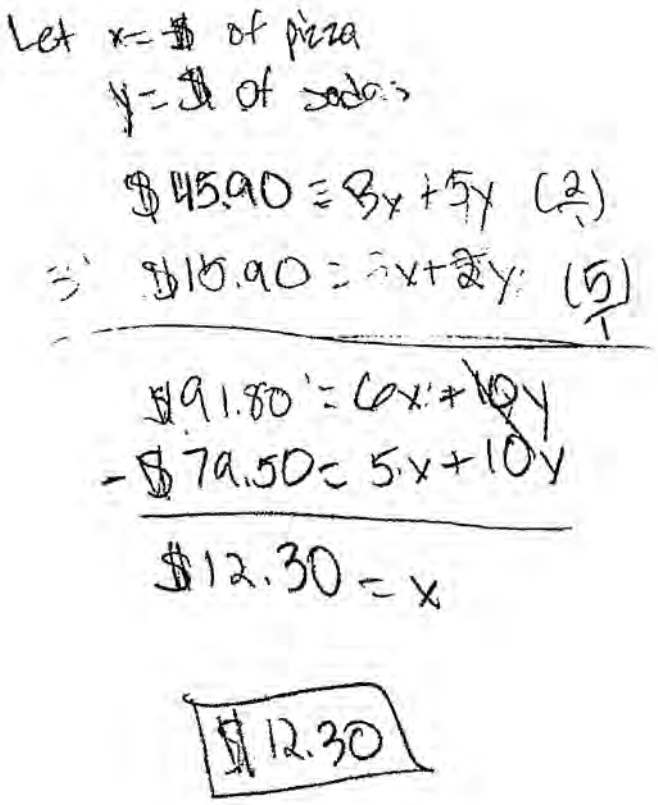


Score 4: The student gave a complete and correct response.

Question 34

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

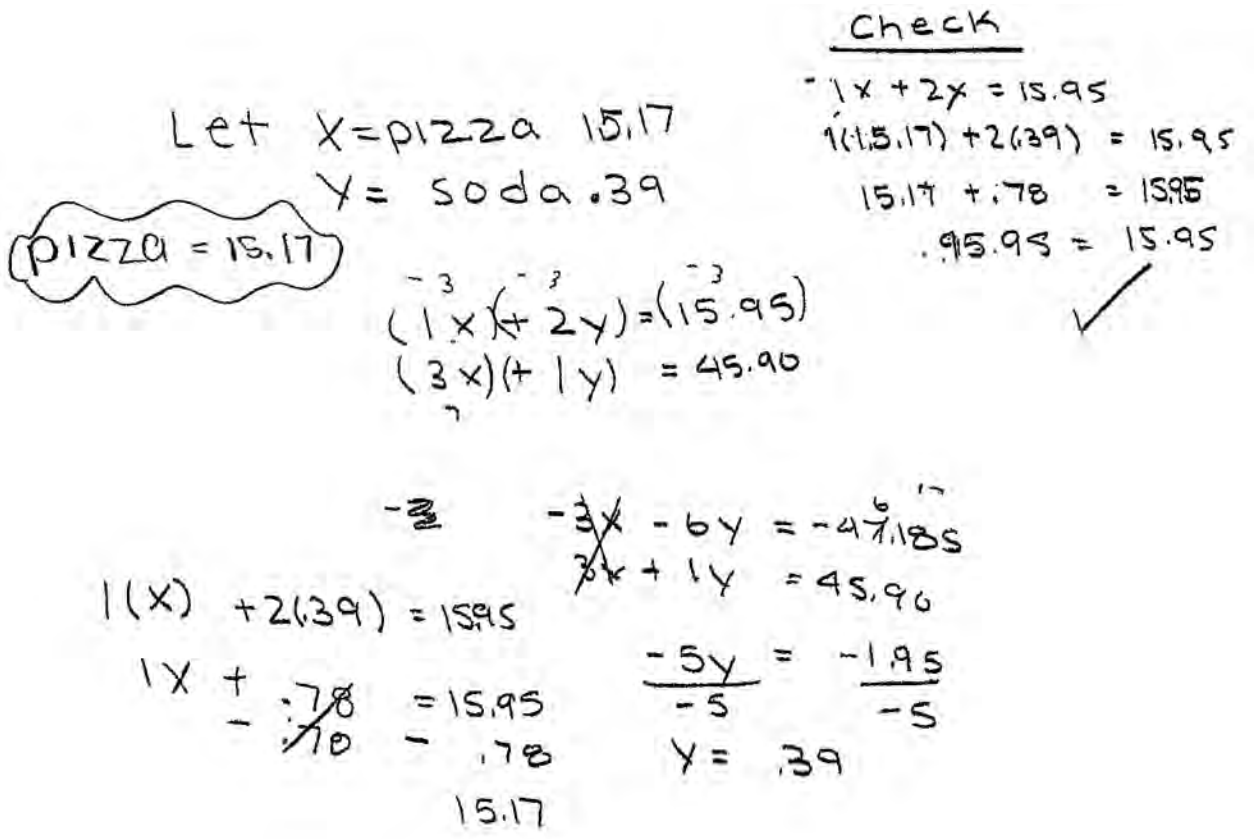


Score 3: The student made a transcription error when writing their second equation, but found an appropriate answer.

Question 34

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]



Score 3: The student wrote an incorrect second equation, but found an appropriate answer.

Question 34

34 Two friends went to a restaurant and ordered one plain pizza (x) and two sodas. Their bill totaled \$15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled \$45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

$$\begin{cases} x + 2a = 15.95 \\ 3x + 5a = 45.90 \end{cases}$$

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

Question 34

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

Let x = # of pizza's ordered
Let y = # of sodas ordered

$3(x + 2y = \$15.95) \rightarrow 3x + 6y = \$47.85$
$3x + 3y = \$45.90 \rightarrow 3x + 3y = \$45.90$

$\frac{9y}{9} = \frac{94.75}{9}$

$y = \$10.55$

Score 1: The student only wrote one correct equation.

Question 34

34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

P = pizza

S = sodas

$(p)(s^2) = \$15.95$

$(p^3)(s^5) = \$45.90$

Score 0: The student showed no correct work.

Question 35

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

$f(x) = \frac{3}{4}x + 4.5$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

The slope means that she spends $0.75 on each card, but the y-intercept says that she spent $4.50 initially to start making the cards.

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

Question 35

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

$y = 0.75x + 4.5$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

the slope means how much each card costs

the y-intercept mean how much cost she started with

Score 3: The student did not write an equation in terms of $f(x)$.

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

+2, +3, +1 ; +1.5, +2.25, +.75

$y = 54 = 6b$

$\frac{y_2 - y_1}{x_2 - x_1}$ $\frac{12 - 11.25}{10 - 9}$ $\frac{.75}{1}$

Write a linear function, $f(x)$, that represents the data.

$y = x_1 (b + y_1)$
$y = 6(b + 9)$
$y = 6b + 54$

$y = mx + b$

$y = .75x + 9$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

The slope is the ~~amount of~~ money she is spending per card. The y-int is the amount of money she is spending to start

Score 2: The student wrote two correct explanations.

Question 35

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

f(x)= .75x+4.5

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

Slope is the rate at which the line increases y-intercept is where the line begins on the y-axis.

Score 2: The student wrote explanations that were not in context.

Question 35

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

$\frac{\Delta y}{\Delta x}$ $\frac{9-7.5}{6-4} = \frac{1.5}{2} = 1.25$

$\frac{\Delta y}{\Delta x} = \frac{12-11.25}{10-9} = \frac{.75}{1} = \frac{3}{4}$

Write a linear function, $f(x)$, that represents the data.

$y = \frac{3}{4}x$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

The slope is how much money each card cost, and the y intercept is showing the starting point.

Score 1: The student wrote one correct explanation.

Question 35

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

y = ax + b a = .75 b = 4.5

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

The slope means rise over run. In this case it is .75. The y-intercept is 4.5, which is where the graph starts on the y-axis.

Score 1: The student did not write an equation in terms of $f(x)$.

Question 35

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Write a linear function, $f(x)$, that represents the data.

y = $1.50(x)

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

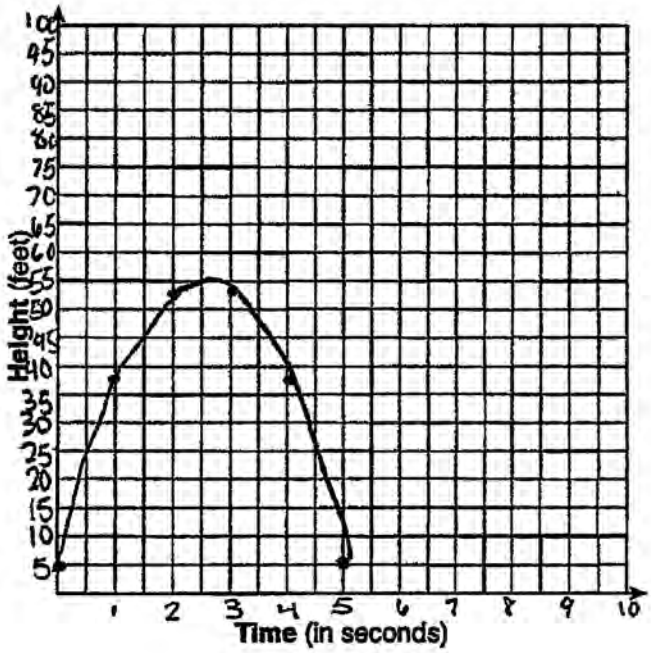
X is equal to the number of cards she makes

Y is equal to the money she spent on the cards.

Score 0: The student showed no correct work.

Question 36

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.



x	y
0	5
1	37
2	53
3	53
4	37
5	5

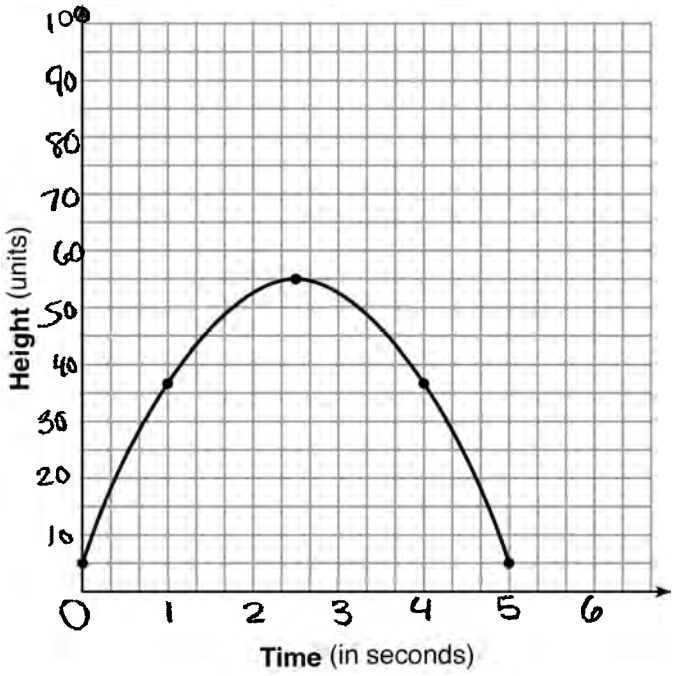
State the coordinates of the vertex and explain its meaning in the context of the problem.

The vertex is (2.5,55) which means the ball started to fall after 2.5 seconds at a height of 55.

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

Question 36

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.



State the coordinates of the vertex and explain its meaning in the context of the problem.

X = $2\frac{1}{2}$

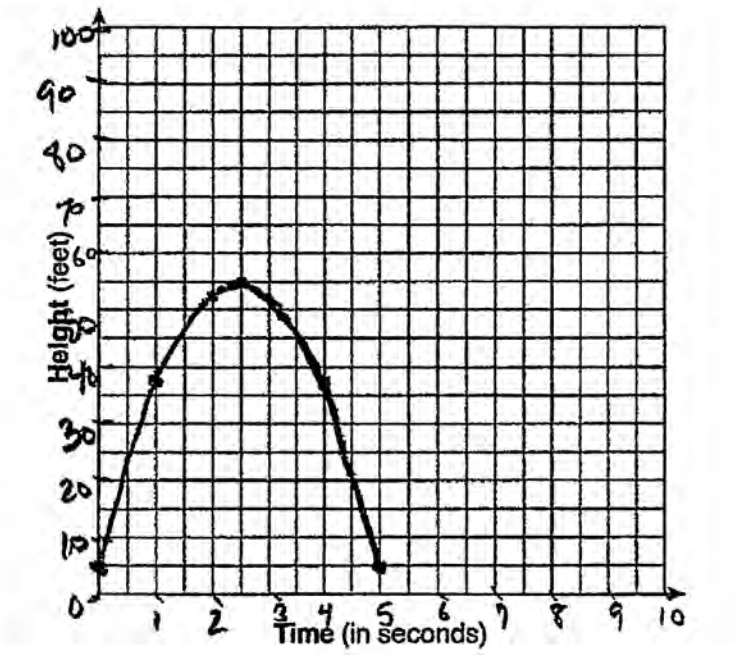
Y = 55

this means that is where the ball is falling back down, it has reached its highest point

Score 3: The student wrote an incomplete explanation.

Question 36

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.



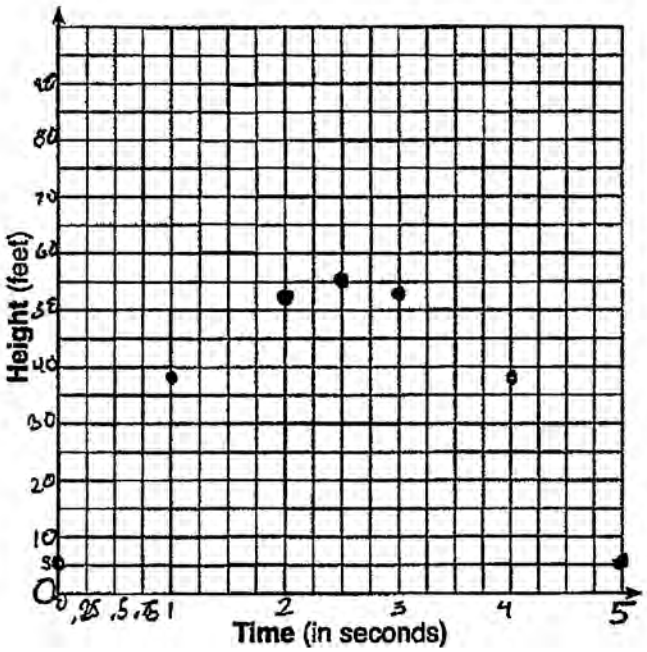
State the coordinates of the vertex and explain its meaning in the context of the problem.

At 2.5 seconds the height was 55 this means that the highest the ball got was 55 units and it was 2.5 seconds this occured.

Score 3: The student did not state the coordinates of the vertex.

Question 36

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.



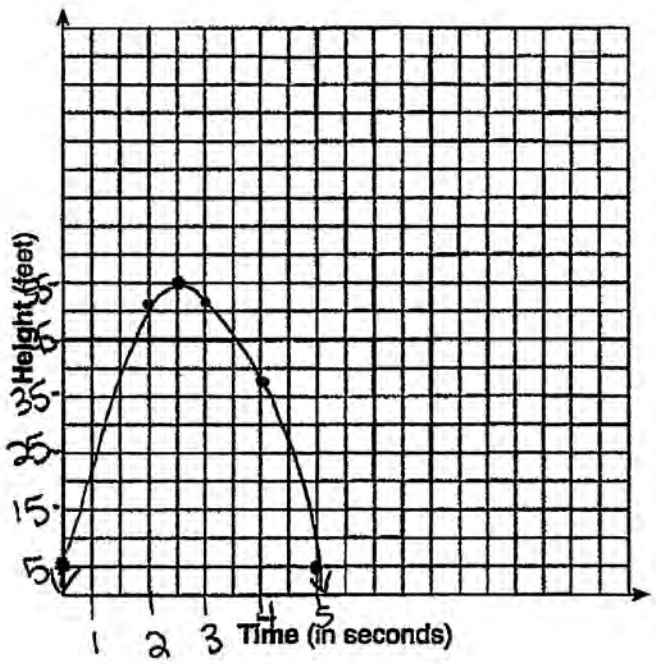
State the coordinates of the vertex and explain its meaning in the context of the problem.

Vertex = (2.5, 55)

Score 2: The student did not connect the points to form the parabola and did not explain the meaning of the coordinates of the vertex.

Question 36

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.



State the coordinates of the vertex and explain its meaning in the context of the problem.

$x = \frac{-b}{2a} = \frac{-40}{-16} = 2.5$ - turning point (2.5, 55)

$h = -8(2.5)^2 + 40(2.5) + 5$

$= -50 + 100 + 5$

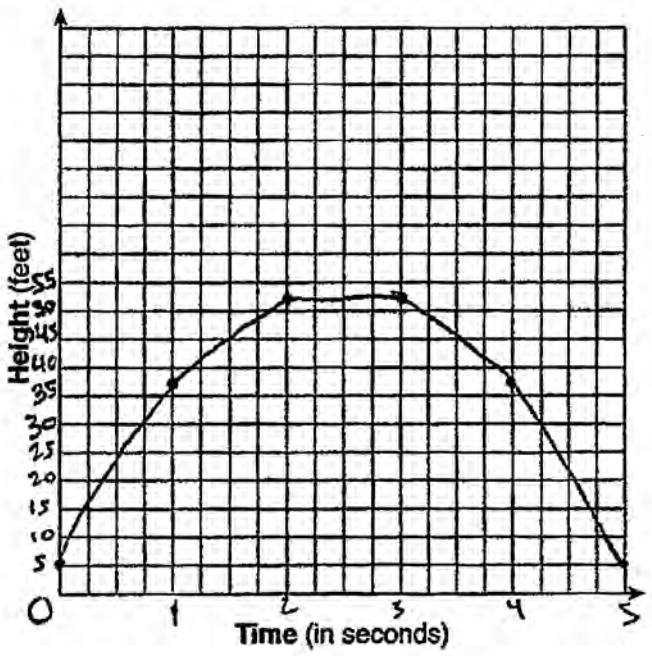
$= -50 + 105$

$= 55$

Score 1: The student did not use a consistent scale of the x-axis, extended the graph beyond $t = 0$ and $t = 5$, and did not explain the meaning of the coordinates of the vertex.

Question 36

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.



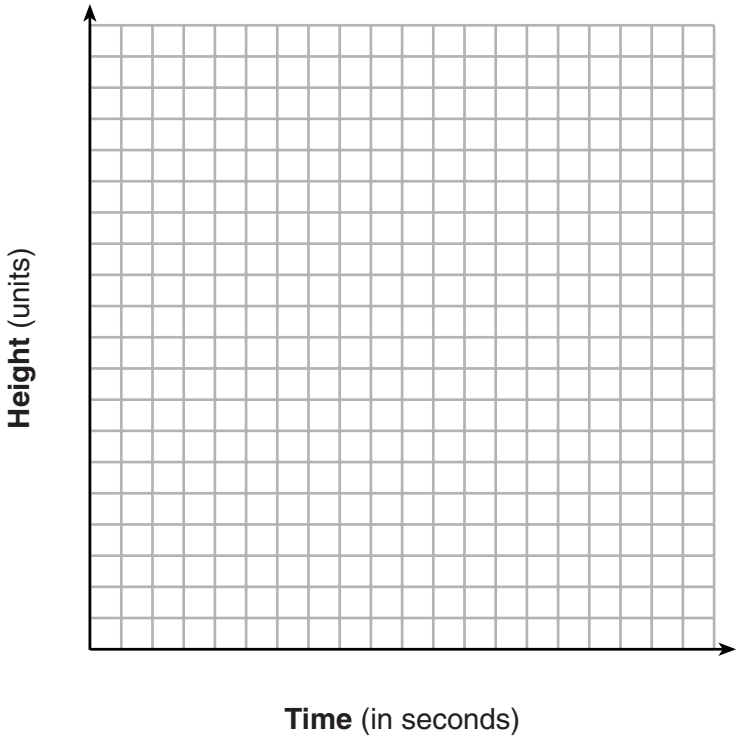
State the coordinates of the vertex and explain its meaning in the context of the problem.

The vertex is (2, 53) and that is the maximum height the ball reaches.

Score 1: The student made an error when graphing the parabola and only explained the meaning of the y-coordinate.

Question 36

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.



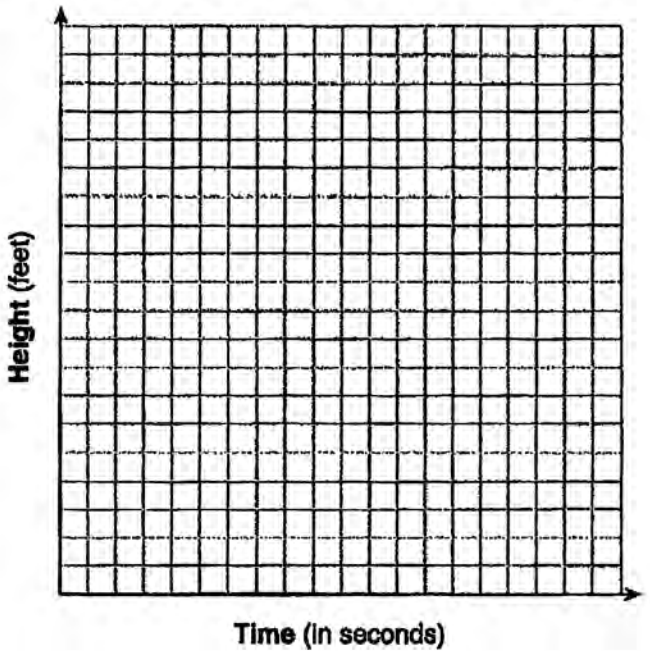
State the coordinates of the vertex and explain its meaning in the context of the problem.

The vertex is the time when the ball will be at its highest point.

Score 1: A correct explanation for the vertex is provided, but no further correct work is shown.

Question 36

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.



x	y
0	5
1	37
2	53
2.5	55
3	53
4	37
5	5

State the coordinates of the vertex and explain its meaning in the context of the problem.

Vertex is the maximum point on the graph

Score 0: The student did not show enough work to receive any credit.

Question 37

37 Ian is borrowing \$1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of \$60 per month. Ken is borrowing \$600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of \$20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$1000-60x=600-20x$ — equation

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

$1000-60x=600-20x$

$+60x \quad +60x$

$1000=600+40x$

$-600 \quad -600$

$400=40x$

$\frac{400}{40}=\frac{40x}{40}$

$10=x$

10 months

\$400

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

Ian is incorrect because 6 months after he and Ken owe the same amount, he still owes his parents \$40. x = months. Ian and Ken will owe the same amount in 10 months. $1000-60(16)=y$. y = total \$ owe. y = \$40.

10 months + 6 months = 16 months

$1000-60(16)=y$

$1000-960=y$

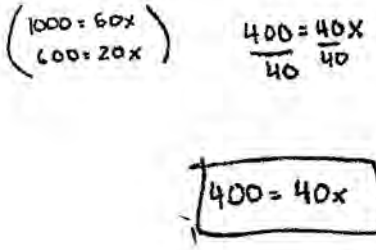
$\$40=y$

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

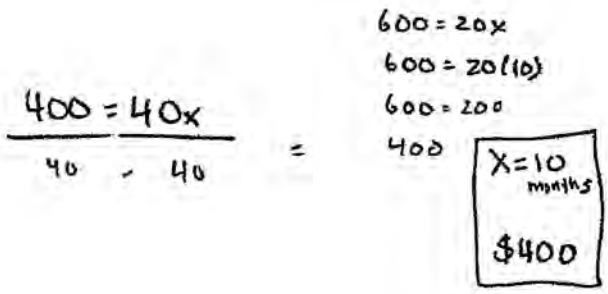
Question 37

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.



Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.



Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

No. He will have $40 to pay after 6 months.

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

Question 37

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

Ian → $60x = 1000$

Ken → $20x = 600$

$40x = 400$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

$60(10) = 600$

$20(10) = 200$

IAN: $1000 - 600 = 400$ #

KEN: $600 - 200 = 400$ #

in 10 months the two boys will owe the same amount

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

At 10 months Ian only owes 400 $

$60(6) = 360$

$360 - 400 = -40$ #

Ian is not correct, he still owes 40 # because after 6 months he only made 360 # when he needed 400 #

Score 5: The student did not show an algebraic solution to determine the number of months.

Question 37

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

Ian $y = -60x + 1000$

Ken $y = -20x + 600$

$-60x + 1000 = -20x + 600$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

$-60x + 1000 = -20x + 600$

$+60x \qquad +60x$

$1000 = 40x + 600$

$-600 \qquad -600$

$\frac{400}{40} = \frac{40x}{40}$

$x = 10$

Ian: $y = -60(10) + 1000$

$= 400$

Ken $y = -20(10) + 600$

$y = 400$

both owe $400

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

Ian is not correct!

Score 4: The student did not write an explanation.

Question 37

37 Ian is borrowing \$1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of \$60 per month. Ken is borrowing \$600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of \$20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$1000 - 60x = 600 - 20x$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Ian

x	y
2	880
4	760
6	640
8	520
10	400
12	280

After 10 months they will both owe \$400

x	y
2	560
4	520
6	480
8	440
10	400
12	360

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

$y = 1000 - 60x$
$y = 1000 - 60(6)$
$y = 1000 - 360$
$y = 640$

NO, Ian is incorrect. He will still owe \$640

Score 4: The student used a method other than algebraic to determine the number of months and amount owed. The student also made an error in the explanation by not taking into consideration the ten months that had been paid.

Question 37

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

I = Ian

K = Ken

X = months

$f(I) = 60x = 1000$

$f(K) = 20x = 600$

$60x + 20x = 1600$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Ken (payed amount)	20	40	60	80	100	120	140	160	180	200
	1	2	3	4	5	6	7	8	9	10

Ian (payed amount)	60	120	180	240	300	360	420	480	540	600
	1	2	3	4	5	6	7	8	9	10

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

No Ian is wrong, It will take Ian about 17 months to pay off his loan at a constant rate of $60 a month. the boys will both owe $400 at month 10 and Ken will be paid off In 30 months with a rate of $20

Score 3: The student did not write a correct equation and used a nonalgebraic method to determine the number of months.

Question 37

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$y = -60x + 1000$ Ian

$y = -20x + 600$ Ken

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Ian

1	940
2	880
3	820
4	760
5	700
6	640
7	580
8	520
9	460
10	400

Ken

1	580
2	560
3	540
4	520
5	500
6	480
7	460
8	440
9	420
10	400

By month 10 they will owe the same amount.

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

It is correct because they both paid there debt.

Score 2: The student wrote an appropriate system of equations and used a nonalgebraic method to determine the number of months.

Question 37

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

Ian
$60x = 1000$

Ken:
$20x = 600$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Ian:
$60x = 1000$
$60(2) = 120$
$60(3) = 180$
$60(4) = 240$
$60(5) = 300$
$60(6) = 360$
$60(7) = 420$
$60(8) = 480$
$60(9) = 540$
$60(10) = 600$
$60(11) = 660$
$60(12) = 720$

After 10 months, Ian will have paid $600 which is the total amount Ken has to pay.

Ken:
$20x = 600$
$20(2) = 40$
$20(3) = 60$
$20(4) = 80$
$20(5) = 100$
$20(6) = 120$
$20(7) = 140$
$20(8) = 160$
$20(9) = 180$
$20(10) = 200$
$20(11) = 220$
$20(12) = 240$

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

No he is not correct because he has to pay a total of $1000 and he has only paid $360.

Score 1: The student wrote individual equations for Ian and Ken.

Question 37

37 Ian is borrowing $1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of $60 per month. Ken is borrowing $600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of $20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

$Y = 1000X + 60$ Ian

$Y = 600X + 20$ Ken

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

$40\sqrt{400}$

NOW = 60, 20

same amount = 10 months

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

He is wrong because it took 10 months for them to owe the same amount

Score 0: The student did not show enough correct work to receive any credit.