The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I

v202

MODEL RESPONSE SET

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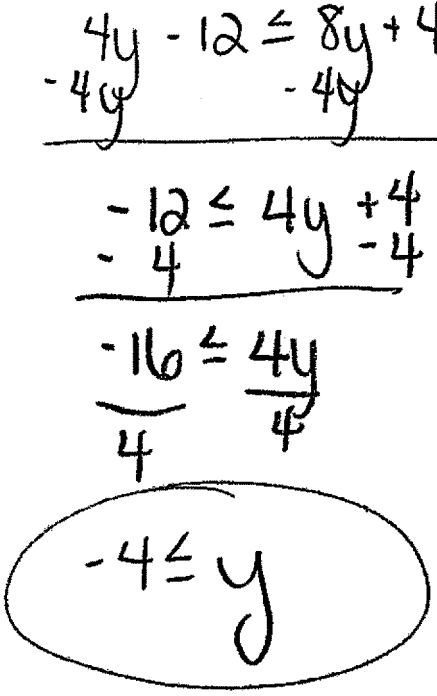
Question 25

25 Solve algebraically for y:

$$4(y - 3) \leq 4(2y + 1)$$



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

Question 25

25 Solve algebraically for y:

$$\frac{4(y-3)}{4} \leq \frac{4(2y+1)}{4}$$

$$y-3 \leq 2y+1$$
$$-y \quad\quad -y$$

$$y+1 \geq -3$$
$$-1$$

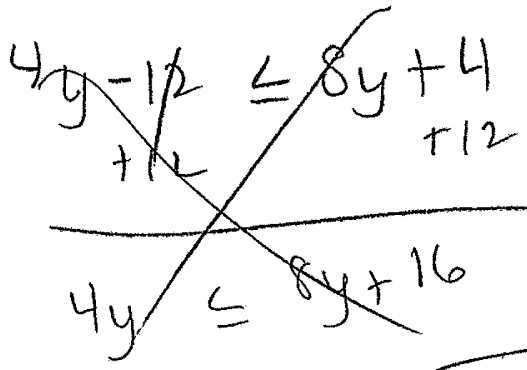
$$y \geq -4$$

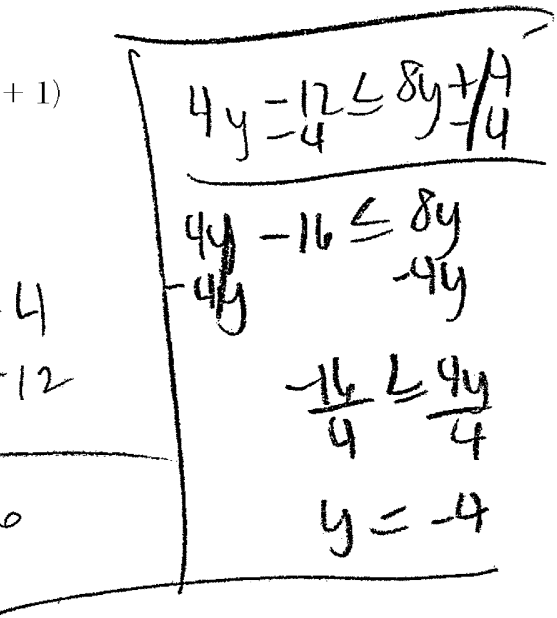
Score 2: The student gave a complete and correct response.

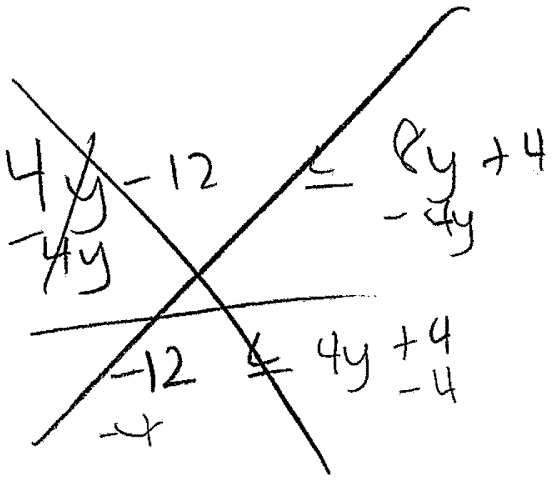
Question 25

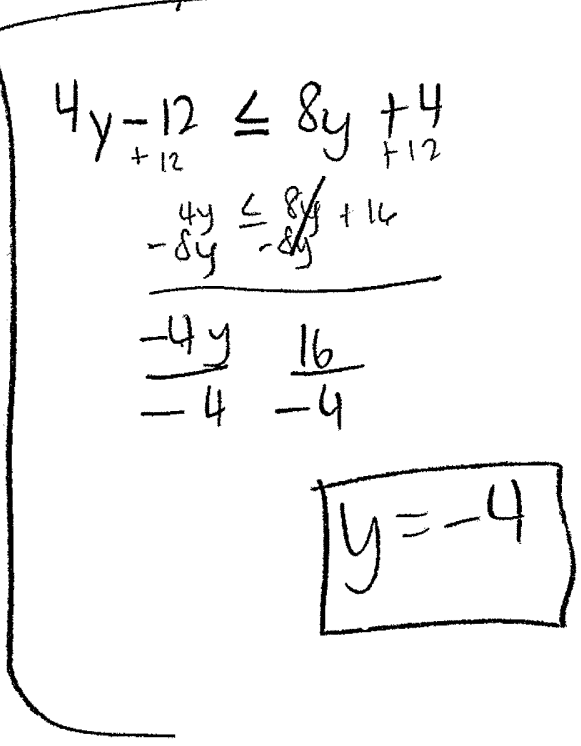
25 Solve algebraically for y:

$$4(y - 3) \leq 4(2y + 1)$$









Score 1: The student expressed their answer as an equality.

Question 25

25 Solve algebraically for y:

$$4(y - 3) \leq 4(2y + 1)$$

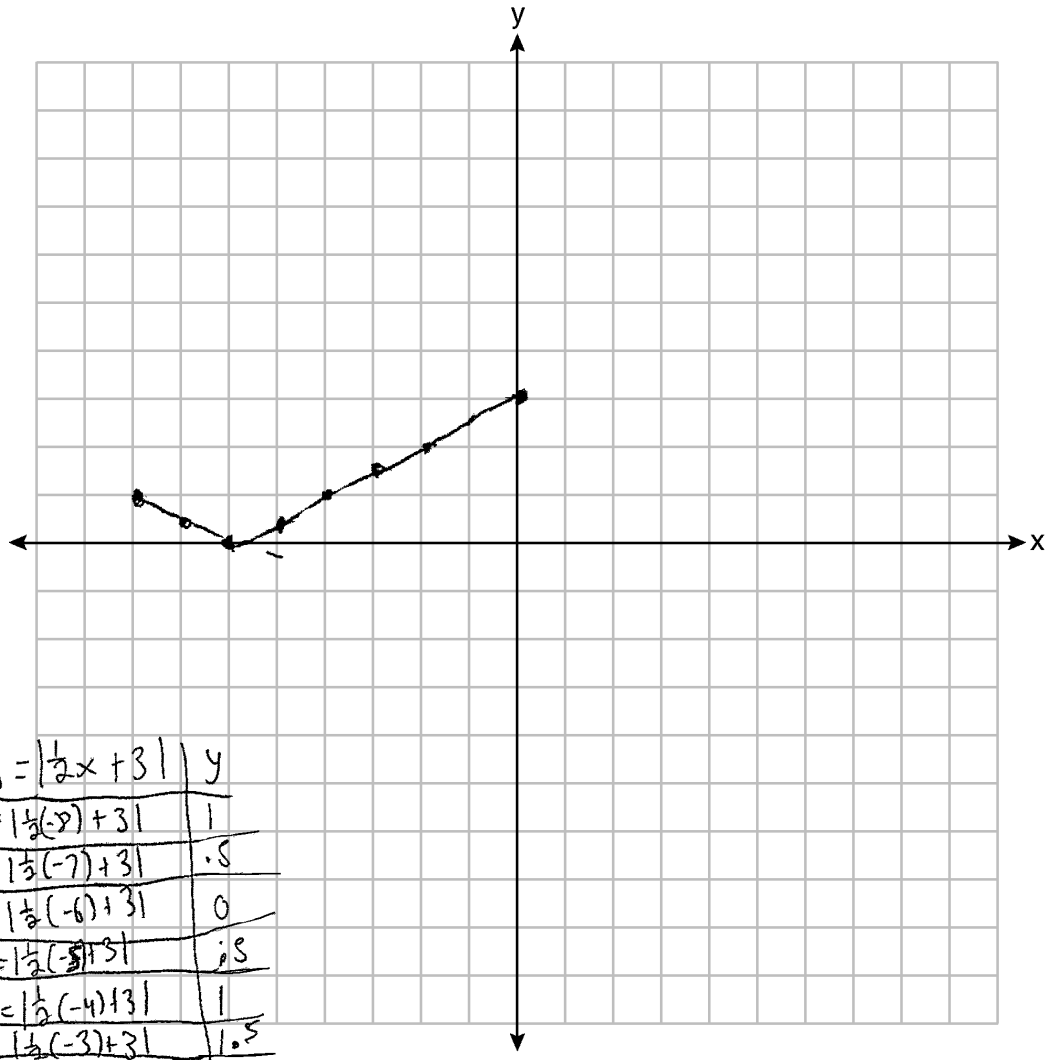
$4(y-3) \leq 4(2y+1)$

$4y - 12 \leq 8y + 4$

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

Question 26

26 Graph the function $f(x) = \left|\frac{1}{2}x + 3\right|$ over the interval $-8 \leq x \leq 0$.

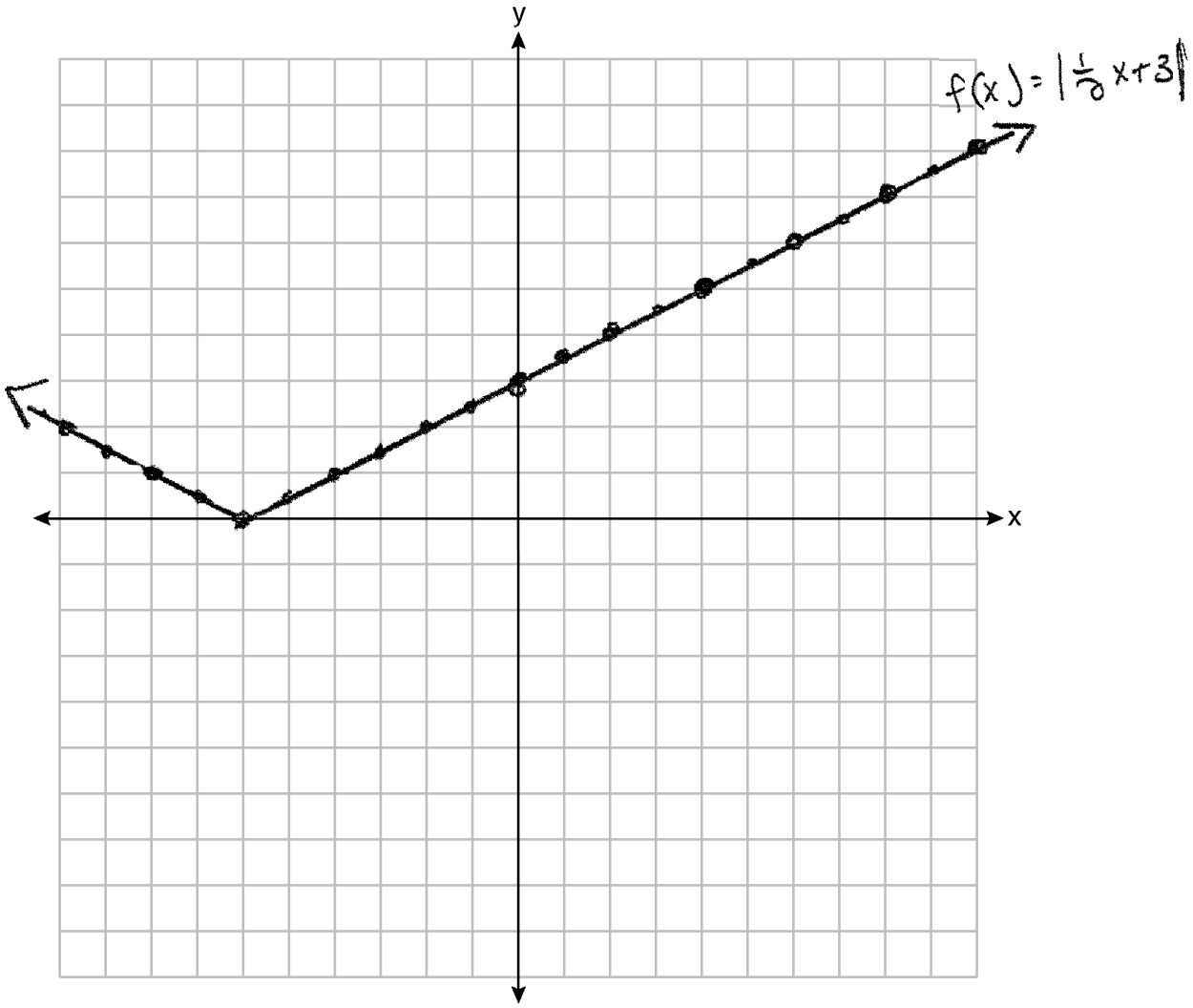


x	$y = \left\|\frac{1}{2}x + 3\right\|$	y
−8	$y = \left\|\frac{1}{2}(-8) + 3\right\|$	1
−7	$y = \left\|\frac{1}{2}(-7) + 3\right\|$	.5
−6	$y = \left\|\frac{1}{2}(-6) + 3\right\|$	0
−5	$y = \left\|\frac{1}{2}(-5) + 3\right\|$	.5
−4	$y = \left\|\frac{1}{2}(-4) + 3\right\|$	1
−3	$y = \left\|\frac{1}{2}(-3) + 3\right\|$	1.5
−2	$y = \left\|\frac{1}{2}(-2) + 3\right\|$	2
−1	$y = \left\|\frac{1}{2}(-1) + 3\right\|$	2.5
0	$y = \left\|\frac{1}{2}(0) + 3\right\|$	3

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

Question 26

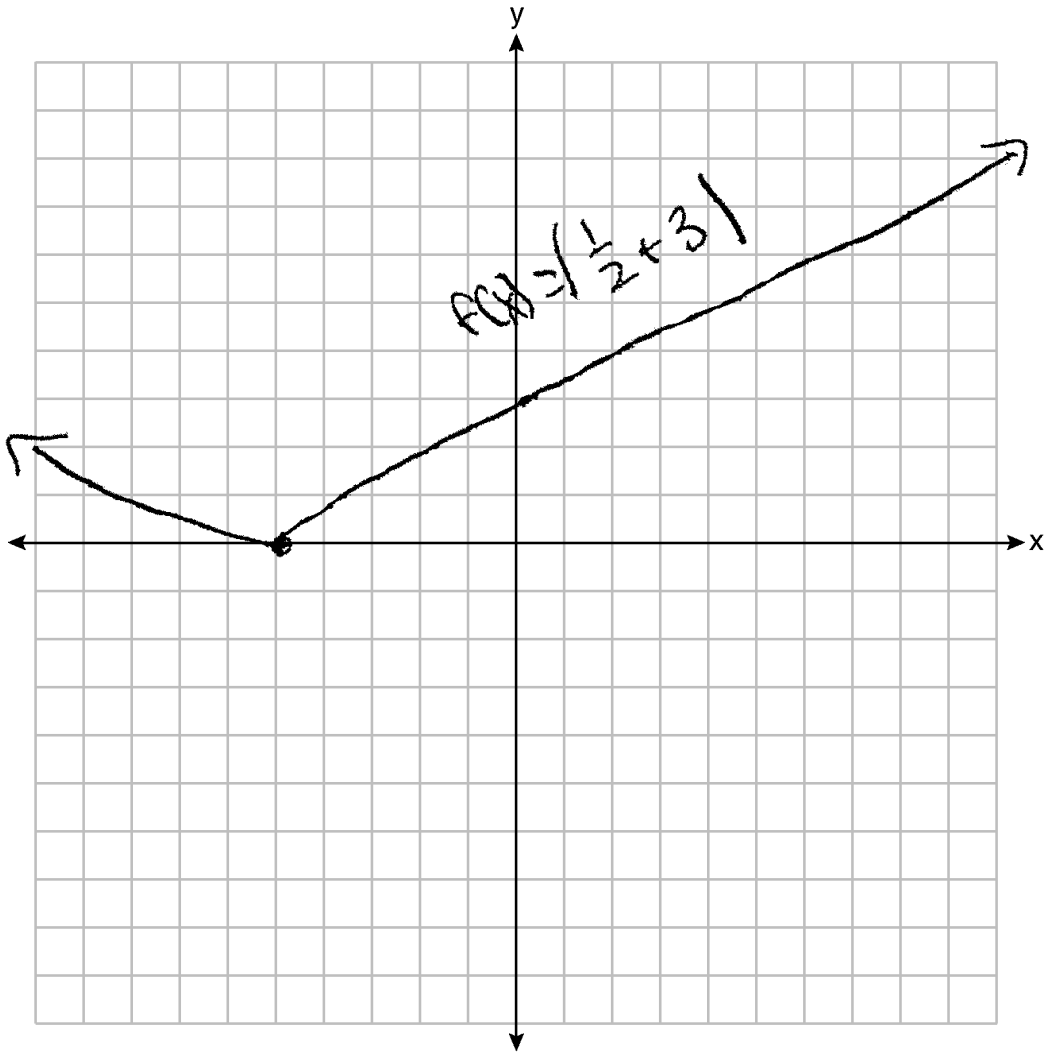
26 Graph the function $f(x) = \left|\frac{1}{2}x + 3\right|$ over the interval $-8 \leq x \leq 0$.



Score 1: The student did not graph the function over the correct interval.

Question 26

26 Graph the function $f(x) = \left|\frac{1}{2}x + 3\right|$ over the interval $-8 \leq x \leq 0$.



Score 0: The student made two graphing errors.

Question 27

27 The table below shows the height in feet, $h(t)$, of a hot-air balloon and the number of minutes, t, the balloon is in the air.

Time (min)	2	5	7	10	12
Height (ft)	64	168	222	318	369

The function $h(t) = 30.5t + 8.7$ can be used to model this data table.

Explain the meaning of the slope in the context of the problem.

Slope - The height of the hot air balloon increases 30.5 ft every minute.

Explain the meaning of the y-intercept in the context of the problem.

y-int. - The hot air balloon starts 8.7 ft off the ground

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

Question 27

27 The table below shows the height in feet, $h(t)$, of a hot-air balloon and the number of minutes, t, the balloon is in the air.

Time (min)	2	5	7	10	12
Height (ft)	64	168	222	318	369

The function $h(t) = 30.5t + 8.7$ can be used to model this data table.

Explain the meaning of the slope in the context of the problem.

The slope represents the rate of change of the balloon, meaning how fast the balloon is rising.

Explain the meaning of the y-intercept in the context of the problem.

The yint represents the height of the balloon at time 0.

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

Question 27

27 The table below shows the height in feet, $h(t)$, of a hot-air balloon and the number of minutes, t, the balloon is in the air.

Time (min)	2	5	7	10	12
Height (ft)	64	168	222	318	369

The function $h(t) = 30.5t + 8.7$ can be used to model this data table.

Explain the meaning of the slope in the context of the problem.

Explain the meaning of the y-intercept in the context of the problem.

The y intercept represents the starting height of the air balloon.

Score 1: The student gave one correct explanation.

Question 27

27 The table below shows the height in feet, $h(t)$, of a hot-air balloon and the number of minutes, t, the balloon is in the air.

Time (min)	2	5	7	10	12
Height (ft)	64	168	222	318	369

The function $h(t) = 30.5t + 8.7$ can be used to model this data table.

Explain the meaning of the slope in the context of the problem.

The slope is 30.5t and the y-intercept is 8.7. The slope means the height in feet, h, of a hot air balloon.

Explain the meaning of the y-intercept in the context of the problem.

The y-intercept 8.7 is the number of mintes the balloon is in the air.

Score 0: The student gave an incorrect response.

Question 28

28 Factor $x^4 - 16$ completely.

$x^4 - 16$

$(x^2 - 4)(x^2 + 4)$

$(x - 2)(x + 2)(x^2 + 4)$

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

Question 28

28 Factor $x^4 - 16$ completely.

$\sqrt{x^4}\sqrt{16}$

$x^2 - 4$

$(x - 2)(x + 2)$

Score 1: The student made a conceptual error, but factored $x^2 - 4$ correctly.

Question 28

28 Factor $x^4 - 16$ completely.

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

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

Score 1: The student made one factoring error.

Question 28

28 Factor $x^4 - 16$ completely.

$(x-16)\ (x-16)\ (x-16)\ (x-16)$

Score 0: The student gave a completely incorrect response.

Question 29

29 Mike knows that (3,6.5) and (4,17.55) are points on the graph of an exponential function, $g(x)$, and he wants to find another point on the graph of this function.

First, he subtracts 6.5 from 17.55 to get 11.05.
Next, he adds 11.05 and 17.55 to get 28.6.
He states that (5,28.6) is a point on $g(x)$.

Is he correct? Explain your reasoning.

No, he is not correct. He found the next point as if it was a linear equation, not an exponential equation.

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

Question 29

29 Mike knows that (3,6.5) and (4,17.55) are points on the graph of an exponential function, $g(x)$, and he wants to find another point on the graph of this function.

First, he subtracts 6.5 from 17.55 to get 11.05.
Next, he adds 11.05 and 17.55 to get 28.6.
He states that (5,28.6) is a point on $g(x)$.

Is he correct? Explain your reasoning.

$y = (.3302) \cdot (2.7)^x$

$28.6 \neq .3302 \cdot (2.7)^5$

$28.6 \neq 47.3801$

He is incorrect because when you plug in 5 it does not equal 28.6.

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

Question 29

29 Mike knows that (3,6.5) and (4,17.55) are points on the graph of an exponential function, $g(x)$, and he wants to find another point on the graph of this function.

First, he subtracts 6.5 from 17.55 to get 11.05.

Next, he adds 11.05 and 17.55 to get 28.6.

He states that (5,28.6) is a point on $g(x)$.

Is he correct? Explain your reasoning.

(3,6.5)(4,17.55) $\frac{17.55 - 6.5}{4 - 3} = \frac{11.05}{1}$

$y = 11.05x + b$

$6.5 = 11.05(3) + b$

$6.5 = 33.15 + b$

$-26.65 = b$

$y = 11.05x - 26.65$

$28.6 = 11.05(5) - 26.65$

$28.6 = 55.25 - 26.65$

$28.6 = 28.6$

Mike is correct because the equation would have the equation $g(x) = 11.05x - 26.65$ and the coordinate (5, 28.6) fits into the equation

Score 1: The student wrote a correct justification for a linear function.

Question 29

29 Mike knows that (3,6.5) and (4,17.55) are points on the graph of an exponential function, $g(x)$, and he wants to find another point on the graph of this function.

First, he subtracts 6.5 from 17.55 to get 11.05.

Next, he adds 11.05 and 17.55 to get 28.6.

He states that (5,28.6) is a point on $g(x)$.

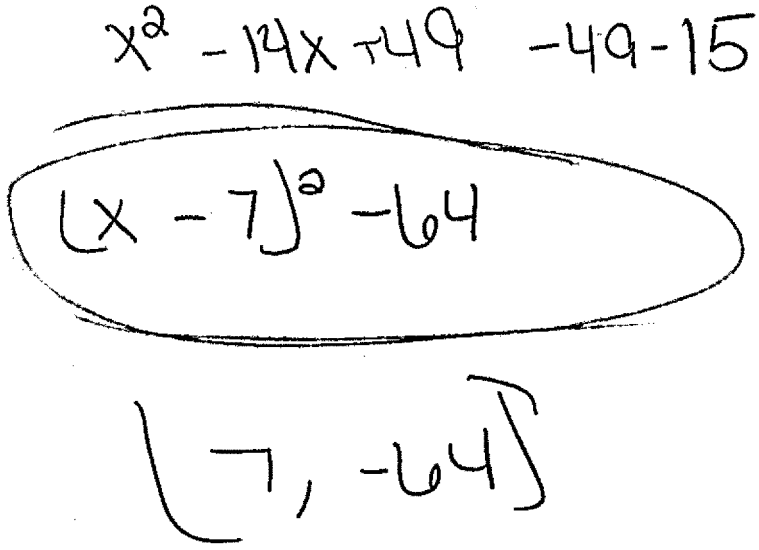
Is he correct? Explain your reasoning.

Yes, because the rate of change is increasing at a steady amount everytime.

Score 0: The student gave a completely incorrect response.

Question 30

30 Use the method of completing the square to determine the vertex of $f(x) = x^2 - 14x - 15$. State the coordinates of the vertex.



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

Question 30

30 Use the method of completing the square to determine the vertex of $f(x) = x^2 - 14x - 15$. State the coordinates of the vertex.

$x^2 - 14x - 15$

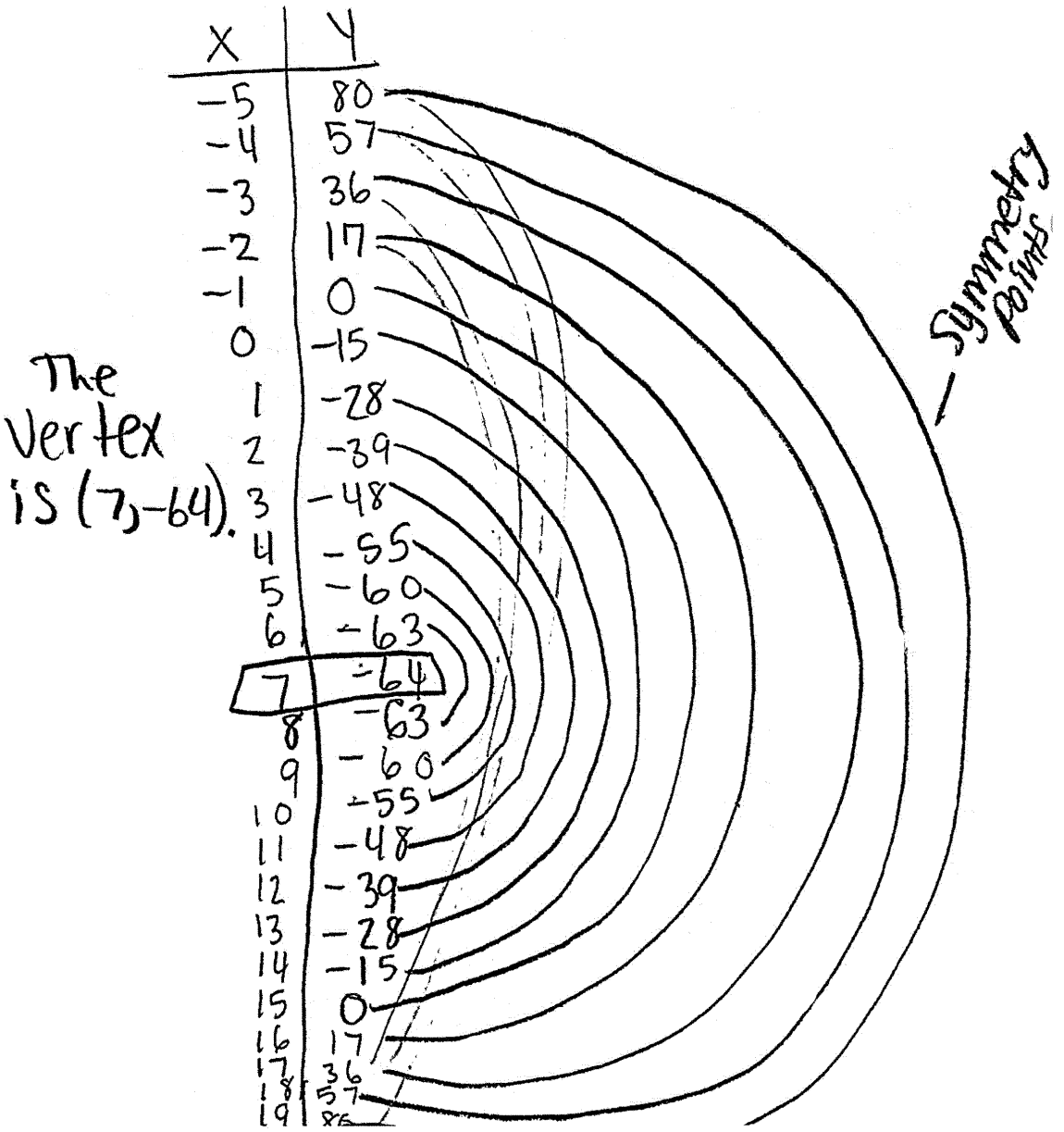
$x^2 - 14x + 49 - 15 - 49$

$(x - 7)^2 - 64$

Score 1: The student did not state the coordinates of the vertex.

Question 30

30 Use the method of completing the square to determine the vertex of $f(x) = x^2 - 14x - 15$. State the coordinates of the vertex.



Score 1: The student used a method other than completing the square to find the vertex.

Question 30

30 Use the method of completing the square to determine the vertex of $f(x) = x^2 - 14x - 15$. State the coordinates of the vertex.

$x^2 - 14x + 7.5 = 15 - 7.5$

$x^2 - 14x + 7.5 = 7.5$

$(x - 7)^2 = 7.5$

Score 0: The student gave an incorrect response.

Question 31

31 The temperature inside a cooling unit is measured in degrees Celsius, C. Josh wants to find out how cold it is in degrees Fahrenheit, F.

Solve the formula $C = \frac{5}{9}(F - 32)$ for F so that Josh can convert Celsius to Fahrenheit.

$\frac{9}{5}C = F - 32$

$+32 \quad +32$

$\frac{9}{5}C + 32 = F$

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

Question 31

31 The temperature inside a cooling unit is measured in degrees Celsius, C. Josh wants to find out how cold it is in degrees Fahrenheit, F.

Solve the formula $C = \frac{5}{9}(F - 32)$ for F so that Josh can convert Celsius to Fahrenheit.

$C = \frac{5}{9}F - \frac{5}{9}(32)$

$C = \frac{5}{9}F - 17.\overline{7}$

$C + 17.\overline{7} = \frac{5}{9}F$

$\frac{9C + 9(17.\overline{7})}{5} = F$

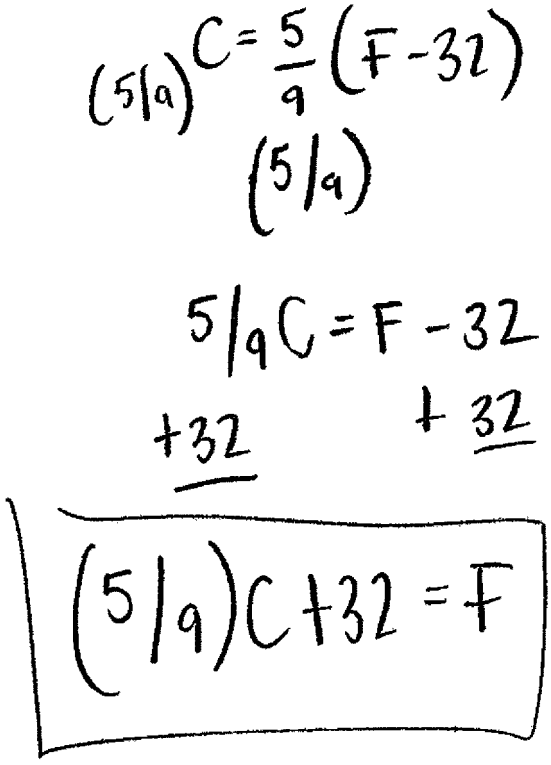
$\frac{9C + 160}{5} = F$

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

Question 31

31 The temperature inside a cooling unit is measured in degrees Celsius, C. Josh wants to find out how cold it is in degrees Fahrenheit, F.

Solve the formula $C = \frac{5}{9}(F - 32)$ for F so that Josh can convert Celsius to Fahrenheit.

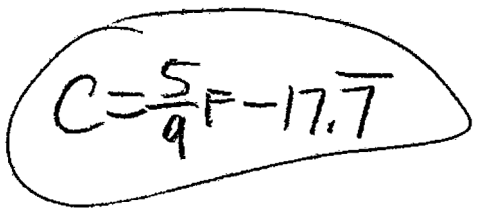


Score 1: The student made a computational error.

Question 31

31 The temperature inside a cooling unit is measured in degrees Celsius, C. Josh wants to find out how cold it is in degrees Fahrenheit, F.

Solve the formula $C = \frac{5}{9}(F - 32)$ for F so that Josh can convert Celsius to Fahrenheit.



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

Question 32

32 Solve $4w^2 + 12w - 44 = 0$ algebraically for w, to the *nearest hundredth*.

$4w^2 + 12w - 44 = 0$

$ax^2 + bx + c$

$$w = \frac{-12 \pm \sqrt{(12)^2 - 4(4)(-44)}}{2(4)}$$

$$w = \frac{-12 \pm \sqrt{848}}{8}$$

$w = 2.14$

$w = -5.14$

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

Question 32

32 Solve $4w^2 + 12w - 44 = 0$ algebraically for w, to the *nearest hundredth*.

$\frac{4w^2}{4} + \frac{12w}{4} - \frac{44}{4} = \frac{0}{4}$

$w^2 + 3w - 11 = 0$

$+11 \quad +11$

$w^2 + 3w + \frac{9}{4} = 11 + \frac{9}{4}$

$\left(\frac{3}{2}\right)^2$

$\frac{9}{4}$

$\left(w + \frac{3}{2}\right)\left(w + \frac{3}{2}\right) = \frac{53}{4}$

$\sqrt{\left(w + \frac{3}{2}\right)^2} = \sqrt{\frac{53}{4}}$

$w + \frac{3}{2} = \pm\sqrt{\frac{53}{4}}$

$-\frac{3}{2} \quad -\frac{3}{2}$

$w = -\frac{3}{2} \pm \sqrt{\frac{53}{4}}$

Score 1: The student did not round their answers to the nearest hundredth.

Question 32

32 Solve $4w^2 + 12w - 44 = 0$ algebraically for w, to the *nearest hundredth*.

$$x = \frac{-12 \pm \sqrt{12^2 - 4(4)(-44)}}{2(4)}$$

$$x = \frac{-12 \pm \sqrt{848}}{8}$$

Score 1: The student did not round their answers to the nearest hundredth.

Question 32

32 Solve $4w^2 + 12w - 44 = 0$ algebraically for w, to the *nearest hundredth*.

$\frac{4w^2+12w-44=0}{4}$

A b c

$w^2+3w-11=0$

$-3w \quad +11 \quad +11$

$\sqrt{w^2} = 3\times+11$

$w = 3w+11$

$-3w \quad -3w$

$-2w = 11$

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

$w = -5.5$

Score 0: The student gave an incorrect response.

Question 33

33 Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

Number of Jumping Jacks x	Heart Rate (bpm) y
0	68
10	84
15	104
20	100
30	120

State the linear regression equation that estimates the heart rate per number of jumping jacks.

Calculator: stat edit, then calc lin reg

$y = 1.72x + 69.4$

State the correlation coefficient of the linear regression equation, rounded to the *nearest hundredth*.

$r \approx .97$

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

The correlation coefficient being very close to 1 (perfect line of best fit) suggests that as the number of jumping jacks increases, the heart rate will also increase. There is a very strong correlation between them.

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

Question 33

33 Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

Number of Jumping Jacks x	Heart Rate (bpm) y
0	68
10	84
15	104
20	100
30	120

State the linear regression equation that estimates the heart rate per number of jumping jacks.

$y = 1.72x + 69.4$

State the correlation coefficient of the linear regression equation, rounded to the *nearest hundredth*.

$r = .97$

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

Correlation Coefficient suggest that the line is a good representation for the data due to the fact the correlation coefficient is close to 1

Score 3: The student did not write an explanation in the context of the problem.

Question 33

33 Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

Number of Jumping Jacks x	Heart Rate (bpm) y
0	68
10	84
15	104
20	100
30	120

$y = ax + b$
$a = 1.989189189$
$b = 67.35135135$

$r^2 = 0.926140715$
$r = 0.962362052$

State the linear regression equation that estimates the heart rate per number of jumping jacks.

$y = 1.99x + 67.35$

State the correlation coefficient of the linear regression equation, rounded to the *nearest hundredth*.

0.96

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

As the number of jumping jacks increases, the heart rate increases.

Score 3: The student made a mistake putting the data in the calculator, but used the values that they got on their calculator display appropriately.

Question 33

33 Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

Number of Jumping Jacks **x**	**Heart Rate** (bpm) **y**
0	68
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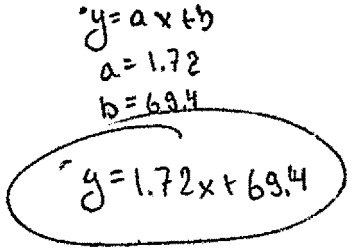
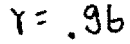


State the correlation coefficient of the linear regression equation, rounded to the *nearest hundredth*.



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

Score 2: The student wrote a correct linear regression equation, but no further correct work was shown.

Question 33

33 Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

Number of Jumping Jacks **x**	**Heart Rate** (bpm) **y**
0	68
10	84
15	104
20	100
30	120

State the linear regression equation that estimates the heart rate per number of jumping jacks.

M = 1.72(x) + 69.4

State the correlation coefficient of the linear regression equation, rounded to the *nearest hundredth*.

0.98

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

Score 1: The student wrote a correct expression, but no further correct work was shown.

Question 33

33 Joey recorded his heart rate, in beats per minute (bpm), after doing different numbers of jumping jacks. His results are shown in the table below.

Number of Jumping Jacks x	**Heart Rate** (bpm) **y**
0	68
10	84
15	104
20	100
30	120

State the linear regression equation that estimates the heart rate per number of jumping jacks.

$y \approx 20x + b$

State the correlation coefficient of the linear regression equation, rounded to the *nearest hundredth*.

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

Score 0: The student gave a completely incorrect response.

Question 34

34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If x represents the number of pens Hannah bought, write an equation in terms of x that can be used to find how many of each item she bought.

$4+x=$ pencils
$x-2=$ erasers
$x=$ pens

Use your equation to determine algebraically how many pens Hannah bought.

$1.25x+0.55(4+x)+0.75(x-2)=16$
$1.25x+2.2+.55x+.75x-1.5=16$
$2.55x+.7=16$
$\frac{2.55x}{2.55}=\frac{15.3}{2.55}$
$x=6$

6 pens

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

Question 34

34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If x represents the number of pens Hannah bought, write an equation in terms of x that can be used to find how many of each item she bought.

$1.25x + .55(x+4) + .75(x-2) = 16$

Use your equation to determine algebraically how many pens Hannah bought.

$x = 3$

$1.25(3) + .55(3+4) + .75(3-2) \stackrel{?}{=} 16$

$8.35 \neq 16$

$x = 4$ $1.25(4) + .55(4+4) + .75(4-2) \stackrel{?}{=} 16$

$10.9 \neq 16$

$x = 5$ $1.25(5) + .55(5+4) + .75(5-2) \stackrel{?}{=} 16$

$13.45 \neq 16$

$x = 6$ $1.25(6) + .55(6+4) + .75(6-2) = 16$

$16 = 16$ ✓

Score 3: The student wrote a correct equation, but used a method other than algebraic to find 6.

Question 34

34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If x represents the number of pens Hannah bought, write an equation in terms of x that can be used to find how many of each item she bought.

$1.25x + .55(x+4) + .75(x-2) = 16$

Use your equation to determine algebraically how many pens Hannah bought.

6

Score 3: The student wrote a correct equation and stated 6, but no algebraic work was shown to find 6.

Question 34

34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If x represents the number of pens Hannah bought, write an equation in terms of x that can be used to find how many of each item she bought.

let x = the number of pens Hannah bought
let x+4 = # of pencils Hannah bough+
let x-2 = # of ~~erasers~~

$16 = 1.25x + .55(x+4) + .75(x-2)$

Use your equation to determine algebraically how many pens Hannah bought.

$1.25x + .55(x+4) + .75(x-2) = 16$

$1.25x + .55x + 2.2 + .75x - 15 = 16$

$2.55x + 12.8 = 16$

$-12.8 \quad -12.8$

$\frac{2.55x}{2.55} = \frac{3.2}{2.55}$

$x = 1.2549$ (es)

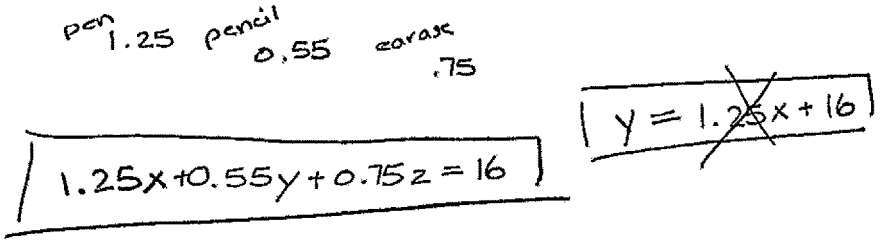
$x = 1.26$

Score 2: The student made multiple errors.

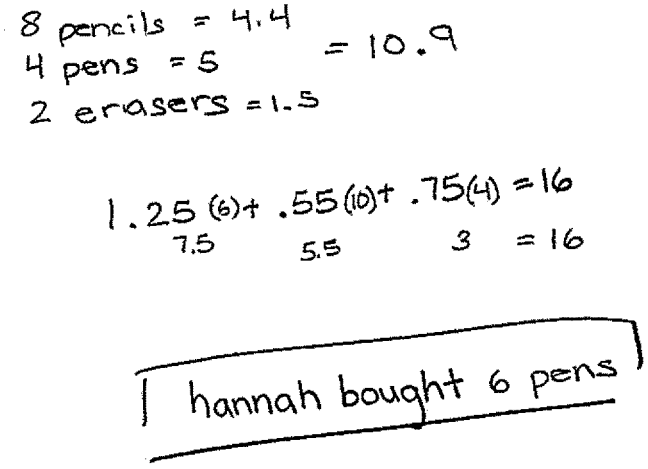
Question 34

34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If x represents the number of pens Hannah bought, write an equation in terms of x that can be used to find how many of each item she bought.



Use your equation to determine algebraically how many pens Hannah bought.



Score 1: The student stated 6, but no further correct work was shown.

Question 34

34 Hannah went to the school store to buy supplies and spent $16. She bought four more pencils than pens and two fewer erasers than pens. Pens cost $1.25 each, pencils cost $0.55 each, and erasers cost $0.75 each.

If x represents the number of pens Hannah bought, write an equation in terms of x that can be used to find how many of each item she bought.

$1.25x + 0.55 + 0.75 = 16$

Use your equation to determine algebraically how many pens Hannah bought.

$1.25x + 0.55 . 0.75 = 16.00$

$1.25x + 1.30 = 16.00$

$2.55x = 16.00$

$x = 6.2745098$

Score 0: The student gave a completely incorrect response.

Question 35

35 Graph the system of inequalities on the set of axes below:

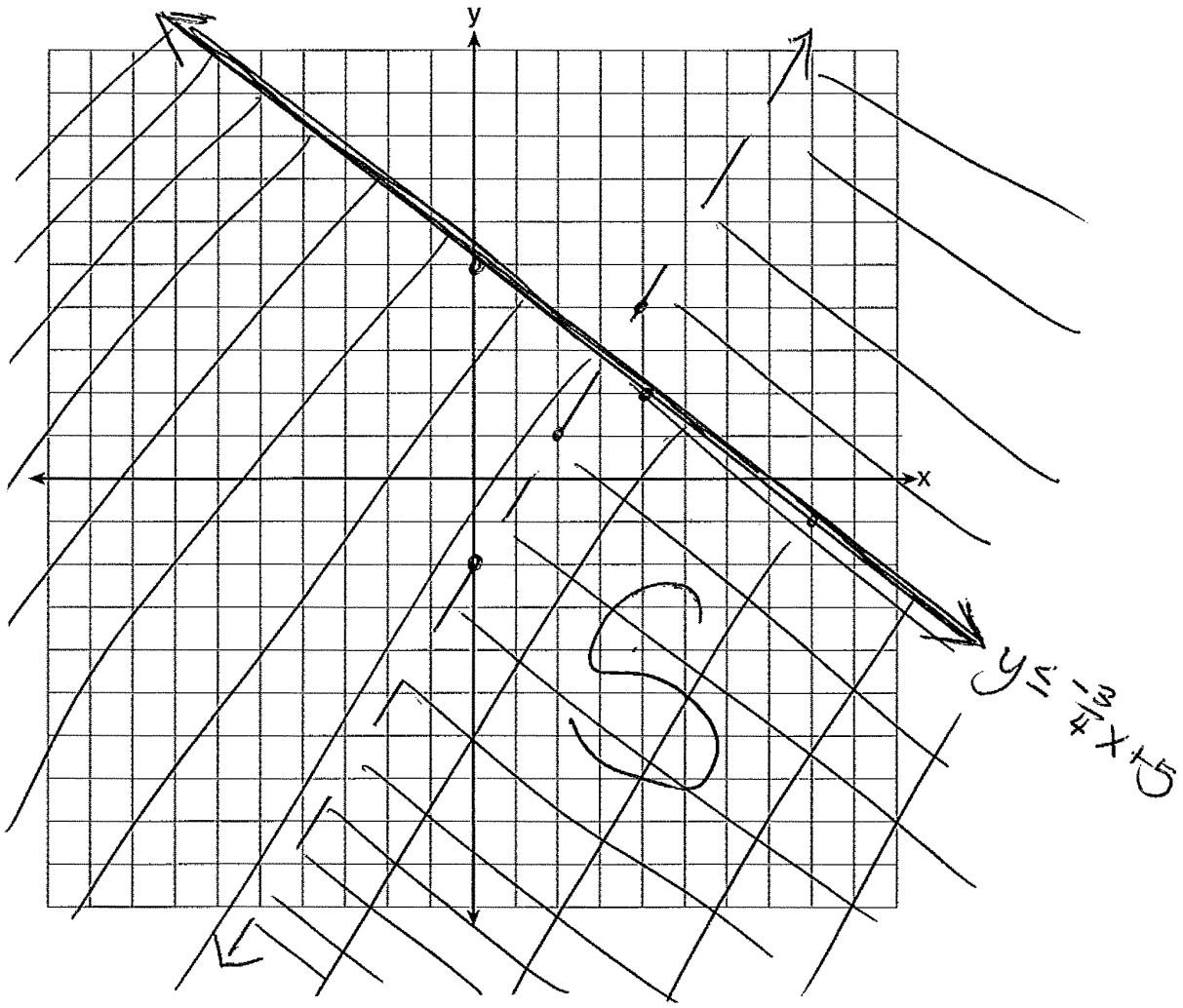
$$y \leq -\frac{3}{4}x + 5$$

$$3x - 2y > 4$$

$3x-2y>4$

$\frac{-2y}{-2} > \frac{-3x+4}{-2}$ $\frac{}{-2}$

$y < \frac{3}{2}x - 2$



Is (6,3) a solution to the system of inequalities? Explain your answer.

No, (6,3) does not lie in the solution set of the system of inequalities.

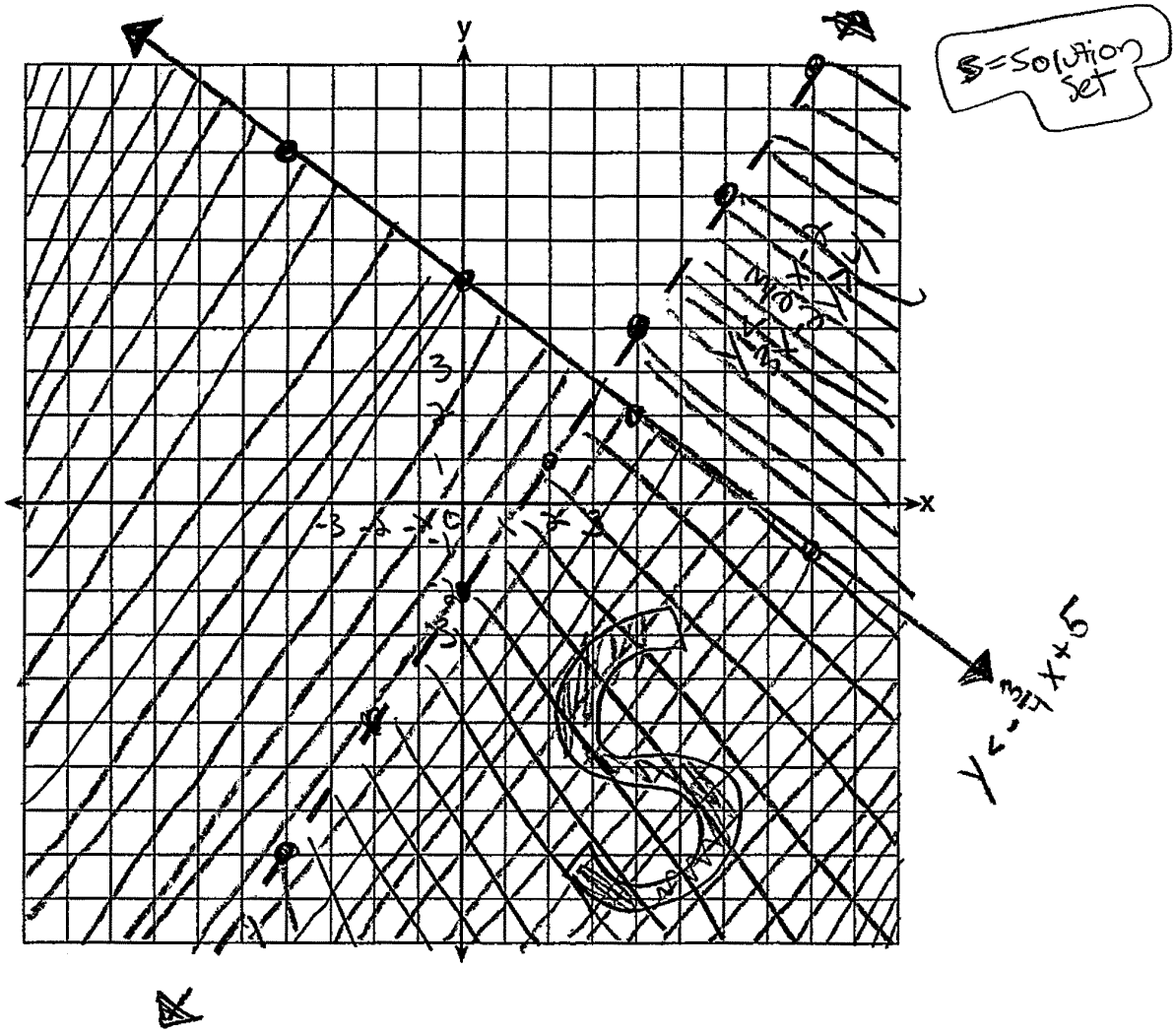
Score 4: The student gave a complete and correct response.

Question 35

35 Graph the system of inequalities on the set of axes below:

$y \leq -\frac{3}{4}x + 5$

$3x - 2y > 4$



Is (6,3) a solution to the system of inequalities? Explain your answer.

No, this point is not a solution to the system of inequalities, because the point does not work.

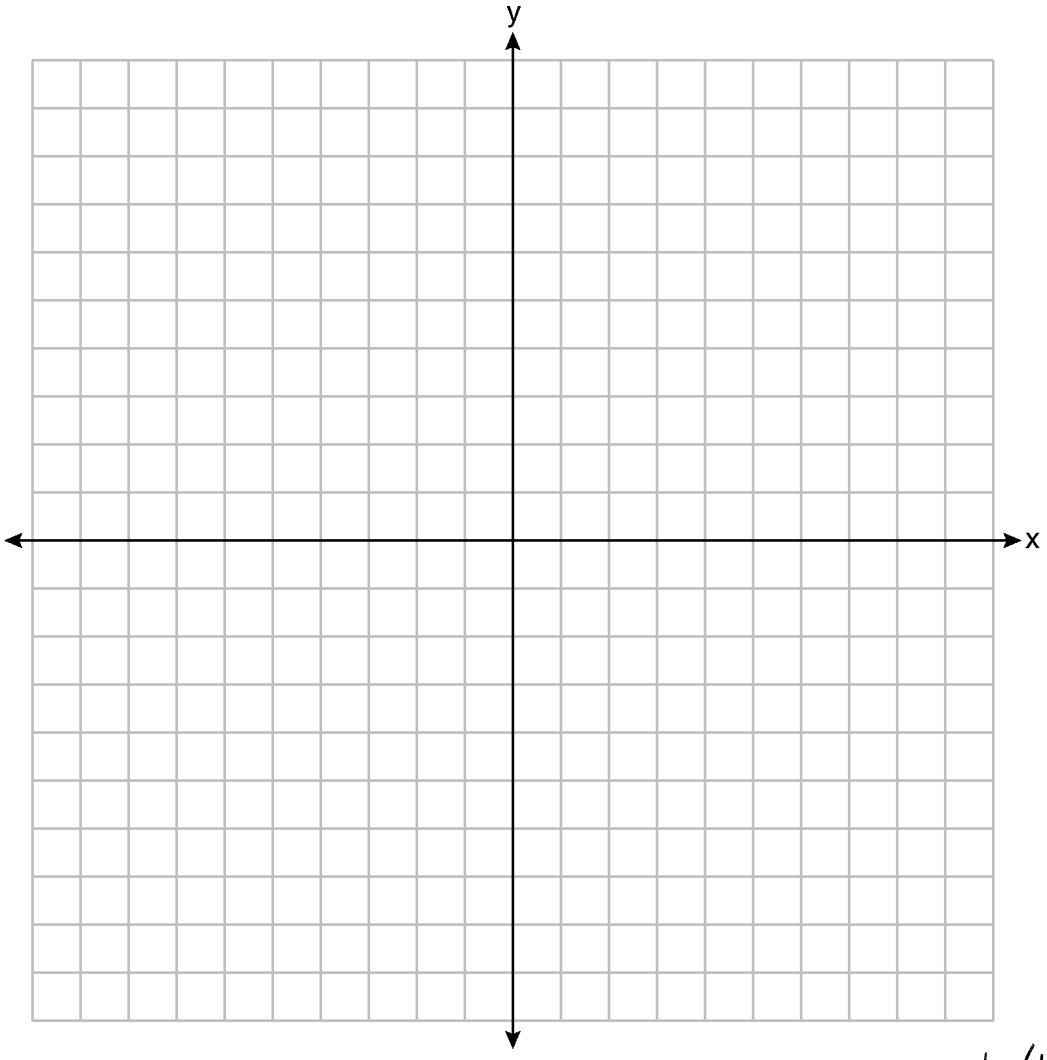
Score 3: The student wrote an incomplete explanation.

Question 35

35 Graph the system of inequalities on the set of axes below:

$$y \leq -\frac{3}{4}x + 5$$

$$3x - 2y > 4$$



x, y

Is (6,3) a solution to the system of inequalities? Explain your answer.

$3 \leq -\frac{3}{4}(6)+5$

$3 \leq -\frac{18}{4}+5$

$3 \leq \frac{1}{2}$ False

$3(6)-2(3)>4$

$18-6>4$

$12>4$

True

The point (6,3) is not a solution to the system of inequalities because the point is only true for $3x-2y>4$.

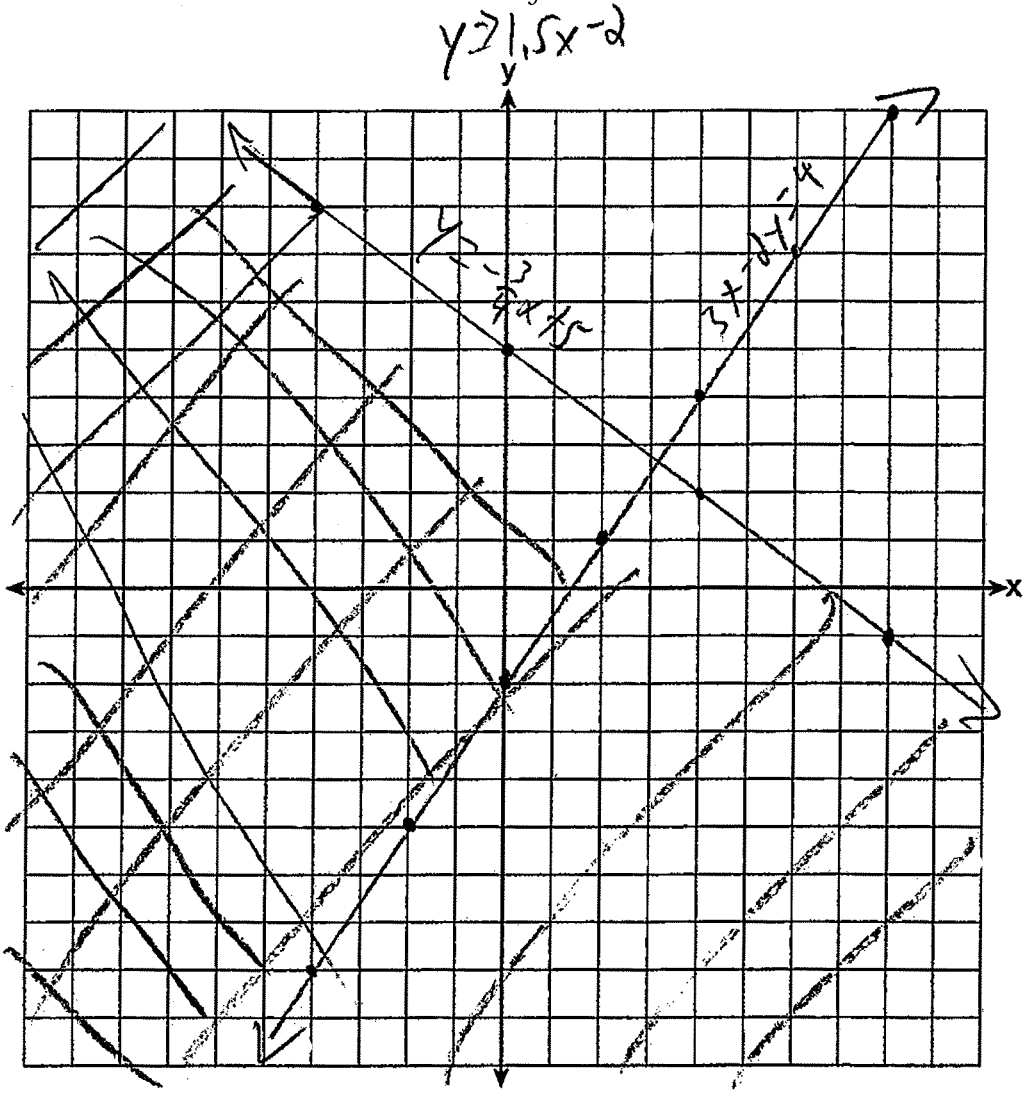
Score 2: The student wrote a correct explanation, but did not graph the system of inequalities.

Question 35

35 Graph the system of inequalities on the set of axes below:

$$y \leq -\frac{3}{4}x + 5$$

$$3x - 2y > 4$$



Is (6,3) a solution to the system of inequalities? Explain your answer.

Score 1: The student graphed and labeled the equations $y = -\frac{3}{4}x + 5$ and $3x - 2y = 4$ correctly, but no further correct work was shown.

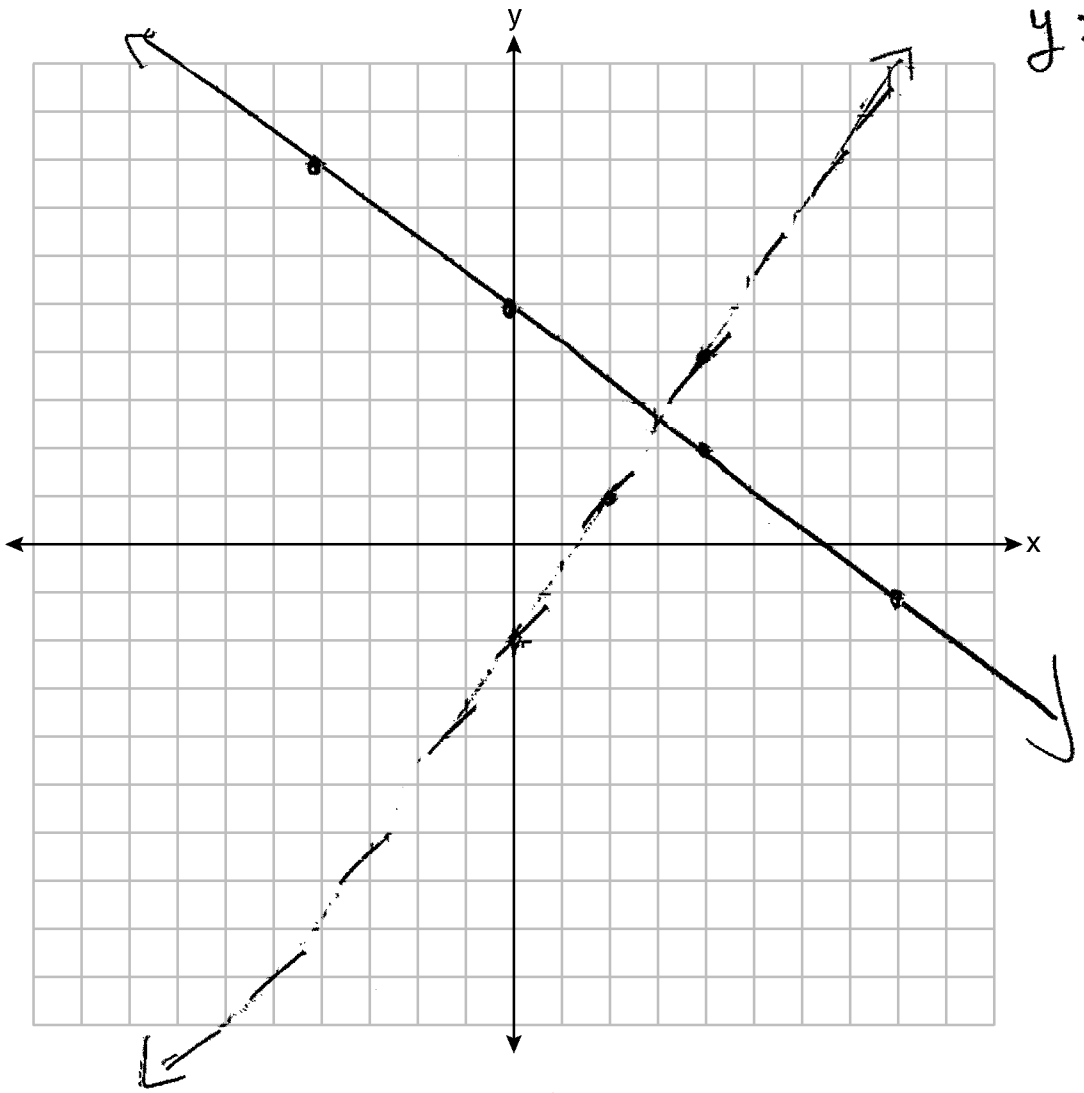
Question 35

35 Graph the system of inequalities on the set of axes below:

$$y \leq -\frac{3}{4}x + 5$$

$$3x - 2y > 4$$

$3x - 2y > 4$
$-3x \quad -3x$
$\frac{-2y}{-2} > \frac{-3x}{-2} + \frac{4}{-2}$
$y > \frac{3}{2} - 2$



Is (6,3) a solution to the system of inequalities? Explain your answer.

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

Question 36

36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function $f(t) = -16t^2 + 96t + 112$, where t is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

112 feet

State the coordinates of the vertex. Explain what it means in the context of the problem.

(3, 256)

At 3 seconds, the ball is 256 feet in the air.

State the entire interval over which the ball's height is *decreasing*.

Decreasing (3, 7)

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

Question 36

36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function $f(t) = -16t^2 + 96t + 112$, where t is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

112ft

State the coordinates of the vertex. Explain what it means in the context of the problem.

$t = x = \frac{-b}{2a} = \frac{-96}{2 \cdot -16} = \frac{-96}{-32} = 3$

$y = -16 \times 3^2 + 96 \cdot 3 + 112 = 256$

(3, 256)

It takes 3 seconds for the ball to reach it's maximum height, 256ft.

State the entire interval over which the ball's height is *decreasing*.

$3 < t \leq 7$

$0 = -16x^2 + 96x + 112$

$0 = -16(x^2 - 8x - 7)$

$0 = -16(x - 7)(x + 1)$

$x = \{7, -1\}$

$x = 7$

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

Question 36

36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function $f(t) = -16t^2 + 96t + 112$, where t is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

112 feet

State the coordinates of the vertex. Explain what it means in the context of the problem.

(3, 256)

At 3 seconds the ball reaches a maximum height of 256 feet.

State the entire interval over which the ball's height is *decreasing*.

from 3 to 7 seconds

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

Question 36

36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function $f(t) = -16t^2 + 96t + 112$, where t is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

the platform is 112 feet

State the coordinates of the vertex. Explain what it means in the context of the problem.

$f(t) = -16t^2 + 96t + 112$

t	$f(t)$
0	112
1	192
2	240
3	256
4	240
5	192
6	112

Vertex: (3, 256).
This is the heighest height the ball will reach off the ground (256 ft) over a certain amount of time (3 seconds)

State the entire interval over which the ball's height is *decreasing*.

$x > 3$

Score 3: The student did not state a correct interval.

Question 36

36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function $f(t) = -16t^2 + 96t + 112$, where t is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

2.

State the coordinates of the vertex. Explain what it means in the context of the problem.

(3, 256) - vertex

This point means after 3 seconds, the ball will be at it's maximum height of 256 feet.

State the entire interval over which the ball's height is *decreasing*.

Score 2: The student correctly stated the coordinates of the vertex and wrote an explanation in the context of the problem, but no further correct work was shown.

Question 36

36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function $f(t) = -16t^2 + 96t + 112$, where t is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.

7 feet

State the coordinates of the vertex. Explain what it means in the context of the problem.

256 feet. All we are looking for is turning point thats you answer (3, 256).

State the entire interval over which the ball's height is *decreasing*.

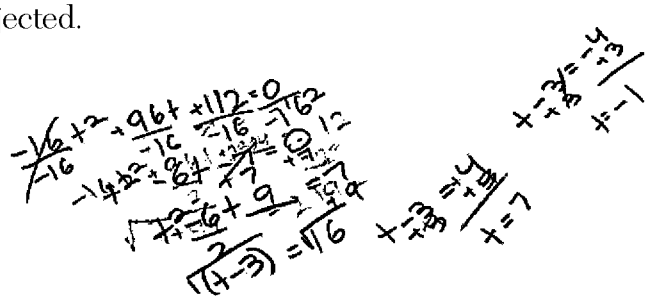
(2, -1)

Score 1: The student correctly stated the coordinates of the vertex, but no further correct work was shown.

Question 36

36 A ball is projected up into the air from the surface of a platform to the ground below. The height of the ball above the ground, in feet, is modeled by the function $f(t) = -16t^2 + 96t + 112$, where t is the time, in seconds, after the ball is projected.

State the height of the platform, in feet.



State the coordinates of the vertex. Explain what it means in the context of the problem.

turning point of the ball

State the entire interval over which the ball's height is *decreasing*.

Score 0: The student gave an incorrect response.

Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is \$40. The cost of 5 large plants and 2 medium plants is \$28.

If l is the cost of a large plant and m is the cost of a medium plant, write a system of equations that models this situation.

$4L + 8m = 40$

$5L + 2m = 28$

Could the cost of one large plant be \$5.50 and the cost of one medium plant be \$2.25? Justify your answer.

$27.5 + 4.5 = 28 \rightarrow 32 \neq 28$

Not true

No, it Cannot.

Determine algebraically both the cost of a large plant and the cost of a medium plant.

$4L + 8m = 40$

$4(5L + 2m = 28)$

$L = 4.5$

$m = 2.75$

$-18 + 8m = 40$

$-18 \quad -18$

$8m = 22$

$\frac{8m}{8} = \frac{22}{8}$

$m = 2.75$

$-(4L + 8m = 40)$

$(20L + 8m = 112)$

$\frac{-16L}{-16} = \frac{-72}{-16}$

$L = 4.5$

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

Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If l is the cost of a large plant and m is the cost of a medium plant, write a system of equations that models this situation.

$l + m = C$

C = Cost
l = # of large plants
m = # of medium plants

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

$4(5.50)+8(2.50)=42$
$5(5.50)+2(2.50)=32.50$

NO that can't be the cost because then you will be getting charged more.

Determine algebraically both the cost of a large plant and the cost of a medium plant.

$l+m=C$
$4l+8m=40$
$5l+2m=28$

$4l+8m=40$
$-20l+8m=112$
$-16l=-72$
$-16 \quad -16$
$l=\$4.50$

$5l+2m=28$
$-4 \quad -4$
$11 \quad 2$

$4(4.5)+8m=40$
$-18+8m=40$
$-18 \quad -18$
$\frac{8m}{8}=\frac{22}{8}$
$m=\$2.75$

$4.50 \times 5 = 22.50$
$2.75 \times 2 = 5.50$
$+ \ 5.50$
28.00

$5(4.50)+2(2.75)=28$
$22.50+5.50=\$28$
$28=28$

$4(4.50)+8(2.75)=40$
$18+22=40$
$40=40$

Score 5: The student made one computational error when substituting in 2.50 for the cost of a medium plant instead of 2.25.

Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is \$40. The cost of 5 large plants and 2 medium plants is \$28.

If l is the cost of a large plant and m is the cost of a medium plant, write a system of equations that models this situation.

$4l + 8m = 40$

$5l + 2m = 28$

Could the cost of one large plant be \$5.50 and the cost of one medium plant be \$2.25? Justify your answer.

$(4)(5.50) + (8)(2.25) = 40$

$22 + 18 = 40$

$40 = 40$

$5(5.50) + 2(2.25) = 28$

$27.50 + 4.50 = 28$

$32 = 28$

$32 \neq 28$

no the plants could not be equal to those prices

Determine algebraically both the cost of a large plant and the cost of a medium plant.

$5(5.50) + 2(2.25) = 28$

Score 4: The student did not solve the system of equations algebraically to determine the cost of a large plant and the cost of a medium plant.

Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If l is the cost of a large plant and m is the cost of a medium plant, write a system of equations that models this situation.

$$\begin{cases} 4l + 8m = 40 \\ 5l + 2m = 28 \end{cases}$$

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

$4l + 8m = 40$

$4(5.50) + 8(2.25)$

$= 22 + 18$

40

Yes!

Determine algebraically both the cost of a large plant and the cost of a medium plant.

$m = 5 - 4l$

Score 3: The student wrote a correct system of equations, but a justification indicating a positive response was given based upon substituting in only the first equation.

Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If l is the cost of a large plant and m is the cost of a medium plant, write a system of equations that models this situation.

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

$4(5.50) + 8(2.25)$
$= 22 + 8$
$= 40$

Determine algebraically both the cost of a large plant and the cost of a medium plant.

$5(5.50) + 2(2.25)$
$= 27.50 + 4.50$
$= 32$
$32 \neq 28$
NO!

Score 2: The student showed a correct justification, but no further correct work was shown.

Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If l is the cost of a large plant and m is the cost of a medium plant, write a system of equations that models this situation.

$4x + 8y = 40$

$5x + 2y = 28$

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

Determine algebraically both the cost of a large plant and the cost of a medium plant.

Score 1: The student wrote an appropriate system of equations, but not in terms of l and m.

Question 37

37 At a local garden shop, the price of plants includes sales tax.

The cost of 4 large plants and 8 medium plants is $40. The cost of 5 large plants and 2 medium plants is $28.

If l is the cost of a large plant and m is the cost of a medium plant, write a system of equations that models this situation.

$9l + 10m = \$68$

Could the cost of one large plant be $5.50 and the cost of one medium plant be $2.25? Justify your answer.

No because it does not all add up to the final amount of money.

Determine algebraically both the cost of a large plant and the cost of a medium plant.

$10(1.85) + 9(5.50) = 68$

The cost of a large plant is $5.50

and the cost of a medium plant is 1.85

Score 0: The student gave a completely incorrect response.