

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I

Wednesday, January 24, 2024 — 1:15 to 4:15 p.m., only

MODEL RESPONSE SET

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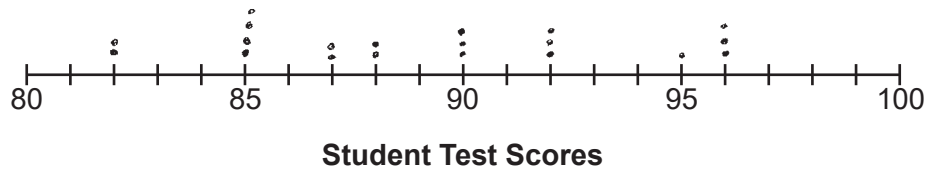
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Question 25

25 Student scores on a recent test are shown in the table below.

85	96	92	82	90
90	88	95	85	88
90	87	96	82	85
92	96	85	92	87

On the number line below, create a dot plot to model the data.



State the median test score for the data set.

89

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

Question 25

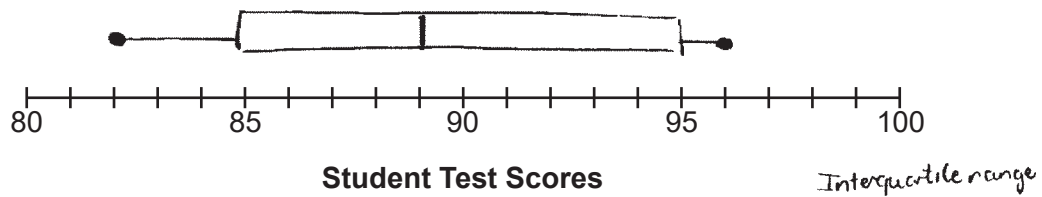
25 Student scores on a recent test are shown in the table below.

85	96	92	82	90
90	88	95	85	88
90	87	96	82	85
92	96	85	92	87

Smallest
82
Largest
96
Median
89
Range
16

82, 82, 85, 85, 85, 85, 87, 87, 88, 88, 90, 90, 90, 90, 92, 92, 92, 92, 95, 96, 96, 96

On the number line below, create a dot plot to model the data.



State the median test score for the data set.

The median test score for the data set is 89

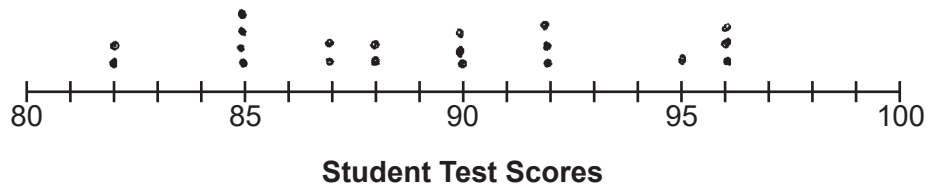
Score 1: The student stated the median correctly.

Question 25

25 Student scores on a recent test are shown in the table below.

85	96	92	82	90
90	88	95	85	88
90	87	96	82	85
92	96	85	92	87

On the number line below, create a dot plot to model the data.



State the median test score for the data set.

82, 82, 85, 85, 85, 85, 87, 87, 88, 88, 90, 90, 90, 92, 92, 92
95, 96, 96, 96

88.5

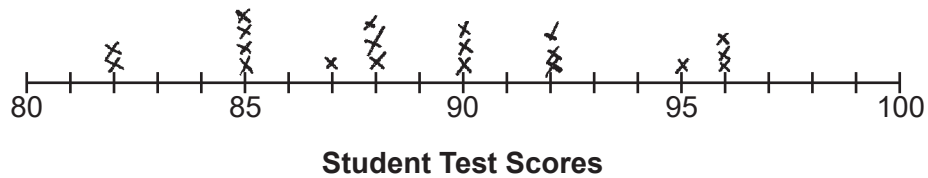
Score 1: The student created a correct dot plot.

Question 25

25 Student scores on a recent test are shown in the table below.

85	96	92	82	90
90	88	95	85	88
90	87	96	82	85
92	90	85	92	97

On the number line below, create a dot plot to model the data.



State the median test score for the data set.

The median Test Scores is 85.

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

Question 26

26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

It is irrational because it equals to a non-repeating, non-terminating decimal that cannot be converted to a fraction. This is because $\sqrt{3}$ is an imperfect square and it is multiplied by a rational number and added to a rational number, which results in an irrational number.

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

Question 26

26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

$$2\sqrt{3} + 6 = 9.464101615$$

$2\sqrt{3} + 6$ is irrational because its sum is not a number that terminates or repeats. The digits behind the decimal point do not repeat in a specific order with the same numbers therefore, it is irrational.

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

Question 26

26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

$2\sqrt{3} + 6 = 6$ which is rational because
it's a whole number.

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

Question 26

26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

9.4641... is the answer, this is irrational because 3 is not a perfect square. So when solving, your answer will be a decimal.

Score 1: The student wrote an incomplete explanation.

Question 26

26 State whether $2\sqrt{3} + 6$ is rational or irrational. Explain your answer.

$$2\sqrt{3} + 6$$

$2\sqrt{3} + 6$ is irrational it turns into a radical.

Score 0: The student wrote an incorrect explanation.

Question 27

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	x_1 2	3	x_2 4	5
Miles from Home (y)	45	y_1 112	178	y_2 238	305

State the average rate of change for the distance traveled between hours 2 and 4.
Include appropriate units.

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{238 - 112}{4 - 2} = 63$$

63 miles/hr

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

Question 27

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	2	3	4	5
Miles from Home (y)	45	112	178	238	305

State the average rate of change for the distance traveled between hours 2 and 4.
Include appropriate units.

$$\frac{126}{2} = 63 \text{ mph}$$

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

Question 27

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	2	3	4	5
Miles from Home (y)	45	112	178	238	305

State the ^{slope} average rate of change for the distance traveled between hours 2 and 4.
Include appropriate units.

$$\begin{array}{cc} (2, 112) & (4, 238) \\ x_1 & y_1 \quad x_2 & y_2 \end{array}$$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{238 - 112}{4 - 2} \rightarrow \frac{126}{2} \rightarrow 63$$

$$m = 63$$

Score 1: The student did not include the units.

Question 27

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	2	3	4	5
Miles from Home (y)	45	112	178	238	305

State the average rate of change for the distance traveled between hours 2 and 4.
Include appropriate units.

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{238 - 112}{4 - 2} = \frac{126}{2} = 63$$

The average rate of change for distance traveled between hours 2 and 4 is 63 miles.

Score 1: The student gave incorrect units.

Question 27

27 The table below shows data from a recent car trip for the Burke family.

x	Hours After Leaving (x)	1	2	3	4	5
y	Miles from Home (y)	45	112	178	238	305

State the average rate of change for the distance traveled between hours 2 and 4.
Include appropriate units.

$$\text{Rate of change} = \frac{x_2 - x_1}{y_2 - y_1} = \frac{4 - 2}{238 - 112} = \frac{2}{126} = \frac{1}{63}$$

Score 0: The student incorrectly determined the average rate of change and did not include units.

Question 27

27 The table below shows data from a recent car trip for the Burke family.

Hours After Leaving (x)	1	2	3	4	5
Miles from Home (y)	45	112	178	238	305

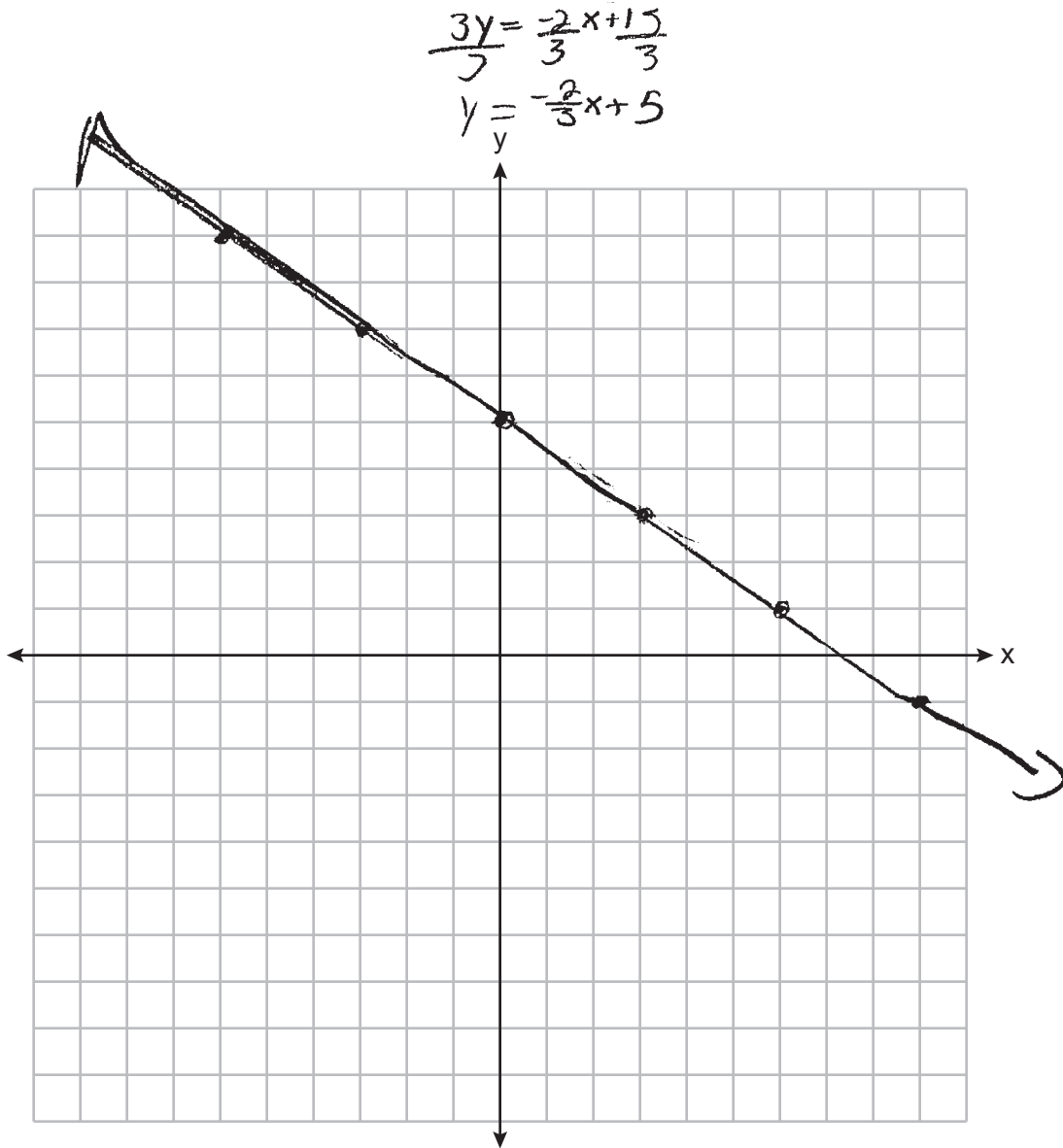
State the average rate of ^{slope}change for the distance traveled between hours 2 and 4.
Include appropriate units.

$$\frac{\Delta y}{\Delta x} = \frac{2+3+4}{112+178+238} = \left(\frac{8 \text{ hr}}{528 \text{ miles}} \right)$$

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

Question 28

28 On the set of axes below, graph the equation $3y + 2x = 15$.



Explain why $(-6, 9)$ is a solution to the equation.

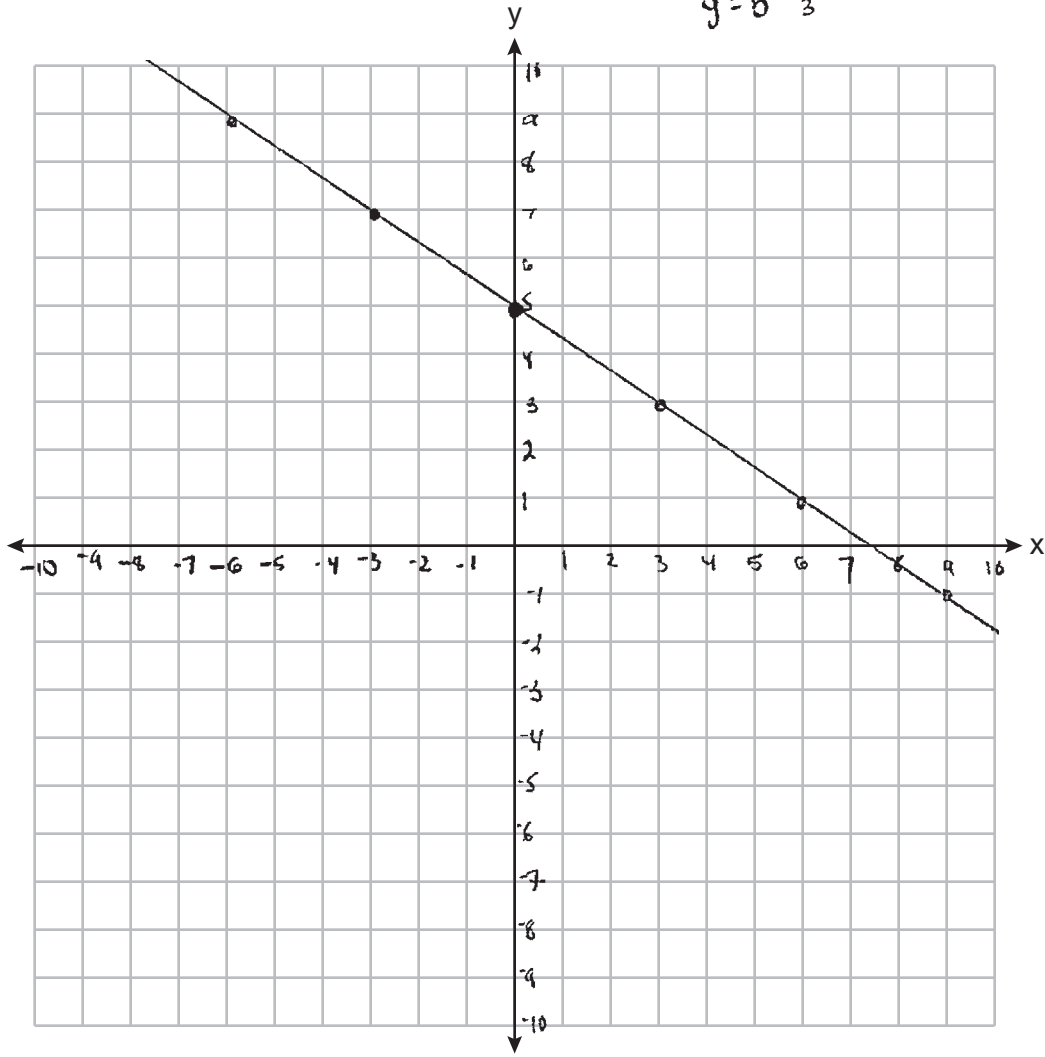
$(-6, 9)$ is a solution because it falls on the line

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

Question 28

28 On the set of axes below, graph the equation $3y + 2x = 15$.

$$\begin{aligned} 3y &= 15 - 2x \\ \frac{3y}{3} &= \frac{15 - 2x}{3} \\ y &= 5 - \frac{2}{3}x \end{aligned}$$



Explain why $(-6, 9)$ is a solution to the equation.

$(-6, 9)$ is a solution to the equation because at $(0, 5)$ you have to go up 2, left 3 and if you do that 2 times you're at the point $(-6, 9)$ on the line.

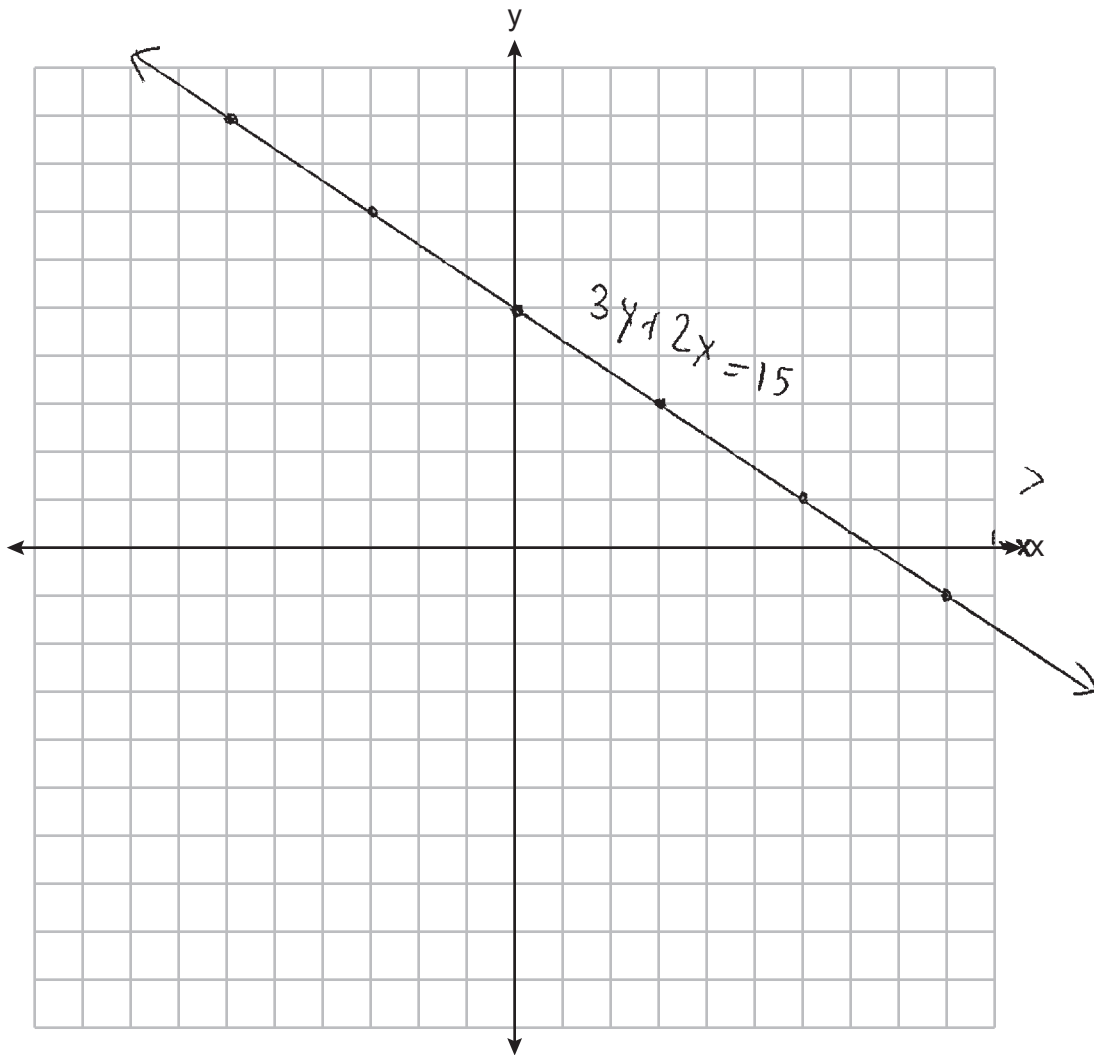
Score 2: The student gave a complete and correct response.

Question 28

28 On the set of axes below, graph the equation $3y + 2x = 15$.

$$y + \frac{2}{3}x = 5$$

$$y = -\frac{2}{3}x + 5$$



Explain why $(-6, 9)$ is a solution to the equation.

$$3(9) + 2(-6) = 15$$

$$27 - 12 = 15$$

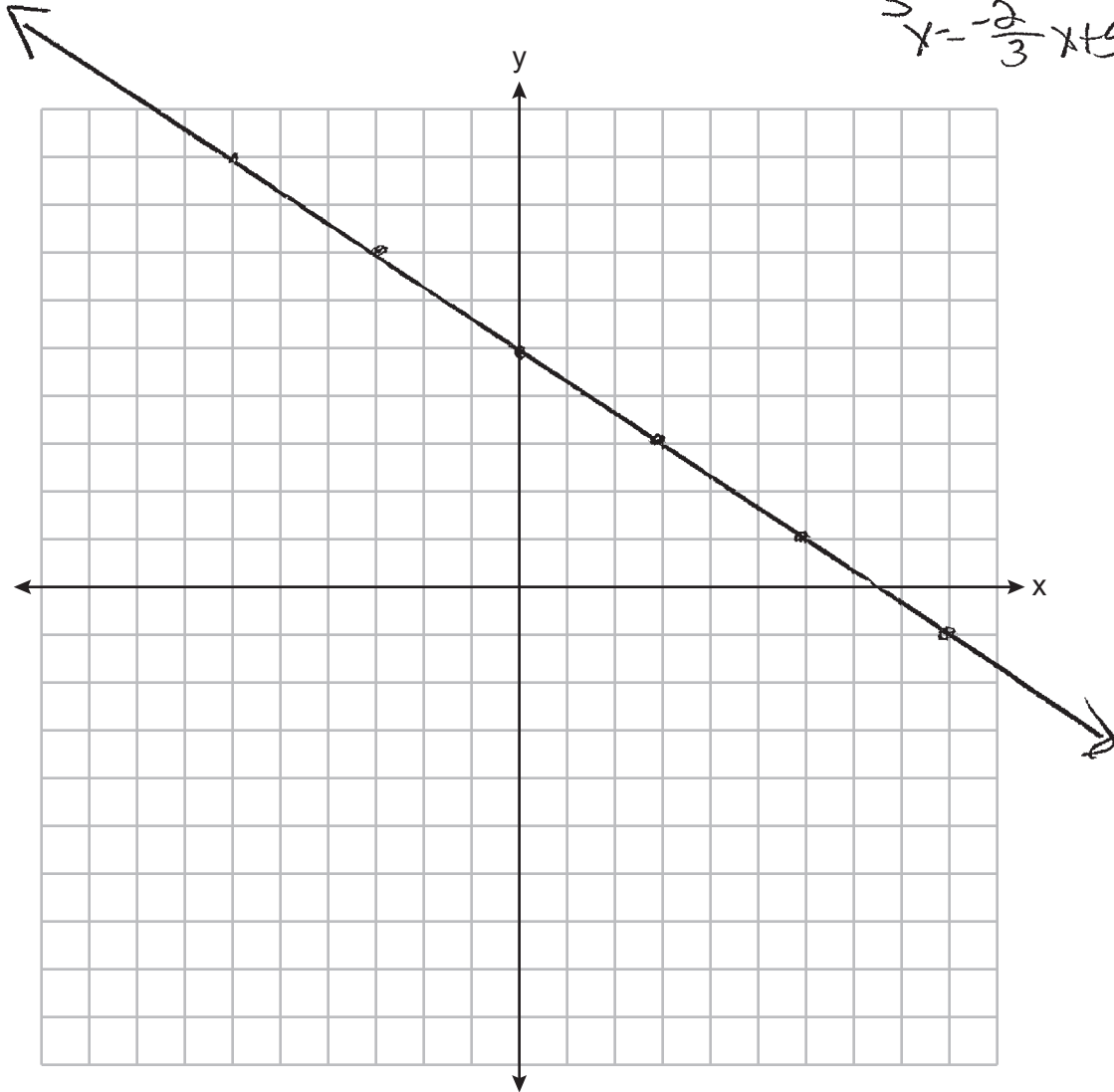
$$15 = 15 \checkmark$$

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

Question 28

28 On the set of axes below, graph the equation $3y + 2x = 15$.

$$\begin{array}{r} 3y + 2x = 15 \\ -2x - 2x \\ \hline 3y = -2x + 15 \\ \hline y = -\frac{2}{3}x + 5 \end{array}$$



Explain why $(-6, 9)$ is a solution to the equation.

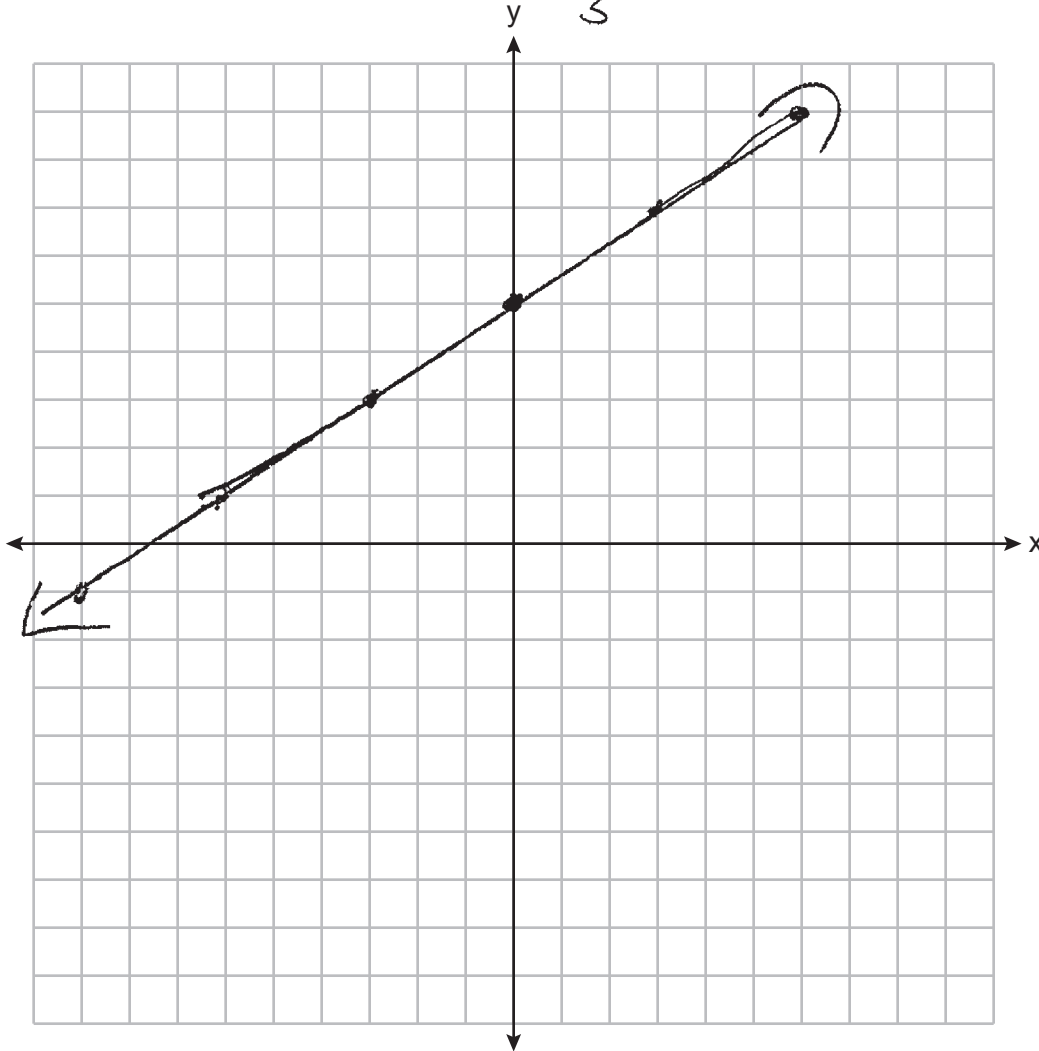
It is the top point

Score 1: The student graphed the equation correctly.

Question 28

28 On the set of axes below, graph the equation $\frac{2}{3}y + \frac{2x}{3} = 15$.

$$y = \frac{2}{3}x + 15$$



Explain why $(-6, 9)$ is a solution to the equation.

Because it is near the line of the graph

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

Question 29

29 Using the quadratic formula, solve $3x^2 - 2x - 6 = 0$ for all values of x .
Round your answers to the nearest hundredth.

$a=3$ $b=-2$ $c=-6$

$$\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$\frac{2 \pm \sqrt{(-2)^2 - 4(3)(-6)}}{2(3)}$$
$$\frac{2 \pm \sqrt{4 + 72}}{6}$$
$$\frac{2 \pm \sqrt{76}}{6}$$
$$\frac{2 \pm \sqrt{4} \sqrt{19}}{6}$$
$$\frac{2 \pm 2\sqrt{19}}{6}$$
$$\frac{1 \pm \sqrt{19}}{3}$$
$$x = \frac{1 + \sqrt{19}}{3} \quad x = \frac{1 - \sqrt{19}}{3}$$
$$x = 1.79 \quad x = -1.12$$

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

Question 29

29 Using the quadratic formula, solve $3x^2 - 2x - 6 = 0$ for all values of x .
Round your answers to the nearest hundredth.

$$\frac{-b \pm \sqrt{(b)^2 - 4(a)(c)}}{2(a)}$$

$$\frac{-2 \pm \sqrt{(-2)^2 - 4(3)(-6)}}{2(3)}$$

$$\frac{-2 + \sqrt{76}}{6} = \boxed{1.12}$$

$$\frac{-2 - \sqrt{76}}{6} = \boxed{-1.79}$$

Score 1: The student made a substitution error.

Question 29

29 Using the quadratic formula, solve $3x^2 - 2x - 6 = 0$ for all values of x .
Round your answers to the *nearest hundredth*.

$$x = \frac{-(-2) \pm \sqrt{(-2)^2 - 4(3)(-6)}}{2(3)}$$
$$x = \frac{2 \pm \sqrt{76}}{6}$$
$$\begin{array}{l} \swarrow \quad \searrow \\ x = \frac{2 + \sqrt{76}}{6} \quad x = \frac{2 - \sqrt{76}}{6} \\ [1.79] \quad \quad [-1.11] \end{array}$$

Score 1: The student made one rounding error.

Question 29

29 Using the quadratic formula, solve $3x^2 - 2x - 6 = 0$ for all values of x .
Round your answers to the *nearest hundredth*.

$$\begin{aligned} a &= 3 \\ b &= -2 \\ c &= -6 \end{aligned} \quad x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$x = \frac{2 \pm \sqrt{2^2 - 4(-6)(3)}}{2(3)}$$
$$x = \frac{2 \pm \sqrt{-4 + 27}}{6}$$
$$x = \frac{2 \pm \sqrt{23}}{6}$$
$$x = \frac{2 - \sqrt{23}}{6} \quad x = \frac{2 + \sqrt{23}}{6}$$
$$x = 0.47 \quad x = 1.13$$

Score 0: The student made more than one computational error.

Question 30

30 The piecewise function $f(x)$ is given below.

$$f(x) = \begin{cases} 2x - 3, & x > 3 \\ -x^2 + 15, & x \leq 3 \end{cases}$$

State the value of $f(3)$.

Justify your answer.

$$-(3)^2 + 15 = 6$$

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

Question 30

30 The piecewise function $f(x)$ is given below.

$$f(x) = \begin{cases} 2x - 3, & x > 3 \\ -x^2 + 15, & x \leq 3 \end{cases}$$

State the value of $f(3)$.

Justify your answer.

$$\begin{aligned} 2(3) - 3 \\ 6 - 3 = 3 \end{aligned}$$

Score 1: The student evaluated $2x - 3$ for $f(3)$ instead of evaluating $-x^2 + 15$.

Question 30

30 The piecewise function $f(x)$ is given below.

$$f(x) = \begin{cases} 2x - 3, & x > 3 \\ -x^2 + 15, & x \leq 3 \end{cases}$$

State the value of $f(3)$.

Justify your answer.

$$f(3) \begin{cases} 2(3) - 3 & 3 > 3 \\ -3^2 + 15 & 3 \leq 3 \end{cases}$$

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

Question 31

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

$$\begin{array}{r} x^2 - 8x + 16 = -41 \\ +16 \\ \hline (x-4)^2 = -25 \end{array}$$

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

Question 31

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

$$x^2 - 8x + 41 = 0$$

$$(x^2 - 8x + 16) + 41 - 16 = 0$$

$$(x - 4)^2 + \underset{-25}{25} = 0$$

$$\boxed{(x - 4)^2 = -25}$$

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

Question 31

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

$$\begin{aligned} x^2 - 8x + \frac{41}{-41} &= \frac{0}{-41} \\ \left(-\frac{8}{2}\right)^2 \quad x^2 - 8x &= -41 \\ (-4)^2 = 16 \quad x^2 - 8x + 16 &= -41 \\ (x - 4)^2 &= -41 \end{aligned}$$

Score 1: The student only added 16 to one side of the equation.

Question 31

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

$$x^2 - 8x = -41$$

$$x^2 - 8x + \underline{16} = -41 + \underline{16}$$

$$\begin{array}{ccc} (x-4)^2 & = & -25 \\ +4 & & +4 \end{array}$$

$$\sqrt{x^2} = \sqrt{-21}$$

$$x = \sqrt{-21}$$

Score 1: The student showed correct work to find $(x - 4)^2 = -25$, but continued with incorrect work.

Question 31

31 Express the equation $x^2 - 8x = -41$ in the form $(x - p)^2 = q$.

$$(x - 8)^2 = -41$$
$$(x^2 - 16x + 64) = -41$$
$$x^2 - 16x + 64 = -41$$
$$+41 \quad +41$$

$$\boxed{x^2 - 16x + 105}$$

	x	$-8x$
x	x^2	$-8x$
-8	$-8x$	64

$$x^2 - 16x + 64$$

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

Question 32

32 Factor $36 - 4x^2$ completely.

$$4(9 - x^2)$$

$$4(3 - x)(3 + x)$$

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

Question 32

32 Factor $36 - 4x^2$ completely.

$$\begin{array}{r} 2 \overline{) 36 - 4x^2} \\ 2 \overline{) 18 - 2x^2} \\ 4(9 - x^2) \\ \hline 4(3+x)(3-x) \end{array}$$

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

Question 32

32 Factor $36 - 4x^2$ completely.

$$36 - 4x^2 = 0$$

$$4(9 - x^2) = 0$$

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

$$x = -3$$

$$x = 3$$

Score 1: The student made an error by solving for x .

Question 32

32 Factor $36 - 4x^2$ completely.

$$\begin{array}{r} -4x^2 + 36 \\ \hline -4 \quad -4 \\ \hline -4(x^2 - 9) \\ \hline (x - 3)(x + 3) \end{array}$$

Score 1: The student made a factoring error by leaving out the GCF.

Question 32

32 Factor $36 - 4x^2$ completely.

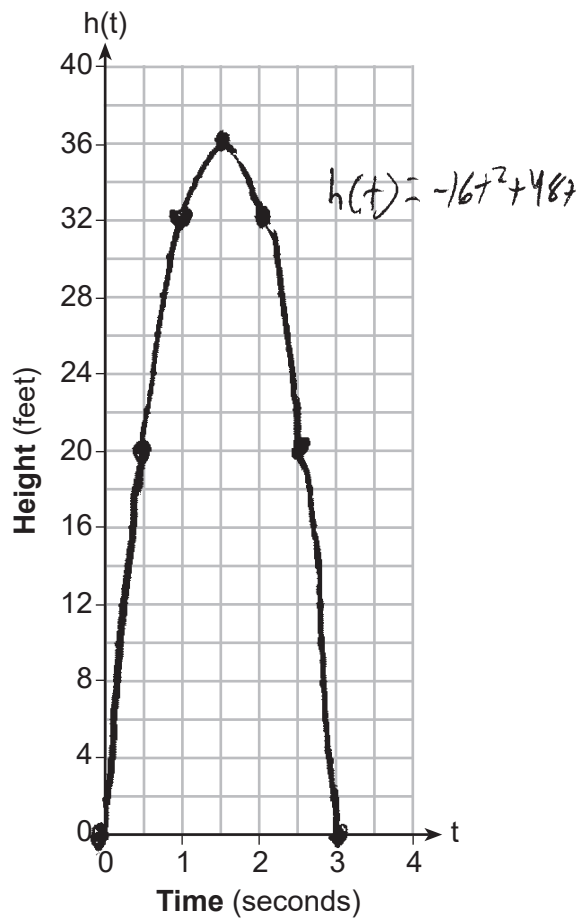
$$\begin{aligned} 36 - 4x^2 &= 0 \\ -36 & \quad -36 \\ \hline -4x^2 &= -36 \\ -4 & \quad -4 \\ \hline x^2 &= 144 \\ x &= 12 \end{aligned}$$

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

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

36ft

How many seconds does it take the golf ball to hit the ground?

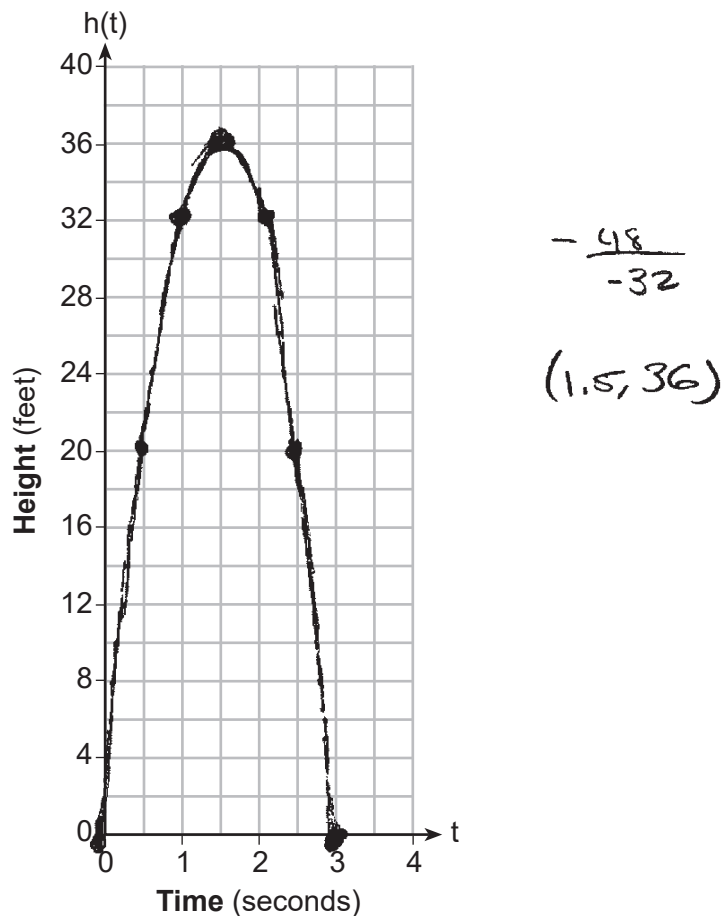
3 Seconds

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

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

The maximum height is 36 feet

How many seconds does it take the golf ball to hit the ground?

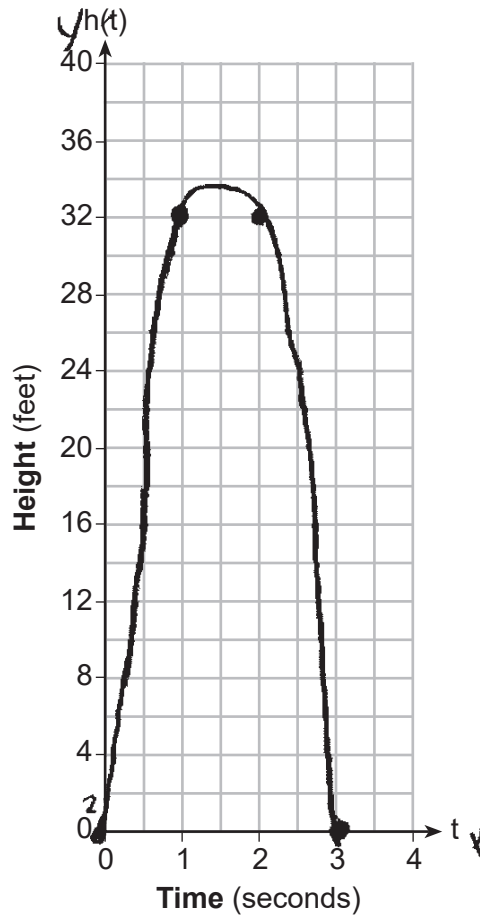
It takes the ball 1.5 seconds to hit the ground.

Score 3: The student drew a correct graph and gave a correct maximum height.

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

32ft

How many seconds does it take the golf ball to hit the ground?

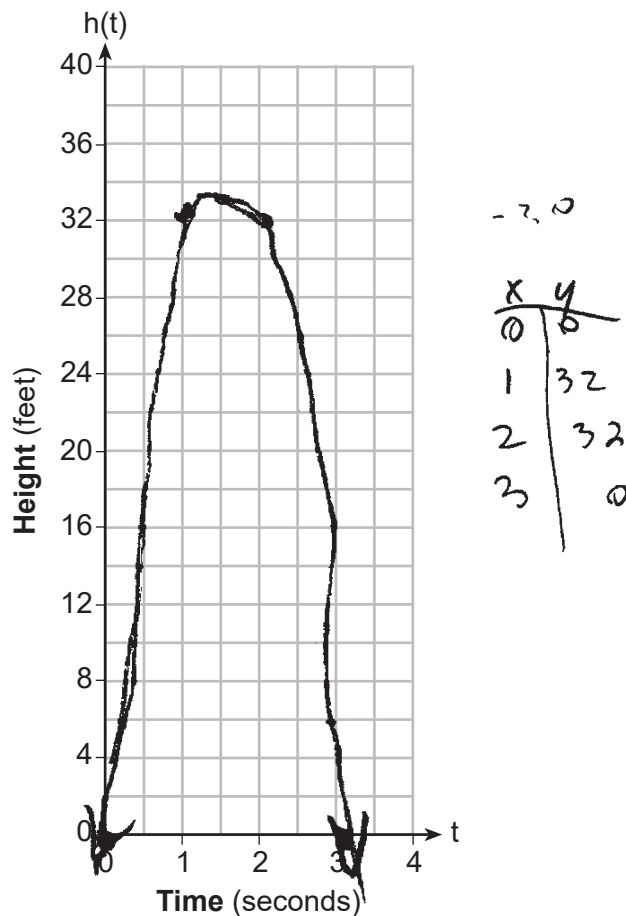
3 seconds

Score 2: The student made one graphing error by not including the point (1.5,36) and gave an incorrect maximum height.

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

32 feet

How many seconds does it take the golf ball to hit the ground?

3 seconds

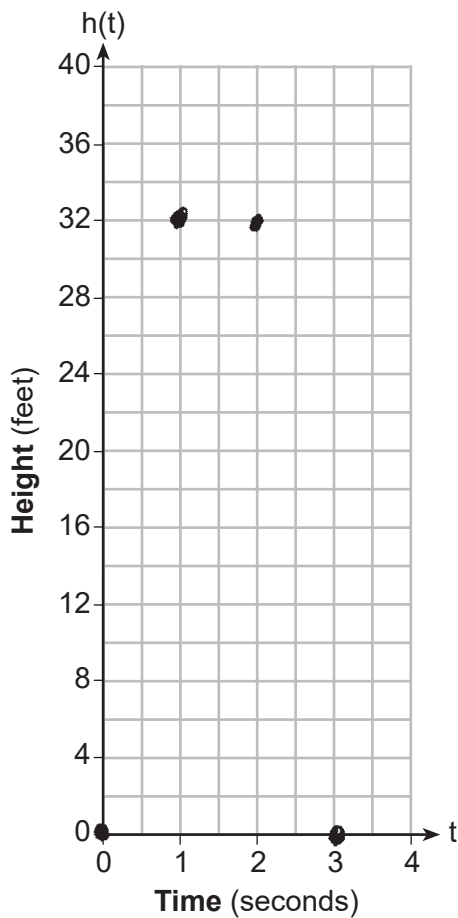
Score 1: The student made two graphing errors by not including the point (1.5,36) and included arrows beyond the x-axis and gave an incorrect maximum height.

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.

x	y
0	0
1	32
2	32
3	0



What is the maximum height, in feet, that the golf ball reaches on this hit?

32 feet

How many seconds does it take the golf ball to hit the ground?

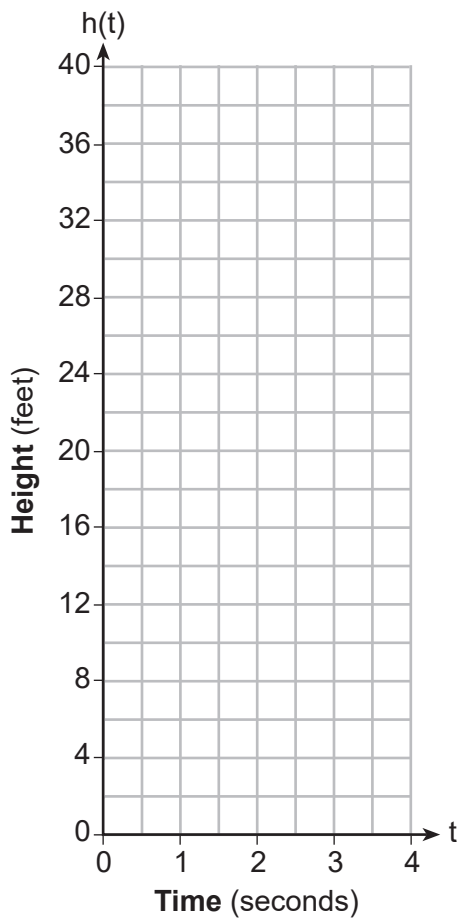
3 seconds

Score 1: The student stated 3, the number of seconds the golf ball took to hit the ground.

Question 33

33 While playing golf, Laura hit her ball from the ground. The height, in feet, of her golf ball can be modeled by $h(t) = -16t^2 + 48t$, where t is the time in seconds.

Graph $h(t)$ on the set of axes below.



What is the maximum height, in feet, that the golf ball reaches on this hit?

40 ft

How many seconds does it take the golf ball to hit the ground?

2 sec

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

Question 34

- 34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

State the linear regression equation for this data set, rounding all values to the *nearest hundredth*.

$$y = 40.48x + 363.81$$

State the correlation coefficient, rounded to the *nearest hundredth*.

$$0.84$$

State what this correlation coefficient indicates about the linear fit of the data.

The # of prep classes attended and the math SAT score have a strong positive correlation. The more prep classes attended the higher the SAT score.

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

Question 34

- 34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

State the linear regression equation for this data set, rounding all values to the *nearest hundredth*.

$$y = 40.48x + 363.81$$

State the correlation coefficient, rounded to the *nearest hundredth*.

.84

State what this correlation coefficient indicates about the linear fit of the data.

it is strong

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

Question 34

- 34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

State the linear regression equation for this data set, rounding all values to the *nearest hundredth*.

$$y = Ax + b$$
$$y = 40.48x + 363.80$$

State the correlation coefficient, rounded to the *nearest hundredth*.

$$r = 0.84$$

State what this correlation coefficient indicates about the linear fit of the data.

There is a
strong positive
correlation

Score 3: The student made one rounding error.

Question 34

- 34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

State the linear regression equation for this data set, rounding all values to the *nearest hundredth*.

$$y = ax + b$$
$$y = 40.5x + 363.8$$

$$r = .84$$

State the correlation coefficient, rounded to the *nearest hundredth*.

State what this correlation coefficient indicates about the linear fit of the data.

Score 2: The student made one rounding error by rounding to the nearest tenth, but stated the correlation coefficient correctly.

Question 34

- 34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

State the linear regression equation for this data set, rounding all values to the *nearest hundredth*.

$$y = 40.48x + 363.80$$

State the correlation coefficient, rounded to the *nearest hundredth*.

$$363.80$$

State what this correlation coefficient indicates about the linear fit of the data.

It shows the minimum score you get without prep classes.

Score 1: The student made one rounding error, and no further correct work is shown.

Question 34

- 34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

State the linear regression equation for this data set, rounding all values to the *nearest hundredth*.

$$40.48x + 363.81$$

State the correlation coefficient, rounded to the *nearest hundredth*.

$$478.58$$

State what this correlation coefficient indicates about the linear fit of the data.

It shows the amount of score the first attendee had.

Score 1: The student wrote an expression instead of an equation, and no further correct work was shown.

Question 34

34 The table below shows the number of SAT prep classes five students attended and the scores they received on the test.

Number of Prep Classes Attended (x)	3	1	6	7	6
Math SAT Score (y)	500	410	620	720	500

State the linear regression equation for this data set, rounding all values to the *nearest hundredth*.

$$y = ab^x$$
$$y = a(1-r)^x$$

State the correlation coefficient, rounded to the *nearest hundredth*.

State what this correlation coefficient indicates about the linear fit of the data.

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

Question 35

35 Julia is 4 years older than twice Kelly's age, x . The product of their ages is 96.

Write an equation that models this situation.

$$(2x + 4)(x) = 96$$

Determine Kelly's age algebraically.

$$(2x + 4)(x)$$

$$2x^2 + 4x = 96$$

$$\begin{array}{r} 2x^2 + 4x = 96 \\ -96 -96 \\ \hline 2x^2 + 4x - 96 = 0 \end{array}$$

$$\frac{-4 \pm \sqrt{4^2 - 4(2)(-96)}}{2(2)}$$

6 years old

$$\frac{-4 \pm \sqrt{784}}{4} \quad x = 6$$

~~$x = 8$~~

State the difference between Julia's and Kelly's ages, in years.

$$2(6) + 4 = 16$$

$$16 - 6 = 10$$

10 years

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

Question 35

35 Julia is 4 years older than twice Kelly's age, \checkmark . The product of their ages is 96.
Write an equation that models this situation.^K

$$\begin{aligned}J &= 2k + 4 \\ Jk &= 96 \\ (2k + 4)(k) &= 96\end{aligned}$$

Determine Kelly's age algebraically.

$$\begin{aligned}2k^2 + 4k - 96 &= 0 \\ k^2 + 2k - 48 &= 0 \\ (k + 8)(k - 6) &= 0 \\ k &= 6 \\ \text{Kelly cannot have a negative age}\end{aligned}$$

State the difference between Julia's and Kelly's ages, in years.

$$\begin{aligned}J &= 2(6) + 4 = 16 \\ 16 - 6 &= 10 \\ \text{Julia is 10 yrs older than Kelly}\end{aligned}$$

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

Question 35

35 Julia is 4 years older than twice Kelly's age, x . The product of their ages is 96.

Write an equation that models this situation.

Determine Kelly's age algebraically.

$$\begin{aligned} \text{let Kelly's age} &= x \\ \text{let Julia} &= 2x + 4 \end{aligned}$$

$$(2x + 4)(x) = 96$$

$$(2(6) + 4)(6) = 96$$

$$(16)(6) = 96$$

State the difference between Julia's and Kelly's ages, in years.

10 years

$$16 - 6 = 10$$

Score 3: The student wrote a correct equation, but found 6 by a method other than algebraic.

Question 35

35 Julia is 4 years older than twice Kelly's age, x . The product of their ages is 96.

Write an equation that models this situation.

$$2x + 4 = 96$$

$$\begin{array}{r} x \\ x + 4 \end{array}$$

Determine Kelly's age algebraically.

$$\begin{array}{r} 2x + 4 = 96 \\ -4 \quad -4 \end{array}$$

$$\frac{2x}{2} = \frac{92}{2}$$

$$x = 46$$

State the difference between Julia's and Kelly's ages, in years.

$$\begin{array}{l} \text{Kelly} = 46 \\ \text{Julia} = 50 \end{array}$$

4 years

Score 2: The student wrote a linear equation instead of a quadratic, but solved and used it appropriately to find the difference in ages.

Question 35

35 Julia is 4 years older than twice Kelly's age, x . The ^{total} product of their ages is 96.
Write an equation that models this situation.

$$2x + 4 = 96$$

Determine Kelly's age algebraically.

$$\begin{array}{r} 2x + 4 = 96 \\ -4 \\ \hline 2x = 92 \\ \frac{2x}{2} = \frac{92}{2} \\ x = 46 \text{ years old} \end{array}$$

State the difference between Julia's and Kelly's ages, in years.

$$\begin{array}{l} 4(2) = 8 \\ 46 + 8 = 54 \\ 54 - 46 = 8 \end{array}$$

8 years

Score 1: The student wrote a linear equation instead of a quadratic, but solved it appropriately.

Question 35

35 Julia is 4 years older than twice Kelly's age, x . The product of their ages is 96.

Write an equation that models this situation.

$$\text{Julia: } 2x+4$$

$$\text{Kelly: } x$$

$$x(2x+4)=96$$

Determine Kelly's age algebraically.

$$x(2x+4)=96$$

$$2x^2$$

State the difference between Julia's and Kelly's ages, in years.

Score 1: The student wrote a correct equation.

Question 35

35 Julia is 4 years older than twice Kelly's age, x . The product of their ages is 96.

Write an equation that models this situation.

4 ↑

$$2x + (x+4) = 96$$

Determine Kelly's age algebraically.

$$\begin{array}{l} \frac{2x=96}{2} \\ x = \frac{48}{2} = 24 \end{array} \quad \begin{array}{l} \frac{96}{2} = 48 \\ 48 - 4 = 44 \end{array} \quad \begin{array}{l} \cancel{2x + (x+4) = 96} \\ \cancel{\frac{6x = 96}{6} = 16} \\ \cancel{96} \end{array} \quad \begin{array}{l} 2x + x + 4 = 96 - 4 \\ 3x = 92 \\ 45 \end{array} \quad \begin{array}{l} \cancel{2(16) = 32} \\ \cancel{(32+4) = 36} \end{array}$$

State the difference between Julia's and Kelly's ages, in years.

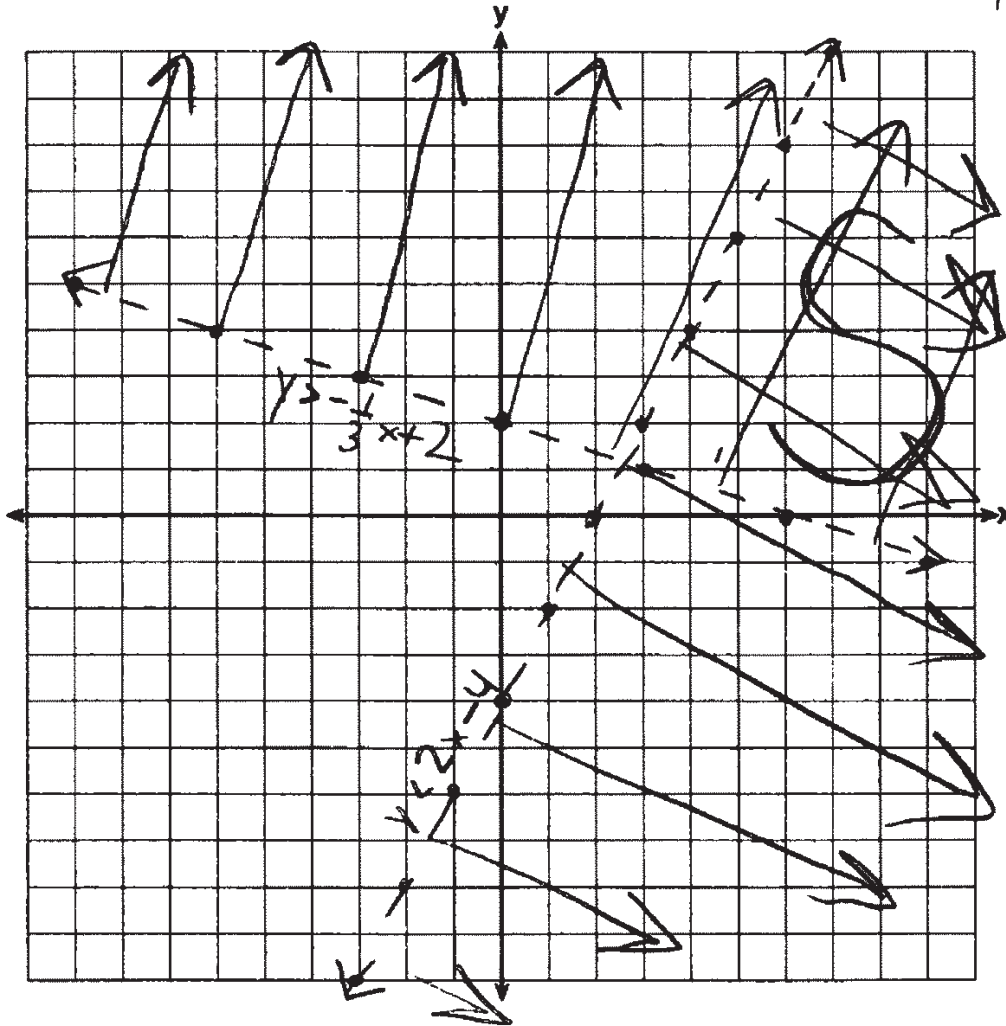
Score 0: The student did not show enough correct work to receive any credit.

Question 36

36 On the set of axes below, graph the following system of inequalities: $2x - y > 4$ $x + 3y > 6$

$-y > -2x + 4$
 $y < 2x - 4$
 $D = 4$
 $\frac{3y}{3} > \frac{-x + 6}{3}$
 $y > -\frac{1}{3}x + 2$

Label the solution set S.



Is (4,2) a solution to this system? Justify your answer.

$$\begin{aligned} (2) &> -\frac{1}{3}(4) + 2 & (2) &< 2(4) - 4 \\ 2 &> \frac{2}{3} & 2 &< 4 \\ &\checkmark & &\checkmark \end{aligned}$$

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

Question 36

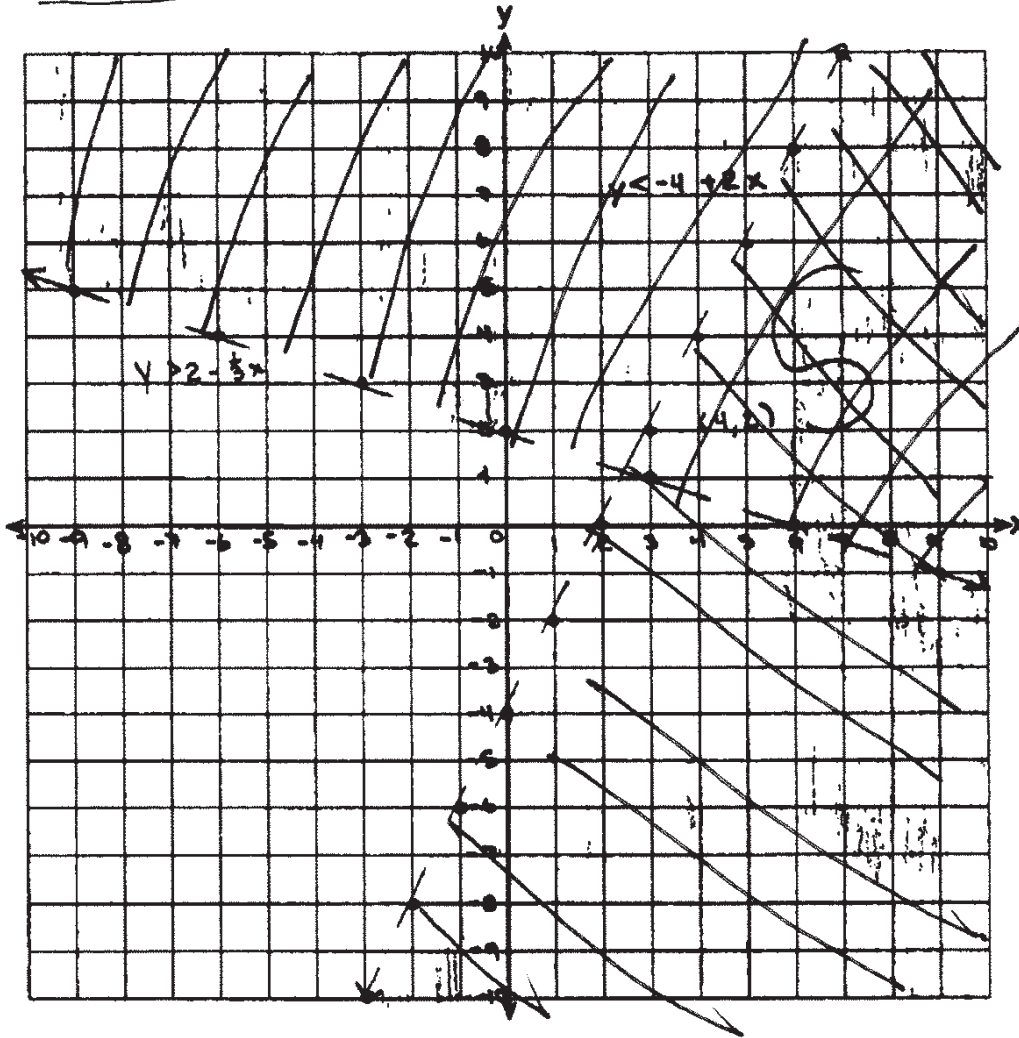
36 On the set of axes below, graph the following system of inequalities:

$$\begin{array}{r} 2x - y > 4 \\ \underline{-2x} \quad \underline{-2x} \\ -y > 4 - 2x \\ \underline{-1} \quad \underline{-1} \\ y < -4 + 2x \end{array}$$

$$\begin{array}{r} 2x - y > 4 \\ x + 3y > 6 \end{array}$$

$$\begin{array}{r} x + 3y > 6 \\ \underline{-x} \quad \underline{-x} \\ 3y > 6 - x \\ \underline{3} \quad \underline{3} \\ y > 2 - \frac{1}{3}x \end{array}$$

Label the solution set S.



Is (4,2) a solution to this system? Justify your answer.

It would be a solution because it's in the shaded area of both inequalities.

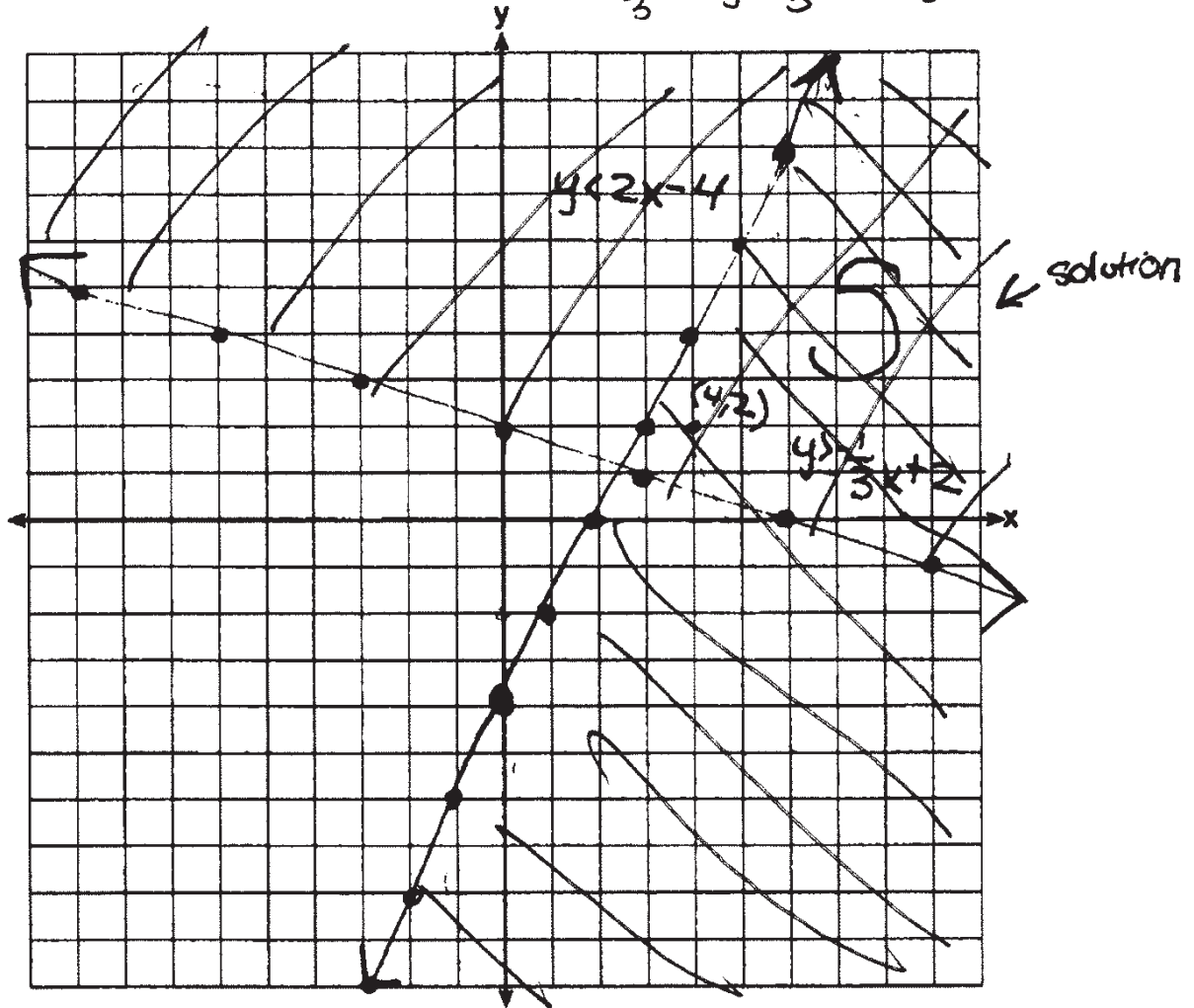
Score 4: The student gave a complete and correct response.

Question 36

36 On the set of axes below, graph the following system of inequalities:

$$\begin{array}{l}
 2x - y > 4 \\
 -2x \quad -2x \\
 \frac{-4 > -2x + 4}{-1 \quad -1 \quad -1} \quad y < 2x - 4 \\
 \leftarrow 2x - y > 4 \quad x + 3y > 6 \\
 x + 3y > 6 \rightarrow -1x \quad -1x \\
 \frac{3y > -1x + 6}{3 \quad 3 \quad 3} \quad y > -\frac{1}{3}x + 2
 \end{array}$$

Label the solution set S.



Is (4,2) a solution to this system? Justify your answer.

yes, (4,2) is a solution to this set because it is placed in the solution area.

Score 3: The student made one graphing error by not using dashed lines.

Question 36

36 On the set of axes below, graph the following system of inequalities:

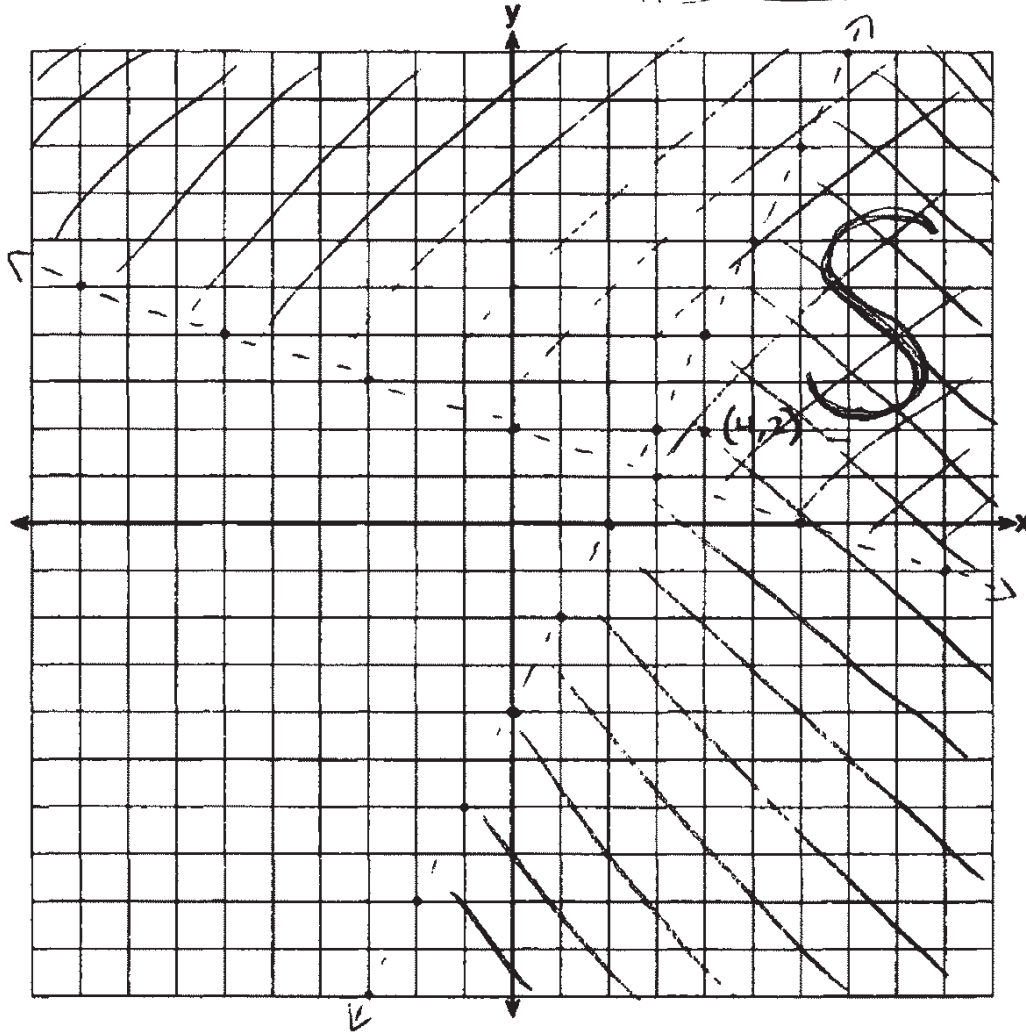
$$\begin{array}{l}
 x + 3y > 6 \\
 2x - y > 4
 \end{array}$$

Handwritten work for solving the inequalities:

$$\begin{array}{l}
 -x \quad -x \\
 \frac{3y > -x + 6}{3} \quad \frac{-x}{3} \quad \frac{+6}{3} \\
 y > -\frac{1}{3}x + 2
 \end{array}$$

$$\begin{array}{l}
 2x - y > 4 \\
 -2x \quad -2x \\
 \frac{-y > -2x + 4}{-1} \quad \frac{-2x}{-1} \quad \frac{+4}{-1} \\
 y < 2x - 4
 \end{array}$$

Label the solution set S.



Is (4,2) a solution to this system? Justify your answer.

Yes because (4,2) is a solution to both inequalities. It is in the solution set S on the graph.

Score 3: The student made one graphing error by not labeling at least one of the lines.

Question 36

36 On the set of axes below, graph the following system of inequalities:

$$2x - y > 4$$

$$x + 3y > 6$$

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

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

$$y > 2x - 4$$

$$m = 2$$

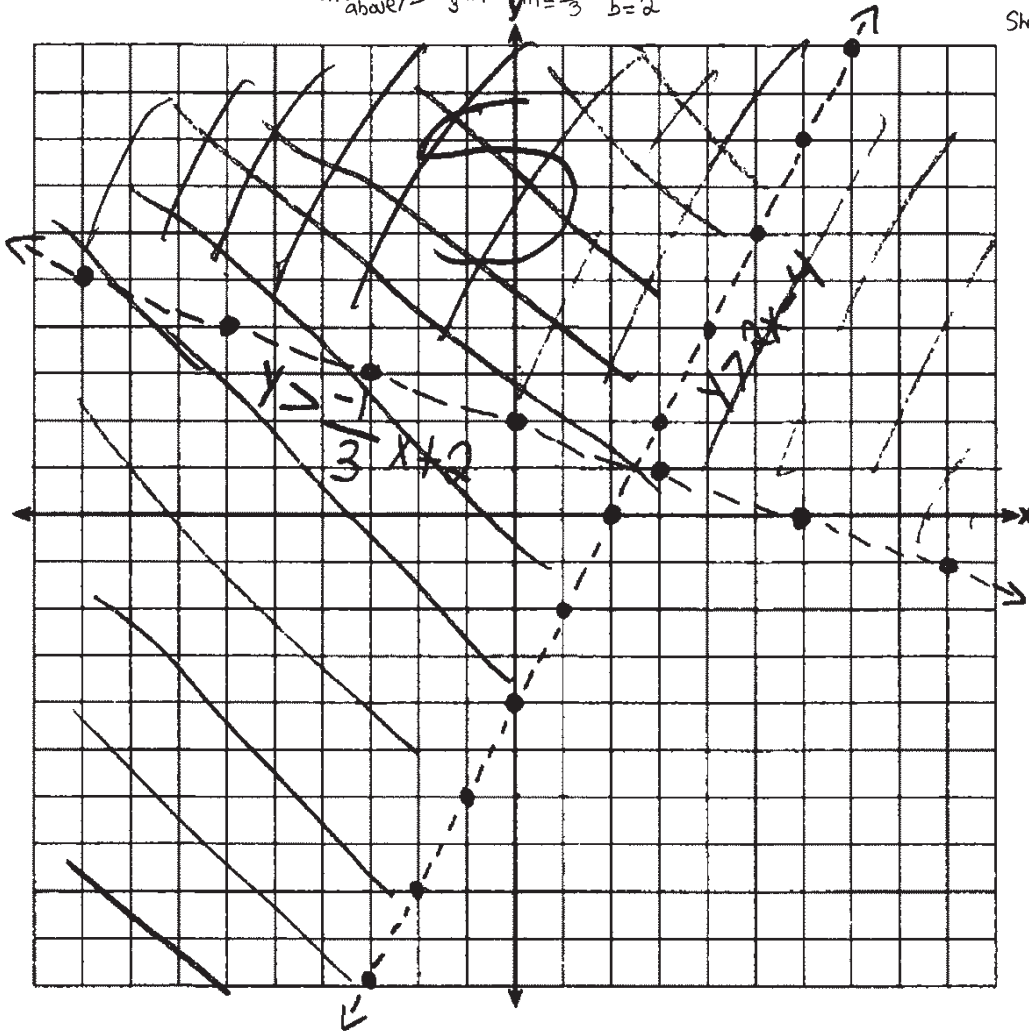
$$b = -4$$

dash line

Shade above

Label the solution set S.

$$\frac{x + 3y > 6}{-x} \quad \frac{3y > -x + 6}{\frac{3}{3}} \quad \frac{3y > -x + 6}{\frac{3}{3}} \quad \frac{3y > -x + 6}{\frac{3}{3}}$$



Is (4,2) a solution to this system? Justify your answer.

NO, because its only in one of the inequalities.

Score 3: The student made one computational error by writing $y > 2x - 4$ instead of $y < 2x - 4$, but used their inequality appropriately.

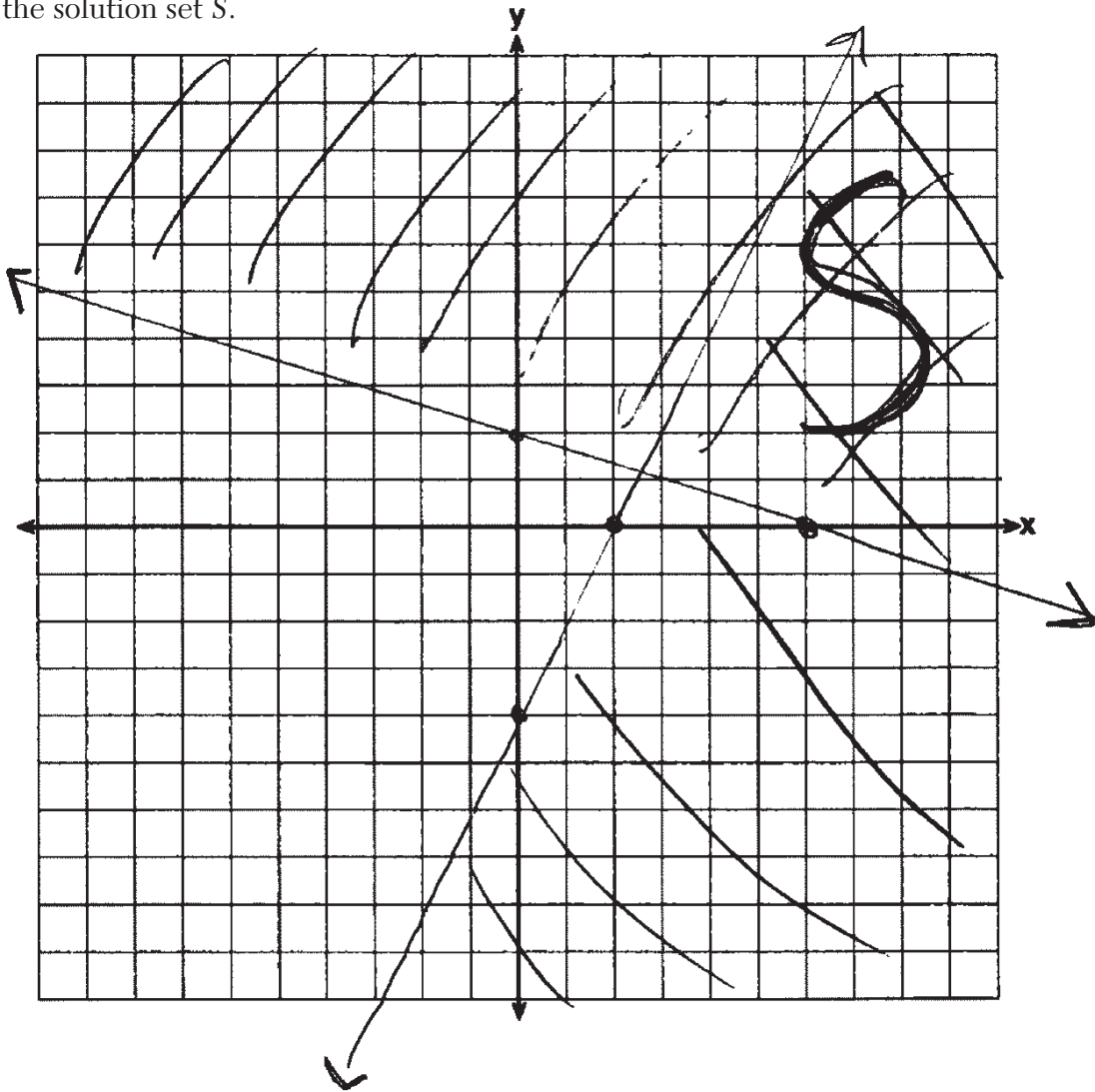
Question 36

36 On the set of axes below, graph the following system of inequalities:

$$2x - y > 4$$

$$x + 3y > 6$$

Label the solution set S .



Is $(4, 2)$ a solution to this system? Justify your answer.

Yes. It is in the solution set

Score 2: The student made two graphing errors by not labeling at least one of the lines and by not using dashed lines.

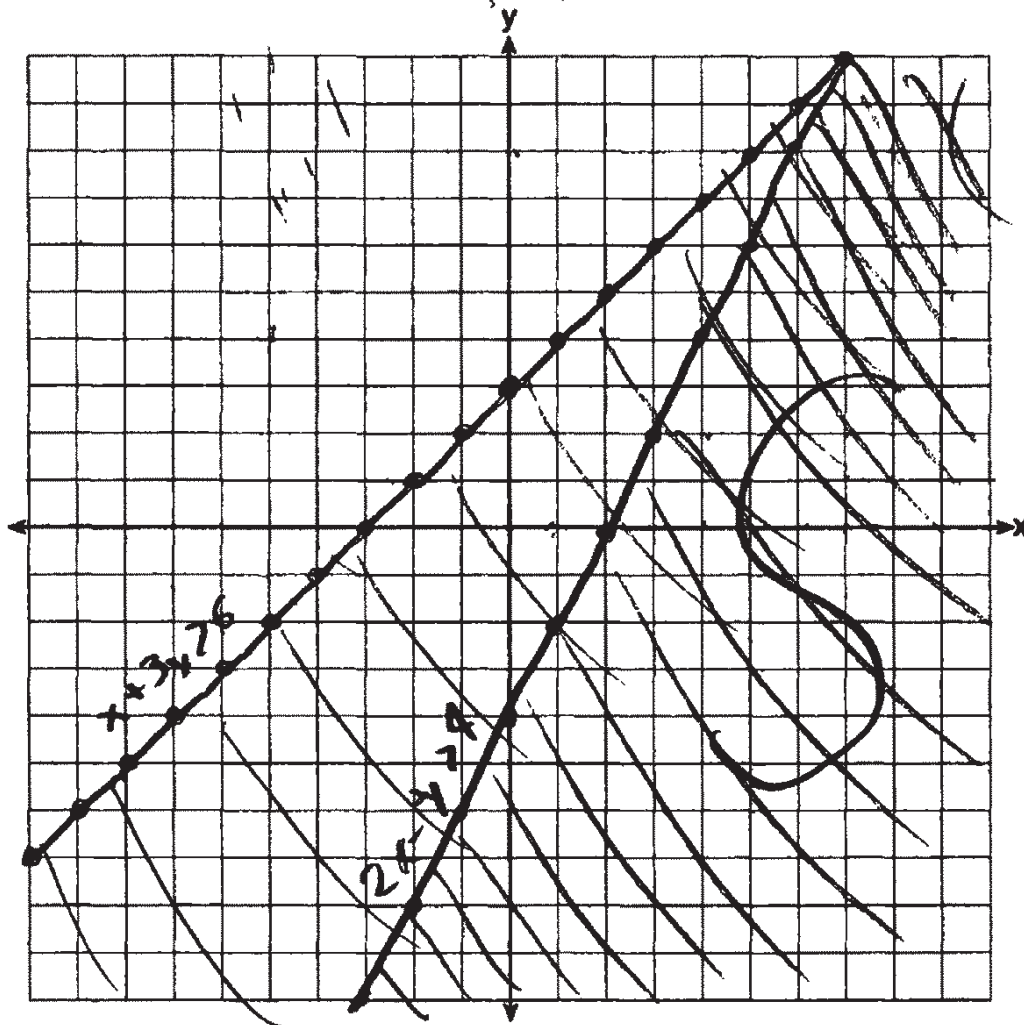
Question 36

36 On the set of axes below, graph the following system of inequalities:

$$\begin{array}{r}
 -2x - y > -4 \\
 -x + 3y > 6 \\
 \hline
 3y > 6 + x
 \end{array}$$

$y > 3 + x$
 $y < 2x - 4$

Label the solution set S.



Is (4,2) a solution to this system? Justify your answer.

Yes it is a solution

Score 1: The student made two or more graphing errors and wrote an incomplete justification, but labeled the solution set appropriately.

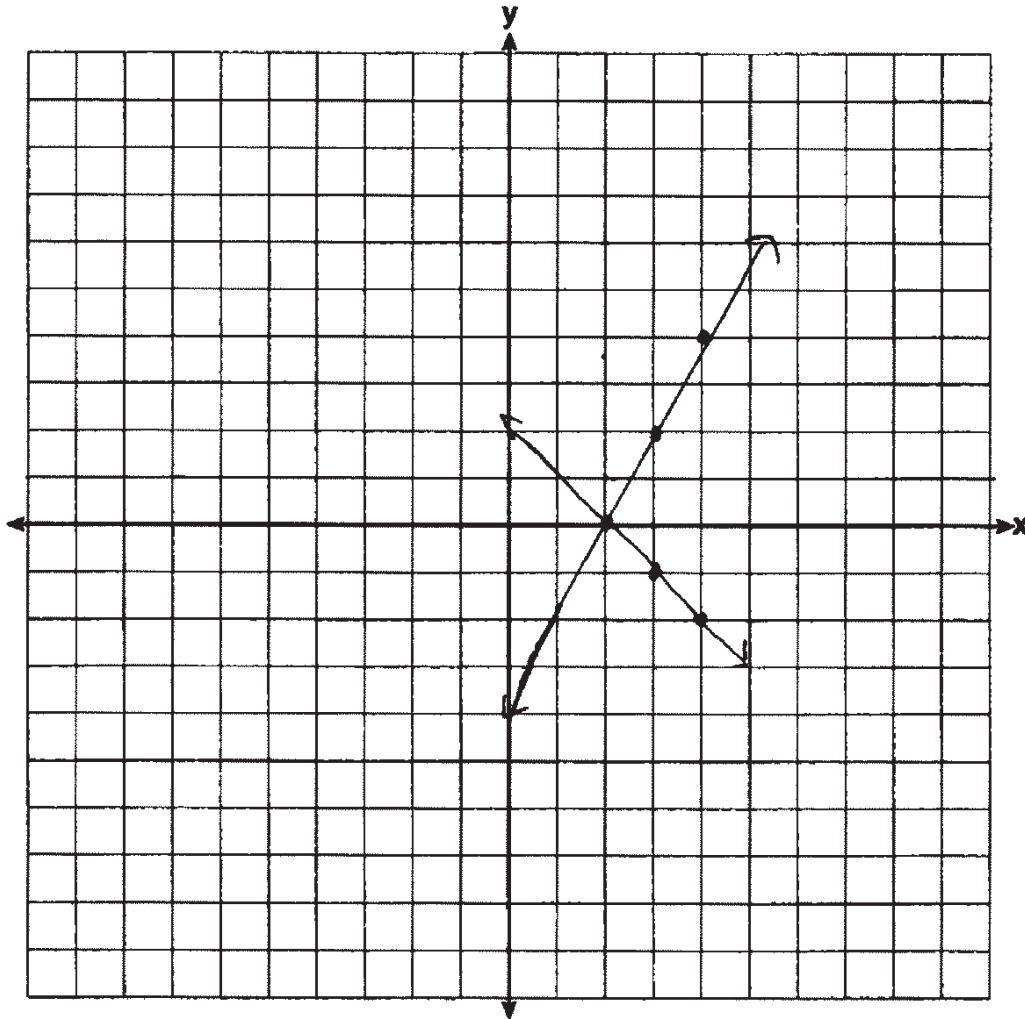
Question 36

36 On the set of axes below, graph the following system of inequalities:

$$2x - y > 4 \quad y < 2x - 4$$

$$x + 3y > 6 \quad y > -x + 2$$

Label the solution set S .



Is $(4, 2)$ a solution to this system? Justify your answer.

Yes, it is a solution because when plugged in, we get $6 > 4$ and $10 > 6$, making it true.

Score 1: The student wrote a correct justification.

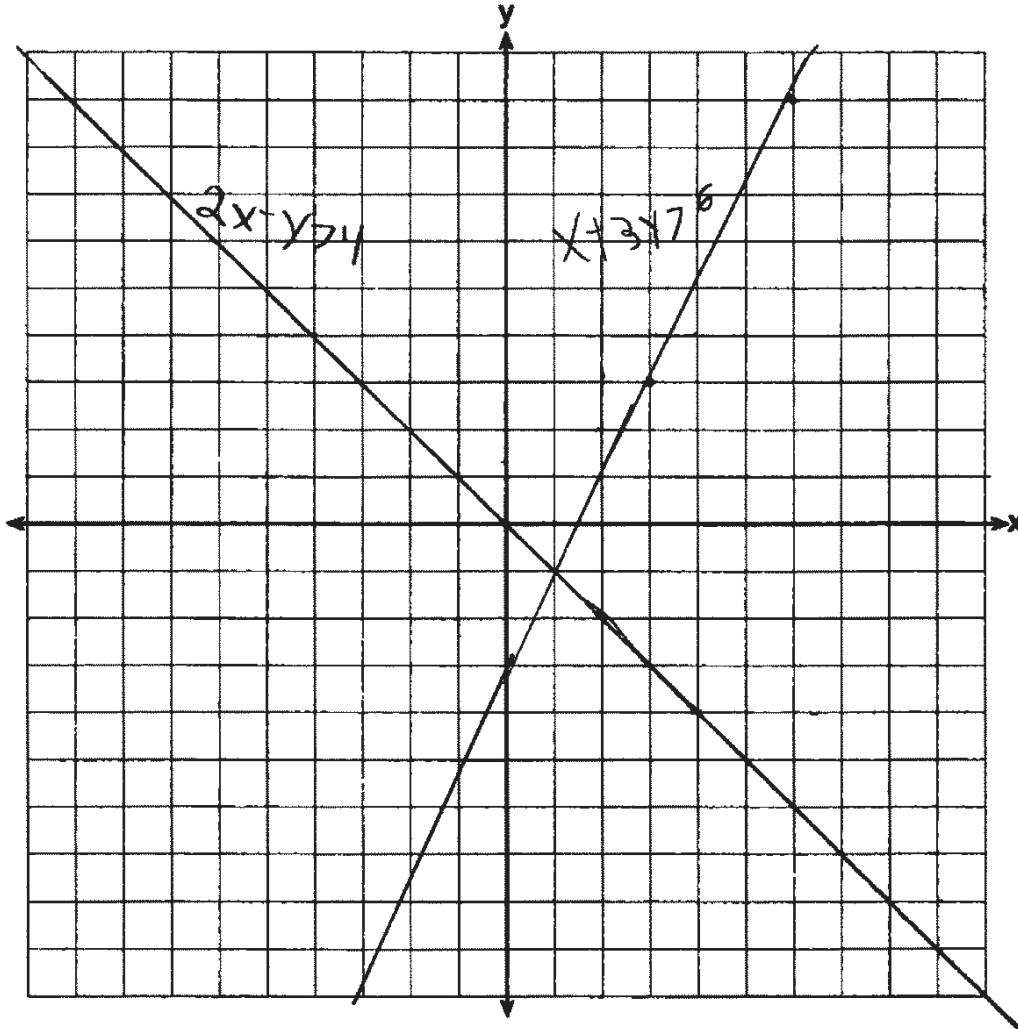
Question 36

36 On the set of axes below, graph the following system of inequalities:

$$2x - y > 4$$

$$x + 3y > 6$$

Label the solution set S .



Is $(4,2)$ a solution to this system? Justify your answer.

No, I got $(1,1)$ as my solution.

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

Question 37

37 Jim had a bag of coins. The number of nickels, n , and the number of quarters, q , totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$$\begin{aligned}0.05n + 0.25q &= 4 \\ n + q &= 28\end{aligned}$$

Use your system of equations to algebraically determine both the number of quarters, q , and the number of nickels, n , that Jim had in the bag.

$$\begin{aligned}q &= 28 - n \\ 0.05n + 0.25(28 - n) &= 4 \\ 0.05n + 7 - 0.25n &= 4 \\ 0.05n - 0.25n &= -3 \\ -0.2n &= -3 \\ \underline{n = 15}\end{aligned}$$
$$\begin{aligned}n &= 28 - q \\ 0.05(28 - q) + 0.25q &= 4 \\ 1.4 - 0.05q + 0.25q &= 4 \\ -0.05q + 0.25q &= 2.6 \\ 0.2q &= 2.6 \\ \underline{q = 13}\end{aligned}$$

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

$$\begin{aligned}q &= n \\ 0.25q + 0.05n &= 3 \quad 10 \text{ nickels} \quad 10 \text{ quarters} \\ 0.25n + 0.05n &= 3 \\ 0.3n &= 3 \\ 3n &= 30 \\ n &= 10\end{aligned}$$

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

Question 37

37 Jim had a bag of coins. The number of nickels, n , and the number of quarters, q , totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$$\begin{array}{l} \text{let } Q = \text{quarters} \\ \text{let } n = \text{nickels} \end{array} \quad Q + n = 28$$

$$.05n + .25Q = 4$$

Use your system of equations to algebraically determine both the number of quarters, q , and the number of nickels, n , that Jim had in the bag.

$$\begin{array}{l} Q + n = 28 \\ (.25Q + .05n = 4) - 4 \quad 28 - 15 = 13 \\ -1Q - .2n = -16 \\ \frac{0.8n}{0.8} = \frac{12}{0.8} \end{array} \quad \boxed{\begin{array}{l} Q = 13 \\ n = 15 \end{array}}$$

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

10 of each.

$$.25(10) + .05(10) = 3$$

I did this on the calculator through trial and error

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

Question 37

37 Jim had a bag of coins. The number of nickels, n , and the number of quarters, q , totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$$\begin{aligned}n + q &= 28 \\ 5n + 25q &= 400\end{aligned}$$

Use your system of equations to algebraically determine both the number of quarters, q , and the number of nickels, n , that Jim had in the bag.

$$5n + 25q = 400$$

$$\begin{aligned}15 \text{ nickels} \\ 13 \text{ quarters} \\ (15 + 13) &= 28 \\ n + q &= 28\end{aligned}$$

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

10 coins each. $25 \times 10 = 250$ and $5 \times 10 = 50$. Once added and divided by 100, we get 3.00.

Score 5: The student used a method other than algebraic to find $n = 15$ and $q = 13$.

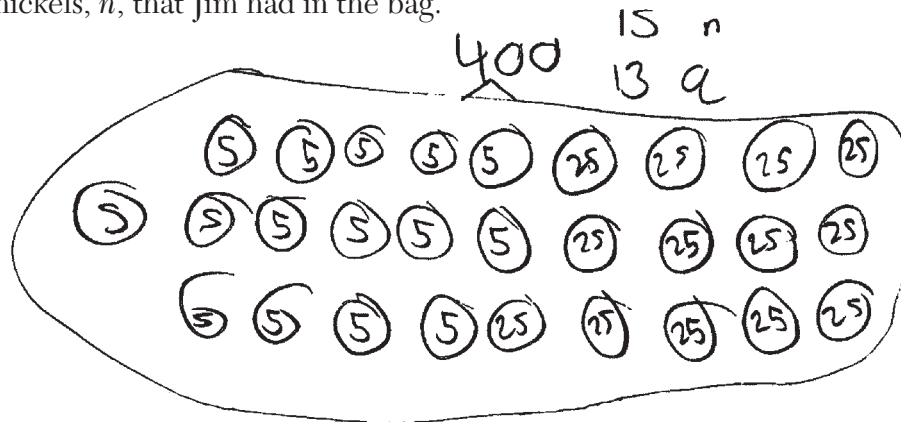
Question 37

37 Jim had a bag of coins. The number of nickels, n , and the number of quarters, q , totaled 28 coins. The combined value of the coins was \$4.

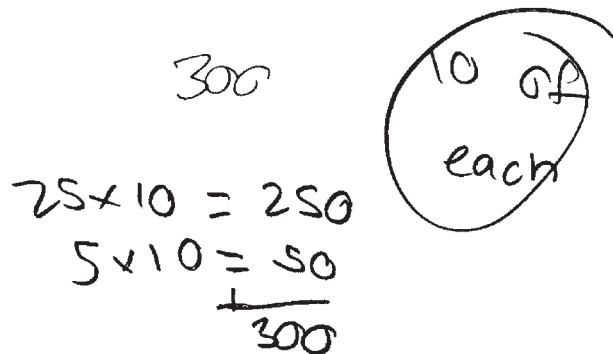
Write a system of equations that models this situation.

$$n + q = 28$$

Use your system of equations to algebraically determine both the number of quarters, q , and the number of nickels, n , that Jim had in the bag.



Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.



Score 4: The student wrote one correct equation, found $n = 15$ and $q = 13$ by a method other than algebraic, and wrote a correct justification.

Question 37

37 Jim had a bag of coins. The number of nickels, n , and the number of quarters, q , totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$$n + q = 28$$

$$5n + 25q = 4.00$$

?? Use your system of equations to algebraically determine both the number of quarters, q , and the number of nickels, n , that Jim had in the bag.

$$\begin{array}{r} n + q = 28 \\ 5n + 25q = 4.00 \\ \hline 5n + 26q = 32 \\ -5n = -5 \\ \hline 26q = 27 \quad q = 1 \\ \frac{26q}{26} = \frac{27}{26} \end{array}$$

$$\begin{array}{r} n + q = 28 \\ -q = -1 \\ \hline n = 27 \end{array}$$

1 quarter
27 nickles

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

10 quarters
10 nickles

$$10 \times 25 = 2.50$$

$$10 \times .5 = .50$$

↓

\$3.00

Score 3: The student wrote only one equation correctly and gave a correct justification.

Question 37

37 Jim had a bag of coins. The number of nickels, n , and the number of quarters, q , totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$$n + q = 28 \quad .05n + .25q = 4$$

Use your system of equations to algebraically determine both the number of quarters, q , and the number of nickels, n , that Jim had in the bag.

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

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

Question 37

37 Jim had a bag of coins. The number of nickels, n , and the number of quarters, q , totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$$\begin{aligned} 10n + 25q &= 4 \\ n + q &= 28 \end{aligned}$$

Use your system of equations to algebraically determine both the number of quarters, q , and the number of nickels, n , that Jim had in the bag.

$$\begin{aligned} 10n + 25q &= 4 \\ -25(n + q = 28) & \\ \hline -25n - 25q &= -700 \\ \hline -10n &= -696 \quad n = 69 \end{aligned}$$

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

Score 1: The student only wrote one correct equation.

Question 37

37 Jim had a bag of coins. The number of nickels, n , and the number of quarters, q , totaled 28 coins. The combined value of the coins was \$4.

Write a system of equations that models this situation.

$$n(7) + q(25) = 4$$

Use your system of equations to algebraically determine both the number of quarters, q , and the number of nickels, n , that Jim had in the bag.

$$n + q(28) = 4$$
$$28 - 4 = 7 \cdot 7 = 28 - 4$$

$$\boxed{\begin{array}{l} n = 7 \\ q = 7 \end{array}}$$

Jim was given an additional \$3.00 that was made up of equal numbers of nickels and quarters. How many of each coin was he given? Justify your answer.

They were given 6 coins

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