The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I

Monday, August 19, 2024 — 8:30 to 11:30 a.m., only
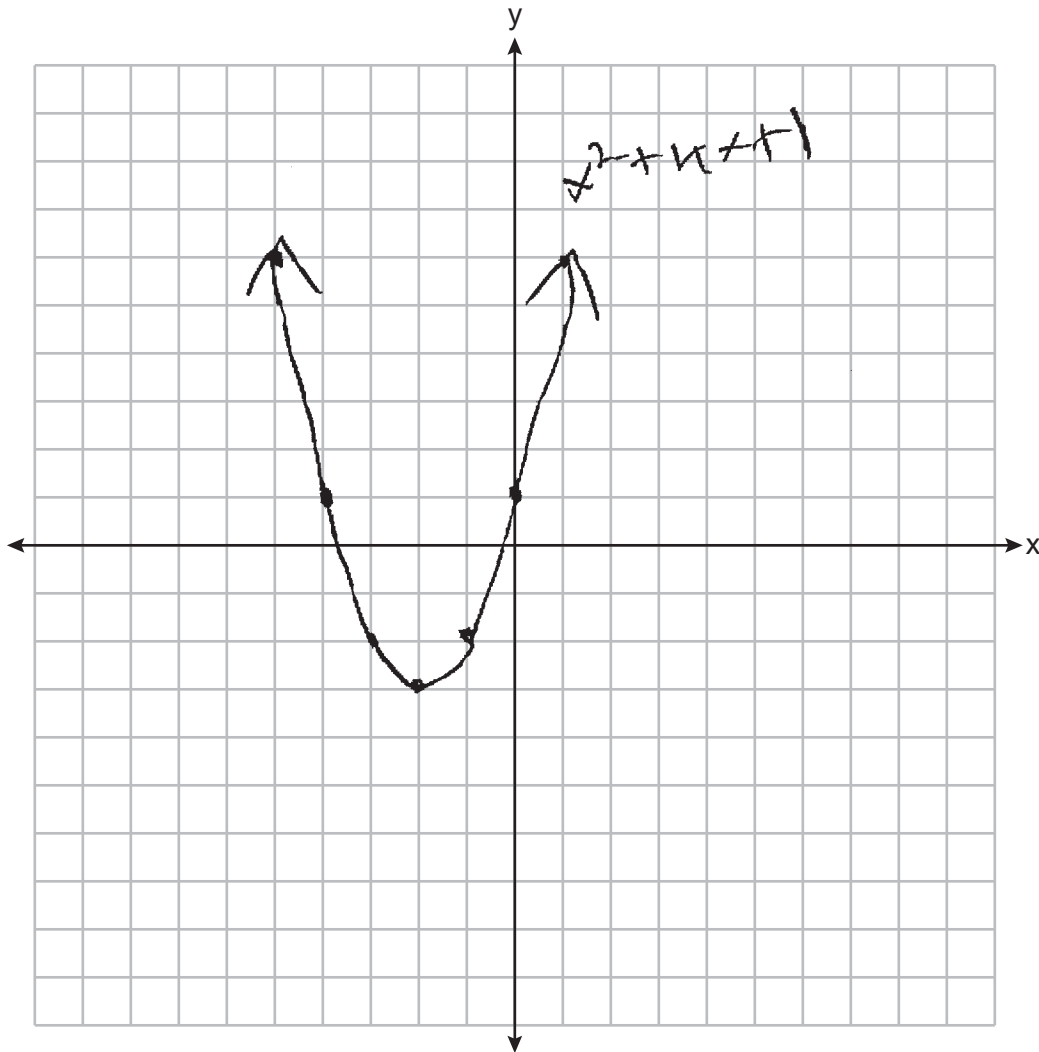
MODEL RESPONSE SET

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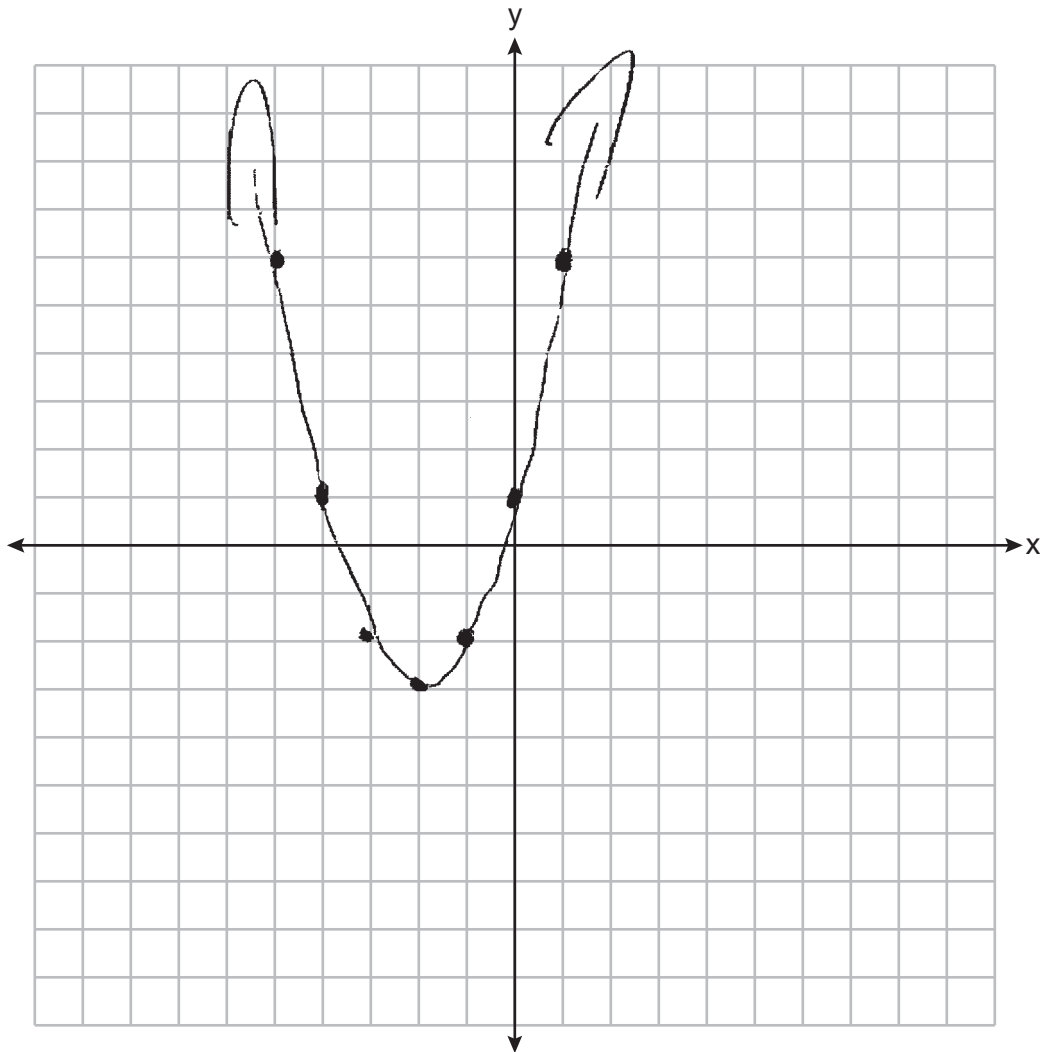**25** On the set of axes below, graph $f(x) = x^2 + 4x + 1$.

$x^2 + 4x + 1$

State the coordinates of the minimum.

$(-2, -3)$

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

25 On the set of axes below, graph $f(x) = x^2 + 4x + 1$.
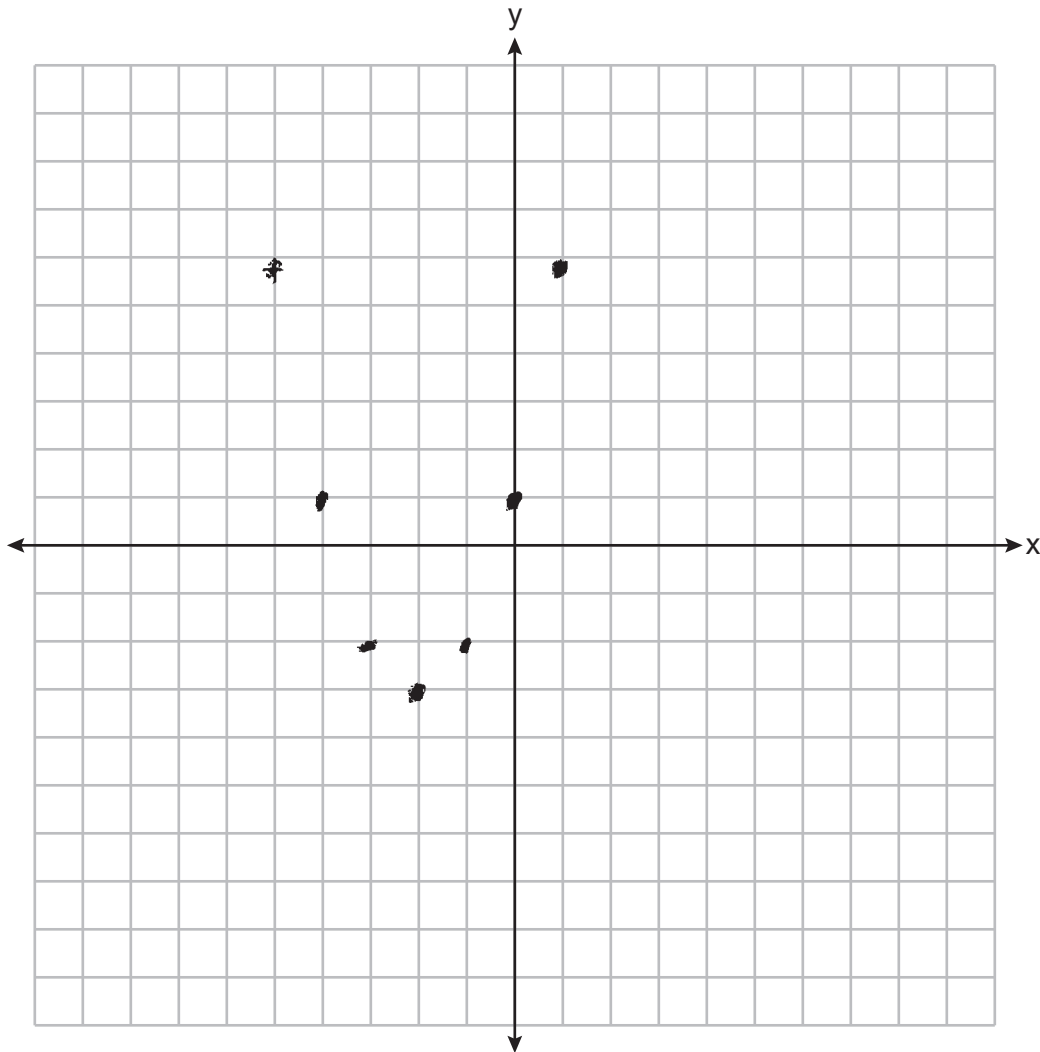

State the coordinates of the minimum.

Score 1: The student graphed $f(x)$ correctly.

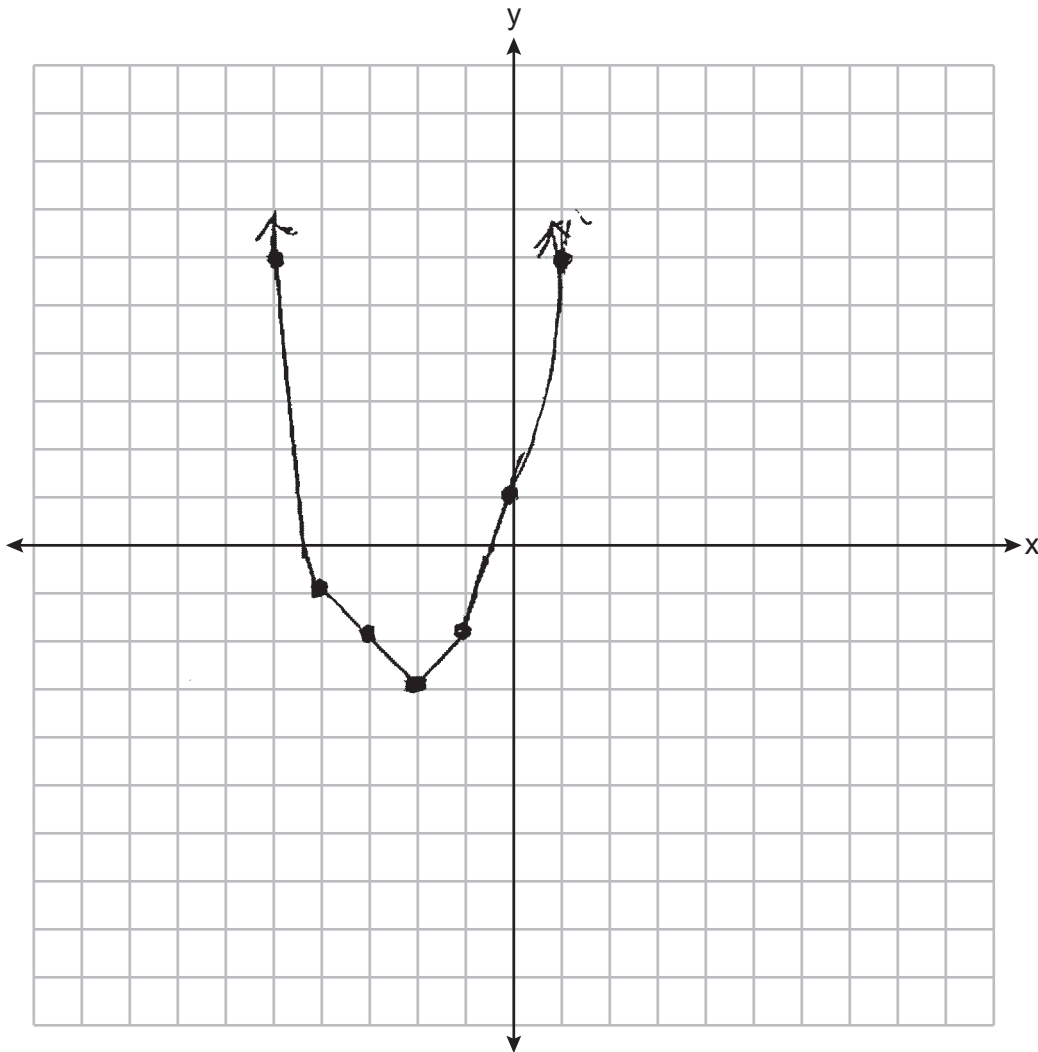**25** On the set of axes below, graph $f(x) = x^2 + 4x + 1$.

State the coordinates of the minimum.

$$(-2, -3)$$

Score 1: The student correctly stated the coordinates of the minimum.

25 On the set of axes below, graph $f(x) = x^2 + 4x + 1$.

State the coordinates of the minimum.

$-2,-3$

Score 0: The student made one graphing error and did not use parentheses on the coordinates of the minimum.

26 If $f(x) = \dfrac{30x^2}{x + 2}$, determine the value of $f\left(\dfrac{1}{2}\right)$.

$$f\left(\tfrac{1}{2}\right) = \frac{30\left(\tfrac{1}{2}\right)^2}{\tfrac{1}{2} + 2}$$

$$f\left(\tfrac{1}{2}\right) = \frac{30(0.25)}{2.5}$$

$$f\left(\tfrac{1}{2}\right) = \frac{7.5}{2.5}$$

$$\boxed{f\left(\tfrac{1}{2}\right) = 3}$$

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

26 If $f(x) = \dfrac{30x^2}{x+2}$, determine the value of $f\left(\dfrac{1}{2}\right)$.

$$\frac{7.5}{2.5}$$

3

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

26 If $f(x) = \dfrac{30x^2}{x+2}$, determine the value of $f\left(\dfrac{1}{2}\right)$.

$$f\left(\tfrac{1}{2}\right) = \frac{30\left(\tfrac{1}{2}\right)^2}{\left(\tfrac{1}{2}\right)+2} \qquad \frac{30\left(\tfrac{1}{4}\right)}{\tfrac{3}{2}} \qquad \frac{\tfrac{15}{2}}{\tfrac{3}{2}}$$

$$\boxed{f\left(\tfrac{1}{2}\right)=5}$$

Score 1: The student made one conceptual error.

26 If $f(x) = \dfrac{30x^2}{x+2}$, determine the value of $f\left(\dfrac{1}{2}\right)$.

$$f\left(\tfrac{1}{2}\right) = \frac{30\left(\tfrac{1}{2}\right)^2}{\tfrac{1}{2}+2}$$

$$f\left(\tfrac{1}{2}\right) = \frac{15^2}{\tfrac{1}{2}+2}$$
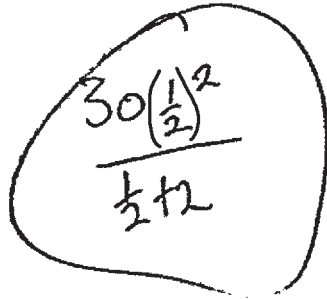
$$f\left(\tfrac{1}{2}\right) = \frac{225}{2.5}$$

$$f\left(\tfrac{1}{2}\right) = 90$$

Score 1: The student made one computational error.

26 If $f(x) = \dfrac{30x^2}{x+2}$, determine the value of $f\left(\dfrac{1}{2}\right)$.

$$\frac{30\left(\frac{1}{2}\right)^2}{\frac{1}{2}+2}$$

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

27 Explain why the relation shown in the table below is a function.

x	−1	0	1	2
y	2	4	4	5

Every x value has only one
y value which allows the relation to
be a function.

Complete the table below with values for both *x* and *y* so that this new relation is *not* a function.

x	−1	0	1	2	1
y	2	4	4	5	5

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

27 Explain why the relation shown in the table below is a function.

x	−1	0	1	2
y	2	4	4	5

It passes the vertical line test

Complete the table below with values for both *x* and *y* so that this new relation is *not* a function.
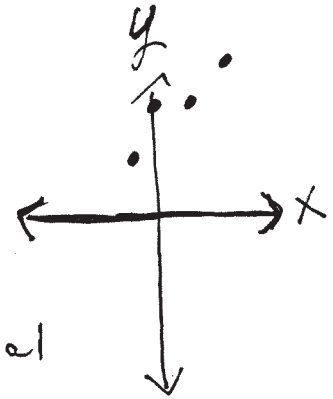
x	−1	0	1	2	2
y	2	4	4	5	4

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

27 Explain why the relation shown in the table below is a function.

x	−1	0	1	2
y	2	4	4	5

The relation shown is a function because the X or Y values do not repeat.

Complete the table below with values for both *x* and *y* so that this new relation is *not* a function.

x	−1	0	1	2	*0*
y	2	4	4	5	*6*

Score 1:   The student completed the table correctly.

27 Explain why the relation shown in the table below is a function.

x	−1	0	1	2
y	2	4	4	5

It is a function because
every input has an output.

Complete the table below with values for both x and y so that this new relation is *not* a function.

x	−1	0	1	2	0
y	2	4	4	5	4

Score 0: The student gave an incomplete explanation and repeated a point from the given relation.

27 Explain why the relation shown in the table below is a function.

domain
range

x	−1	0	1	2
y	2	4	4	5

X ⟶ Y

-1, 0, 1, 2 → 2, 4, 5

No, this is not a function because the domain has 2 ranges the same.

Complete the table below with values for both *x* and *y* so that this new relation is *not* a function.

x	−1	0	1	2	3
y	2	4	4	5	10

×2 +0 +1

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

28 Solve algebraically for x: $0.05(x - 3) = 0.35x - 7.5$

$$0.05(x-3) = 0.35x - 7.5$$
$$0.05x - 0.15 = 0.35x - 7.5$$
$$-0.3x - 0.15 = -7.5$$
$$-0.3x = -7.35$$
$$\boxed{x = 24.5}$$

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

28 Solve algebraically for x: $0.05(x - 3) = 0.35x - 7.5$

$$x - 3 = 7x - 150$$
$$6x = 147$$
$$x = \frac{147}{6}$$

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

28 Solve algebraically for x: $0.05(x - 3) = 0.35x - 7.5$

$$0.05(x - 3) = 0.35x - 7.5$$

$$0.05x - 0.15 = 0.35x - 7.5$$

$$ + 7.5 + 7.5$$

$$\overline{}$$

$$0.05x + 7.35 = 0.35x$$

$$-0.05x -0.05x$$

$$\overline{}$$

$$\frac{7.35}{0.3} = \frac{0.3x}{0.3}$$

$$\boxed{2.45 = x}$$

Score 1:   The student made one computational error.

28 Solve algebraically for x: $0.05(x - 3) = 0.35x - 7.5$

$$0.05\,(x-3) = 0.35x - 75$$

$$0.05x - .15 = 0.35x - 75$$

$$-.15 = -7.5$$

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

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$$y = ax^2 + bx + c$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(1)(-6)}}{2(1)}$$

$$x = \frac{-3 + \sqrt{9 + 24}}{2} \qquad x = \frac{-3 - \sqrt{9 + 24}}{2}$$

$$\boxed{x = \frac{-3 - \sqrt{33}}{2} \qquad x = \frac{-3 + \sqrt{33}}{2}}$$

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

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$$x = \frac{-3 \pm \sqrt{3^2 - 4(1)(-6)}}{2(1)}$$

$$x = \frac{-3 \pm \sqrt{33}}{2}$$

$$x = \frac{-3}{2} \pm \frac{\sqrt{33}}{2}$$

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

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$a = 1$
$b = 3$
$C = -6$

$$X = \frac{-3 \pm \sqrt{(3)^2 - 4(1)(-6)}}{2(1)}$$

$$X = \frac{-3 \pm \sqrt{(3)^2 + 24}}{2}$$

$$X = \frac{-3 \pm \sqrt{9 + 24}}{2}$$

$$X = \frac{-3 \pm \sqrt{33}}{2}$$

$$X = \frac{-3 + \sqrt{33}}{2}$$

$$X = \frac{-3 - \sqrt{33}}{2}$$

$X = 1.372281323$

$X = -4.372281323$

Score 1: The student expressed the answers as decimals.

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$$X^2 + 3x - 6 = 0$$
$$+6 \quad +6$$

$$X^2 + 3x + 2.25 = 6 + 2.25$$

$$\left(\frac{3}{2}\right)^2 = (1.5)^2 = 2.25$$

$$\sqrt{(X + 1.5)^2} = \sqrt{8.25}$$

$$X + 1.5 = \sqrt{8.25}$$
$$-1.5 =$$
$$X = -1.5 \pm \sqrt{8.25}$$

Score 1: The student used a method other than the quadratic formula.

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$$\frac{-3\sqrt{3^2 - 4(1)(-6)}}{2(1)} =$$

$$\frac{-3\sqrt{9 + 24}}{2} =$$

$$\frac{-3\sqrt{33}}{2} =$$

$$\boxed{= -8.62}$$

Score 0: The student did not include ± sign in the formula and wrote the answer as a decimal.

29 Use the quadratic formula to determine the exact roots of the equation $x^2 + 3x - 6 = 0$.

$$X = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$a = 1$
$b = 3$
$c = -6$

$$X = \frac{6 \pm \sqrt{3^2 - 4(1)(-6)}}{2(1)}$$

$$X = \frac{6 \pm \sqrt{33}}{2}$$

$$X = 3 \pm \sqrt{33}$$

$$X = 3 + \sqrt{33} \qquad X = 3 - \sqrt{33}$$

Score 0: The student made multiple errors.

30 Factor $5x^3 - 80x$ completely.

$$5x^3 - 80x$$

$$5x(x^2 - 16)$$

$$\underset{(x)^2 \quad (4)^2}{5x(x^2 - 16)}$$

$$\boxed{5x(x-4)(x+4)}$$

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

30 Factor $5x^3 - 80x$ completely.

$$5x\left(x^2 - 16\right)$$

$$5x\left(x+4\right)\left(x-4\right)$$

$$X=0 \quad X=-4 \quad X=4$$

$$\left\{0, -4, 4\right\}$$

Score 1:   The student factored the polynomial completely, but solved it as an equation.

30 Factor $5x^3 - 80x$ completely.

$$5x^3 - 80x$$

$$5x(x^2 - 16)$$

$$5x(x-4)(x+4)$$

$$5x(x-2)(x+2)(x+4)$$

Score 1: The student made one factoring error.

30 Factor $5x^3 - 80x$ completely.

$$X(5x^2 - 80)$$

Score 0: The student did not factor out $5x$.

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

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

$$y = 15.13x - 959.63$$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

0.99

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

This correlation coefficient indicates that the data has a strong positive linear fit.

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

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

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

$$y = 15.13x - 959.63$$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

$$r = .99$$

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

As the temrature goes up the amount of ice creams go up.

Positive

Score 3: The student did not state the strength of the correlation coefficient.

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

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

$$y = ax + b$$
$$y = 15.125x - 959.625$$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

$$r = 0.992$$

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

It's a very good fit

Score 3: The student rounded to the thousandths place.

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

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

Slope $= 15.13x$

y int $= -959.63$

$y = 15.13x - 959.63$

$y = ax + b$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

15.13

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

Every degree in temperature the aven goes up daily, 5.13 more ice creams are purchased.

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

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

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

$$y = 15.13 - 959.63$$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

1

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

There is a strong relationship between the Average Daily Temp and Daily Ice Cream Cone sales

Score 2: The student left out *x* in the equation and did not state a correct correlation coefficient.

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

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

19917

.992

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

R= .9

stronglinear

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

It is a strong linear

Score 1: The student indicated strong, but no further correct work was shown.

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

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

$$15.1x - .959.6$$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

$$.99$$

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

it indicates that the amount of ice cream and Average temp is close together, everytime its hotter more people buy ice cream.

Score 1: The student gave the correct correlation coefficient, but no further correct work was shown.

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

7̲7̲

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

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

$$y \quad 26x + 14$$

$$\frac{183 \cdot 126}{72}$$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

$$22.8$$

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

The average coefficient of the data

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

31 The owner of an ice cream stand kept track of the number of ice cream cones that were sold each day of the first week in June. She compared the ice cream sales to the average daily temperature. The data are shown in the table below.

Average Daily Temp. (x)	72	75	81	78	77	76	80
Daily Ice Cream Cone Sales (y)	126	183	263	229	200	185	249

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

$$y = 0.57X$$

State the correlation coefficient, to the *nearest hundredth*, for the line of best fit for these data.

The correlation coefficient for the line of best fit for these data is 0.57.

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

This correlation coefficient indicates an increase in the average daily temperature.

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

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

$$y > 3x - 4$$
$$x + 2y \le 6$$

$$\frac{2y}{2} \le \frac{-x+6}{2} \frac{6}{2}$$

$$y \le -\tfrac{1}{2}x + 3$$

$$-x$$

Label the solution set S.

$$y > 3x - 4$$

$$y \le -\tfrac{1}{2}x + 3$$
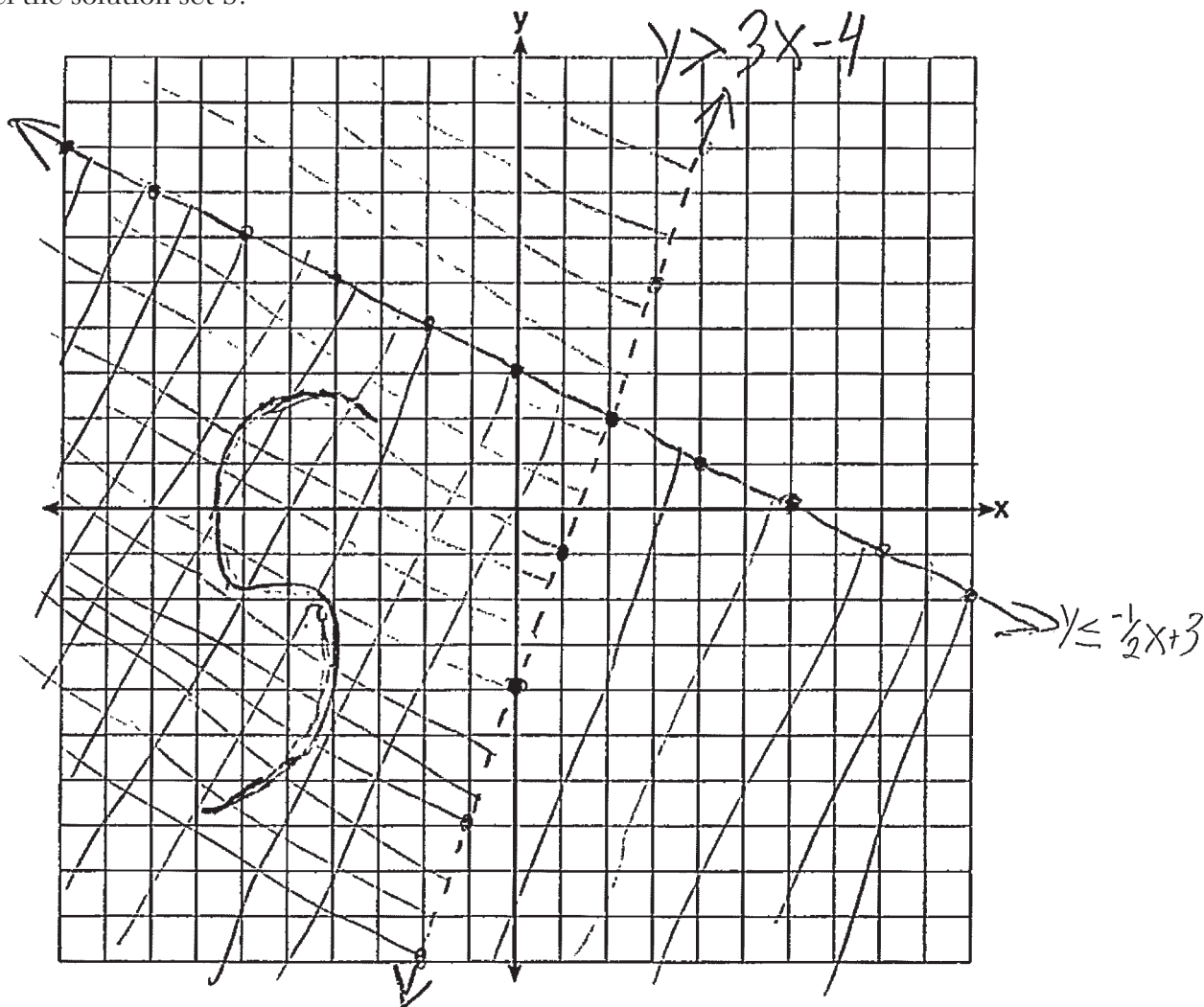
Is the point $(2,2)$ a solution to the system? Justify your answer.

No Because it is on the dotted line.

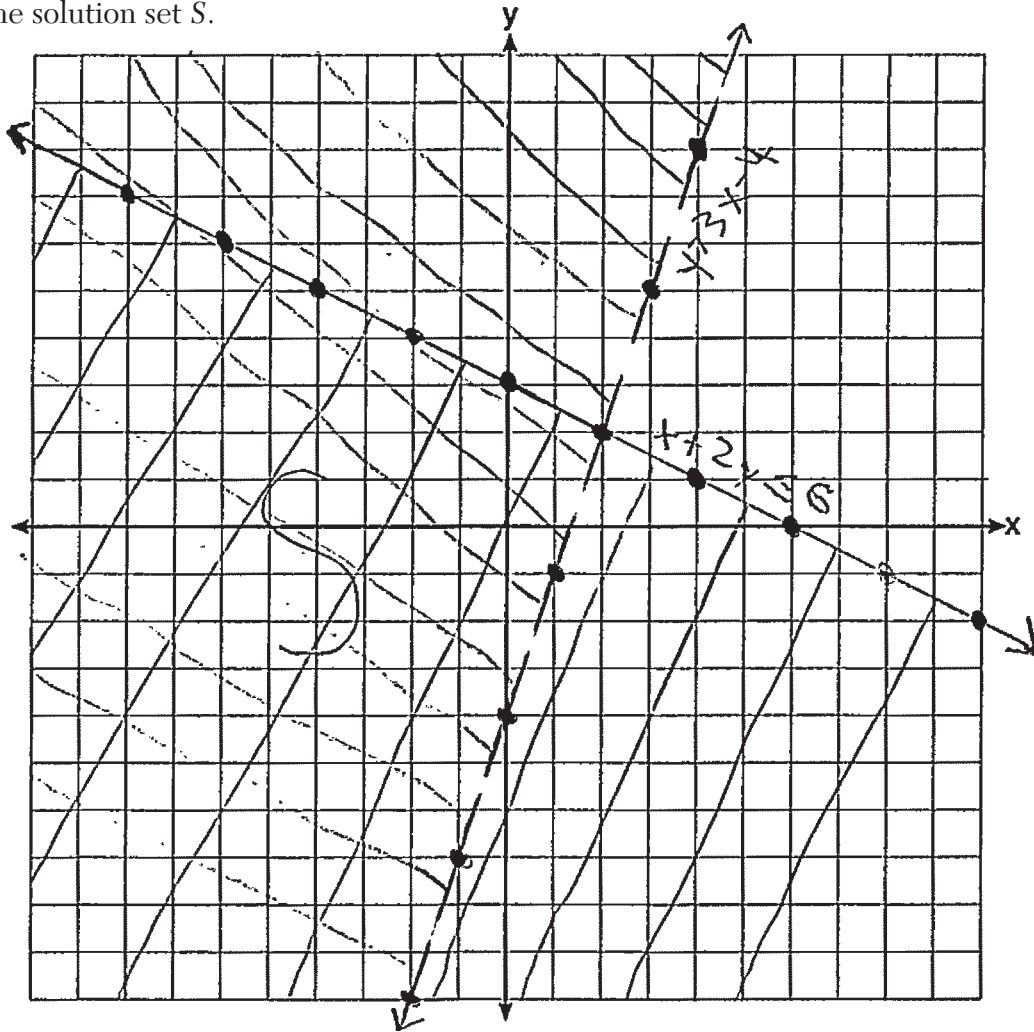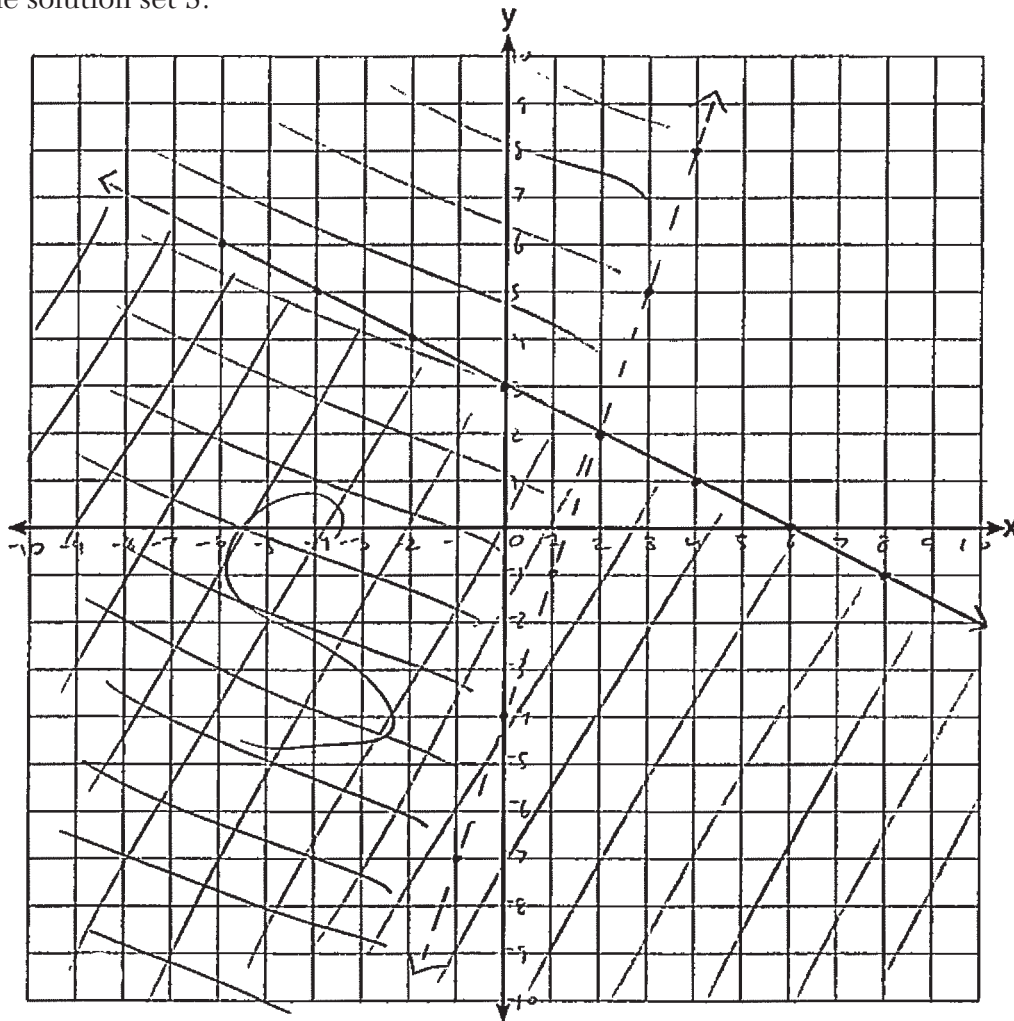**Score 4:** The student gave a complete and correct response.

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

$$y > 3x - 4$$
$$x + 2y \leq 6$$

Label the solution set S.

Is the point $(2,2)$ a solution to the system? Justify your answer.

$$y > 3x - 4$$
$$2 > 3(2) - 4$$
$$2 > 6 - 4$$
$$2 \not> 2$$
$$\times$$

$$x + 2y \leq 6$$
$$2 + 2(2) \leq 6$$
$$2 + 4 \leq 6$$
$$6 \leq 6$$
$$\checkmark$$

(No)

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

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

$$y > 3x - 4$$
$$x + 2y \le 6 \qquad \frac{2y}{2} \le \frac{6-x}{2}, \qquad y \le 3 - \tfrac{1}{2}x$$

Label the solution set S.

Is the point (2,2) a solution to the system? Justify your answer.

The point (2,2) isn't a solution to the system because it falls on a dotted line which is shown by the graph above. Dotted lines are exclusive so (2,2) wouldn't count.

Score 3: The student did not label at least one line.

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

$$y > 3x - 4$$
$$x + 2y \leq 6$$

Label the solution set *S*.

$-x \quad -x$

$$\frac{2y \leq -x + 6}{2} \quad \frac{}{2}$$

$x + 2y \leq 6$

$y > 3x - 4 \quad y \leq -2x + 3$
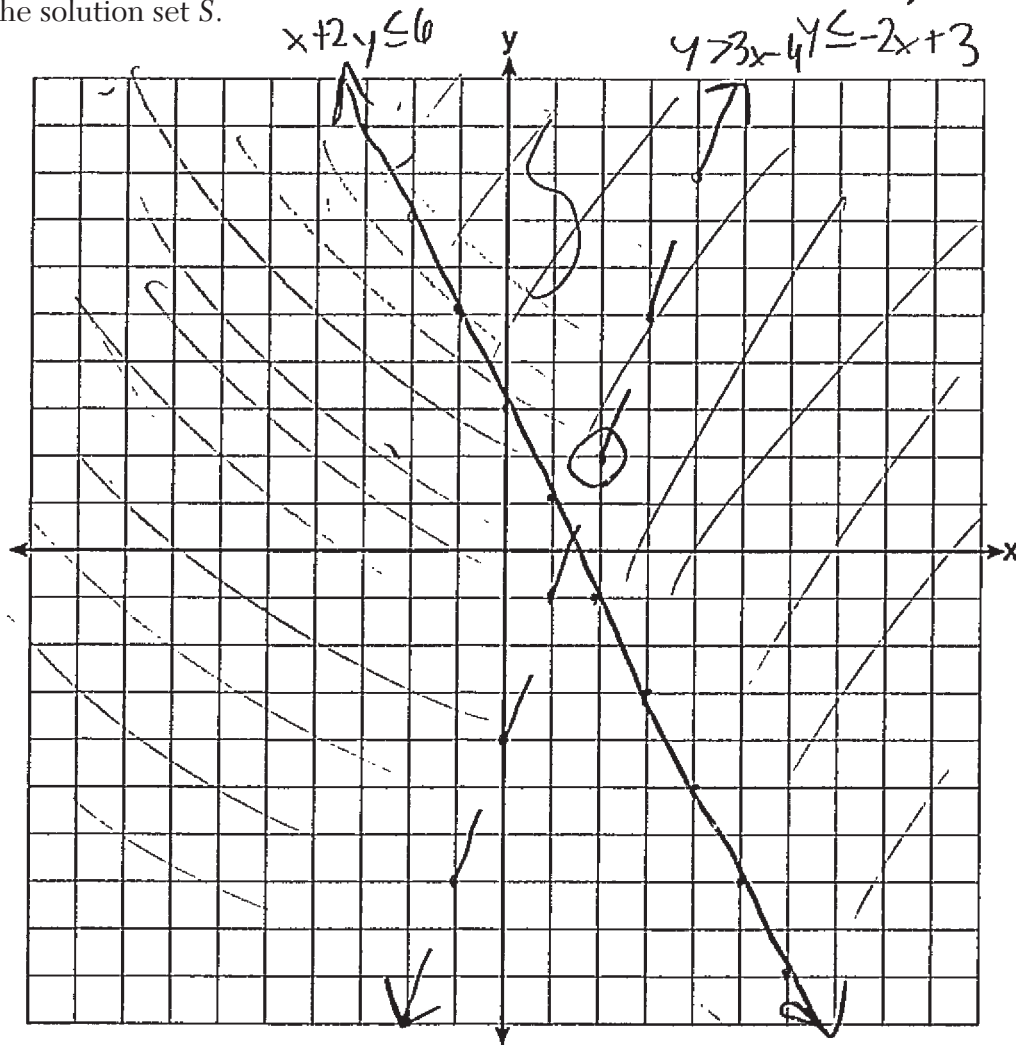
Is the point (2,2) a solution to the system? Justify your answer.

no, because (2,2) is on a dotted line.

Score 3: The student graphed $x + 2y \leq 6$ incorrectly.

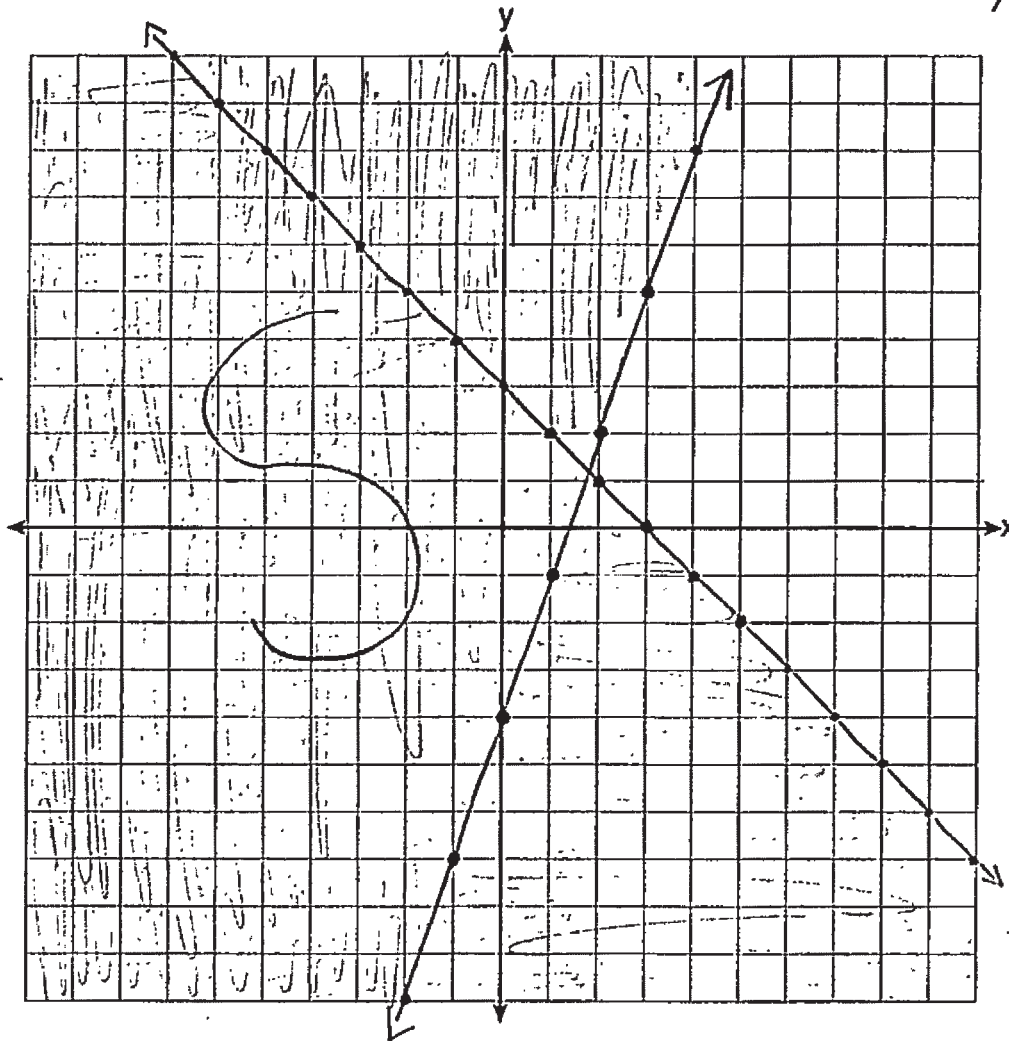**32** Graph the system of inequalities on the set of axes below:

$$y > 3x - 4$$
$$x + 2y \le 6$$

Label the solution set S.

$$\frac{-x \qquad -x}{2y \le 6 - x}$$
$$\frac{}{2}$$

$$y \le 3 - x$$

Is the point (2,2) a solution to the system? Justify your answer.

(2,2) is not in the solution set because it isn't in the shaded section labeled S

Score 2: The student graphed both inequalities incorrectly, but labeled the solution set and wrote a correct justification.

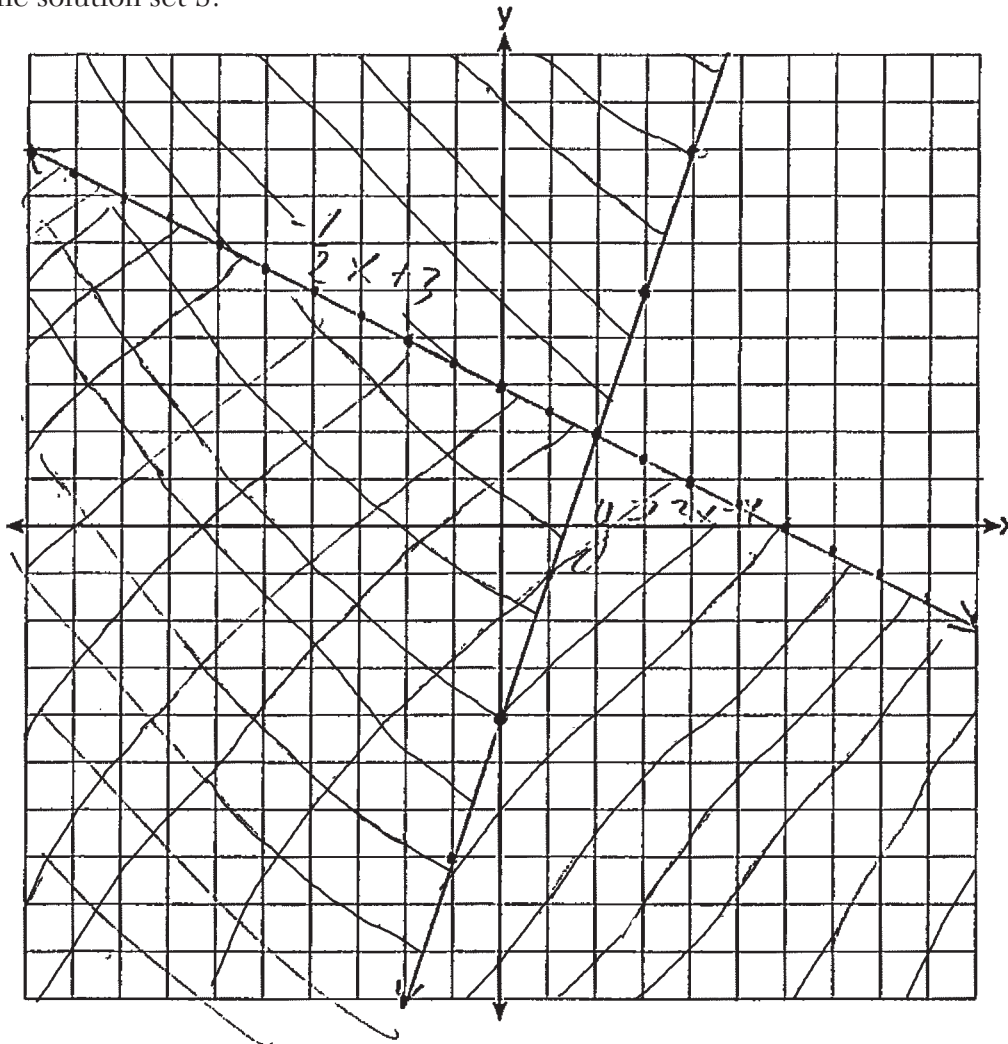**32** Graph the system of inequalities on the set of axes below:

$$y > 3x - 4$$
$$x + 2y \le 6$$

$$2y \le -x + 6$$
$$y \le -\frac{1}{2}x + 3$$

Label the solution set *S*.

Is the point (2,2) a solution to the system? Justify your answer.

I think point (2,2) is a solution to the system because it's were two lines meat each other.

Score 2: The student graphed one inequality correctly and gave an appropriate justification.

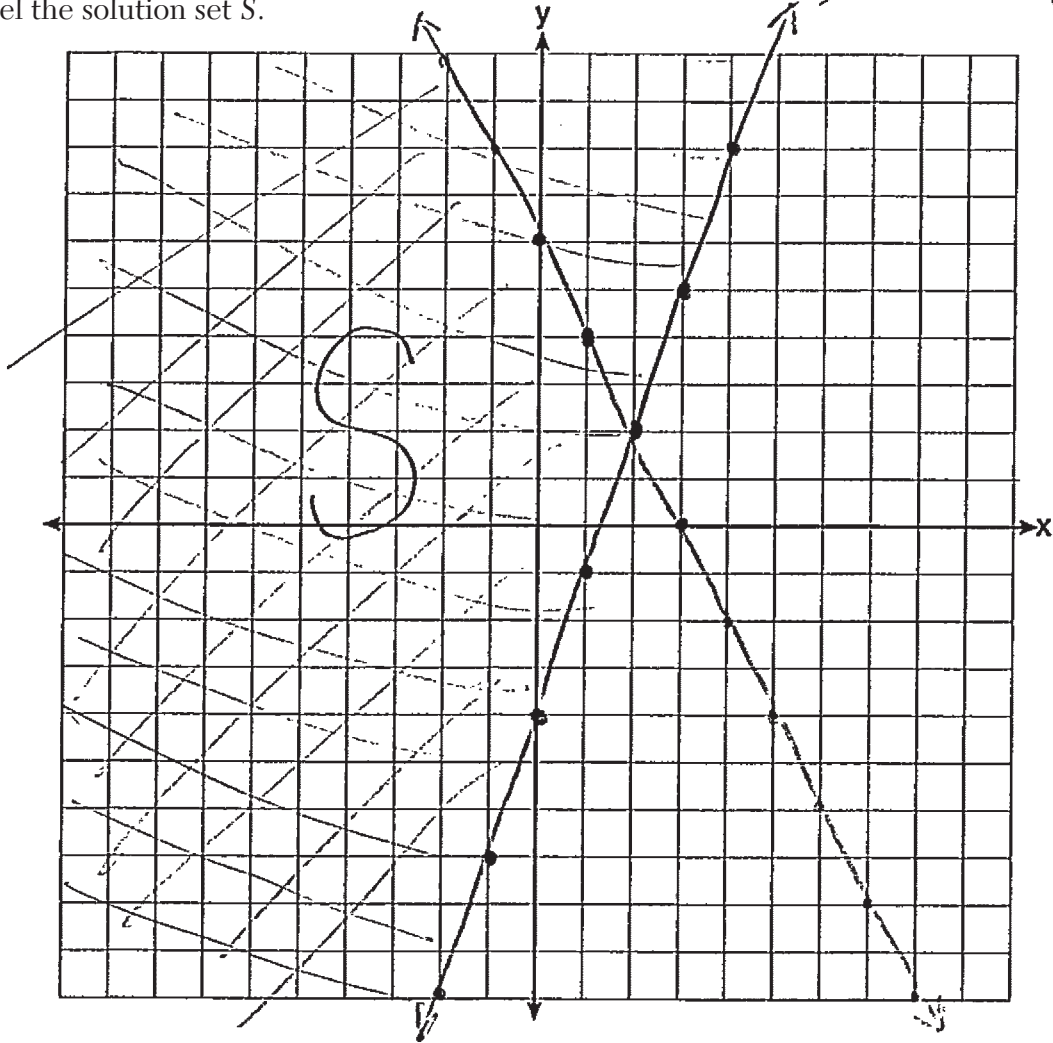**32** Graph the system of inequalities on the set of axes below:

$$y > 3x - 4$$
$$x + 2y \le 6$$

Label the solution set S.

$-x \quad -x$

$$\frac{2y}{2} \le \frac{x + 6}{2}$$

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

Is the point (2,2) a solution to the system? Justify your answer.

yes because its on the line

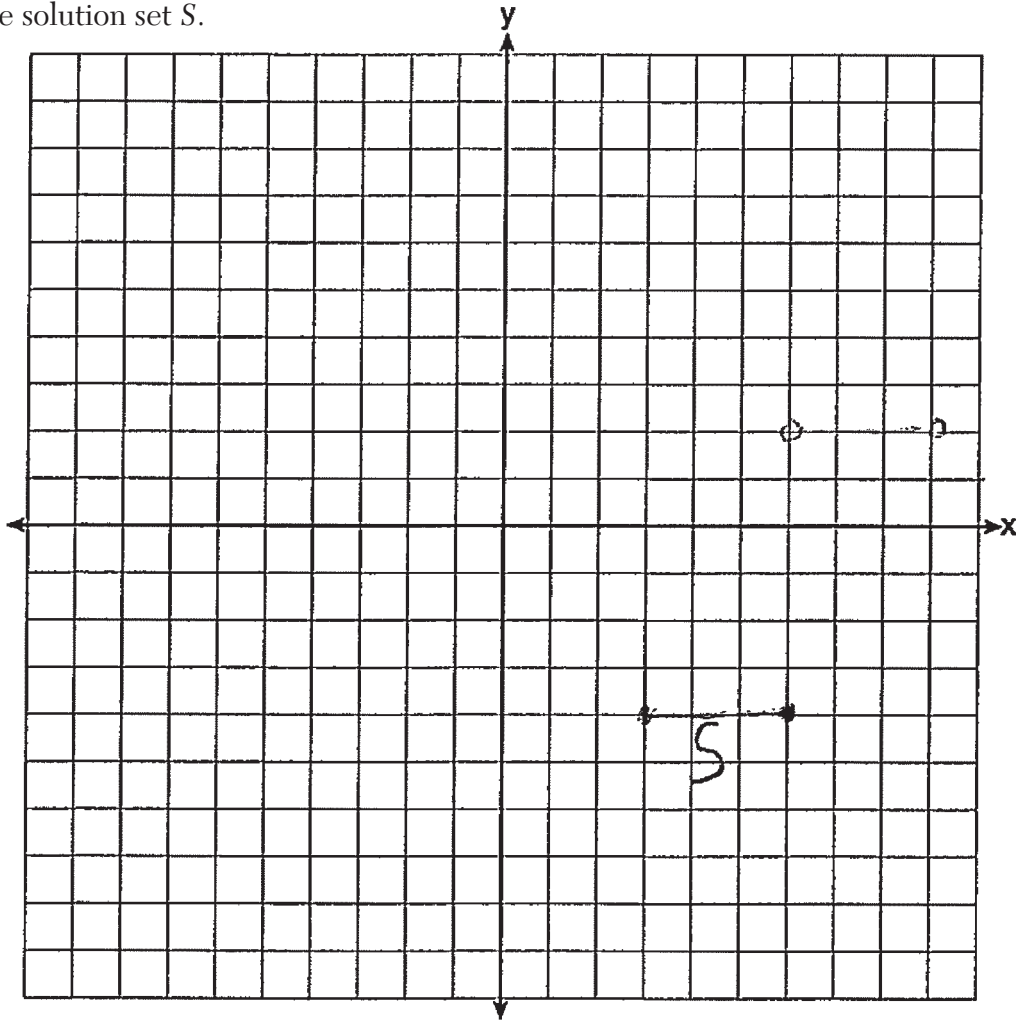**Score 1:** The student labeled an appropriate solution set S.

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

$$y > 3x - 4$$
$$x + 2y \le 6$$

Label the solution set S.

Is the point (2,2) a solution to the system? Justify your answer.

The point (2,2) is not a solution to the system.

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

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

(2,144) This coordinate means that the object reached its highest Point (144 ft.) in the air at 2 Seconds.

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.
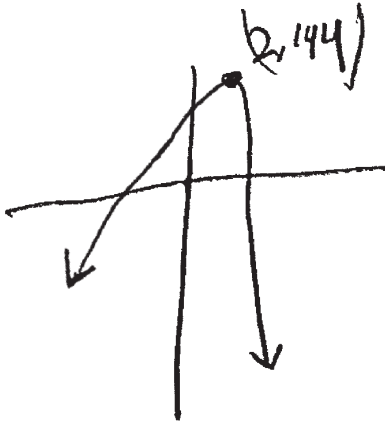
The object takes 5 seconds to hit the ground because the x-intercept is the Point (5,0).

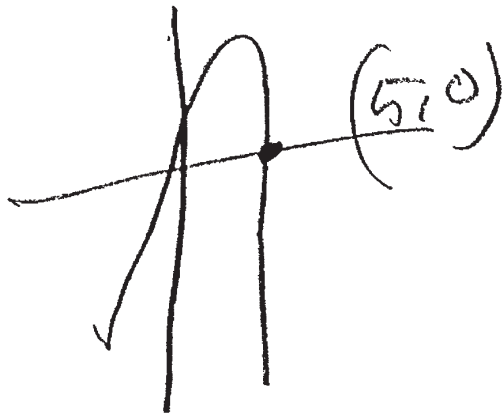**Score 4:** The student gave a complete and correct response.

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

(2, 144)

In 2 second it reached its max hight of 144 feet

Vertex (2, 144)

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

(5, 0)

It would take 5 second for the ball to hit the ground

(5, 0)

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

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

$t = \dfrac{-b}{2a}$

$s(2) = -16(2)^2 + 64(2) + 80$

$s(2) = 144$

$t = \dfrac{-64}{2(-16)}$

$t = 2$

Vertex : $(2, 144)$

2 represents how many seconds it took to reach 144 ft which is the max height

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

$\dfrac{0}{-16} = \dfrac{-16t^2}{-16} + \dfrac{64t}{-16} + \dfrac{80}{-16}$

$0 = t^2 - 4t - 5$

$0 = (t-5)(t+1)$

$t - 5 = 0 \quad | \quad t + 1 = 0$

$t = 5 \quad | \quad t \ne -1$

$\boxed{5 \text{ seconds}}$

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

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

(2,144) I think this means that the highest it reaches is 144 ft in two seconds

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

5 seconds

Score 3: The student did not give a justification for the number of seconds that it takes for the object to reach the ground.

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

Vertex is 144, I used calculator

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

It takes five seconds because the calculator says x=5 and y=0 meaning it hit the grand 5 seconds after be launched

Score 2: The student stated 5 seconds and justified their answer.

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

−16t is the hight of the object t second after it's launched

64t is how many feet per second it travel

80 is how many feet high the platform

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

5 seconds

Score 1: The student stated 5 seconds, but no further correct work was shown.

33 An object is launched upward at 64 feet per second from a platform 80 feet above the ground. The function $s(t)$ models the height of the object t seconds after launch.

If $s(t) = -16t^2 + 64t + 80$, state the vertex of $s(t)$, and explain in detail what each coordinate means in the context of the problem.

A -16

$\dfrac{-b}{2a} = \dfrac{-64}{-32} = 2$

B $+64$

C $+80$

The vertex is when it hits the ground

After the object is launched, how many seconds does it take for the object to hit the ground? Justify your answer.

I takes it

144 seconds to hit the ground

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

34 Solve the system of equations algebraically for all values of x and y.

$$y = x^2 + 4x - 1$$

$$y = 2x + 7$$

$$\underline{\cancel{2x} + 7 = x^2 + \cancel{4x} - 1}$$
$$-7 \quad\quad = \cancel{2x} - 7$$

1·8
2·4

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

$$0 = (x + 4)(x - 2)$$

$$x + 4 = 0 \quad | \quad x - 2 = 0$$
$$-4 -4 \quad | \quad +2 +2$$
$$\overline{\quad x = -4 \quad | \quad x = 2 \quad}$$

(-4, -1)
(2, 11)

← answer

$$Y = 2(2) + 7$$
$$Y = 11$$

$$Y = 2(-4) + 7$$
$$Y = -1$$

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

34 Solve the system of equations algebraically for all values of x and y.

$$y = x^2 + 4x - 1$$

$$y = 2x + 7$$

$2x+7 = x^2 + 4x - 1$

$-2x-7 \qquad -2x-7$

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

$0 = (x+4)(x-2)$

$\{-4, 2\} = x$

$y = 2(-4)+7 = -1$

$y = 2(2)+7 = 11$

$\{-1, 11\} = y$

$x = -4 \qquad x = 2$

$y = -1 \qquad y = 11$

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

34 Solve the system of equations algebraically for all values of x and y.

$$y = x^2 + 4x - 1$$

$$y = 2x + 7$$

$x^2 + 4x - 1 = 2x + 7$
$\underline{-2x -7 -2x -7}$
$x^2 - 2x - 8 = 0$

$(x - 4)(x + 2) = 0$

$\begin{array}{ll} x - 4 = 0 & x + 2 = 0 \\ \underline{+4 + 4} & \underline{-2 -2} \\ x = 4 & x = -2 \end{array}$

$y = 2(4) + 7$
$y = 8 + 7$
$y = 15$

$y = 2(-2) + 7$
$y = -4 + 7$
$y = 3$

$x = 4$
$y = 15$

$x = -2$
$y = 3$

Score 3: The student made one computational error.

34 Solve the system of equations algebraically for all values of x and y.

$$y = x^2 + 4x - 1$$
$$y = 2x + 7$$

$$x^2 + 4x - 1 = 2x + 7$$
$$ -2x -2x$$

$$x^2 + 2x - 1 = -7$$

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

$$x = \frac{-2 \pm \sqrt{4 + 32}}{2}$$

$$y = 2(-8) + 7$$
$$y = -9$$

$$x = \frac{-2 \pm 6}{2}$$

$$y = 2(-4) + 7$$
$$y = -1$$

$$x_1 = -4 \qquad y_1 = -1$$
$$x_2 = -8 \qquad y_2 = -9$$

Score 3: The student found $x = -4, y = -1.$

34 Solve the system of equations algebraically for all values of x and y.

$$y = x^2 + 4x - 1$$
$$y = 2x + 7$$

$$x^2 + 4x - 1 = 2x + 7$$
$$-2x - 7 \quad -2x - 7$$
$$x^2 + 2x - 8 = 0$$

mult to
-8

add to
2

#5

$4x, -2x$

$x + 4 \cancel{)} x - 2 = 0$
$-4 \quad -4 \quad +2 +2$
$x = -4 \qquad x = 2$

$\{-4, 2\}$

Score 3: The student showed appropriate work to find both $x = 2$ and $x = -4$, but no further correct work was shown.

34 Solve the system of equations algebraically for all values of x and y.

$$y = x^2 + 4x - 1$$
$$y = 2x + 7$$

$$2x + 7 = x^2 + 4x - 1$$
$$-2x - 7$$
$$x^2 + 2x - 8 = 0$$
$$(x + 4)(x - 2) = 0$$

Score 2: The student showed appropriate work to find $(x + 4)(x - 2) = 0$, but no further correct work was shown.

34 Solve the system of equations algebraically for all values of x and y.

$$y = x^2 + 4x - 1$$

$$y = 2x + 7$$

$$\left(-4, -1\right)$$

$$\left(2, 11\right)$$

Score 1: The student gave two correct solutions, but no work was shown.

34 Solve the system of equations algebraically for all values of x and y.

$$y = x^2 + 4x - 1$$

$$y = 2x + 7$$

$$2x + 7 = x^2 + 4x - 1$$
$$\underline{-4x} \quad \downarrow \qquad \underline{-4x}$$
$$-2x + 7 = x^2 - 1$$
$$\downarrow \underline{-7} \quad \downarrow \underline{-7}$$
$$8 + (-2x) = x^2 - 8$$
$$+8$$

$$\sqrt{8 + (-2x)} = x^2$$

$$\sqrt{8 + (-2x)} \, x$$
$$\hookrightarrow - \boxed{2.8 = x}$$

$$Y = (2.8)^2 + 4(2.8) - 1$$

Score 0: The student made multiple errors.

34 Solve the system of equations algebraically for all values of x and y.

$$y = x^2 + 4x - 1$$
$$y = 2x + 7$$

$$x^2 + 4x - 1 = 2x + 7$$
$$ -7 -7$$

$$y = 2x + 7)$$

$$x^2 + 4x - 8 = 2x \qquad -2x = -y + 7$$
$$ -4x -4x \qquad x = \tfrac{1}{2}y - 3.5$$

$$y = x^2 + 4x - 1$$
$$y = (\tfrac{1}{2}y - 3.5)^2 + 4(\tfrac{1}{2}y - 3.5) - 1$$
$$y = \tfrac{1}{4}y + 12.25 + 2y - 14 - 1$$
$$y = \tfrac{-9}{4}y - 2.75$$

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

$$\sqrt{x^2} = \sqrt{-2x + 8}$$

$$x = \sqrt{-2x + 8}$$

$$\sqrt{-2x} + \sqrt{8}$$

Score 0: The student made multiple errors.

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$$2m + 3r = 38.50$$
$$6m + r = 47.50$$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

She is incorrect because in June when she spent $47.50 the ticket could not have been that price or else the prices would've been lower

$$2(5.75) + 3(9) = 38.50$$
$$11.5 + 27 = 38.50$$
$$38.50 = 38.50$$
$$6(5.75) + 9 = 47.50$$
$$34.5 + 9 = 43.50 \quad \times$$

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

$$2m + 3r = 38.50$$
$$-3(6m + r = 47.50)$$
$$-18m - 3r = -142.50$$
$$2m + 3r = 38.50$$
$$\frac{-16m}{-16} = \frac{-104}{-16}$$
$$m = 6.5$$

$$2(6.5) + 3r = 38.50$$
$$13 + 3r = 38.50$$
$$\frac{3r}{3} = \frac{25.5}{3}$$
$$r = 8.5$$

the cost of a matinee ticket is $6.50 and the cost of a regular ticket is $8.50

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

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

system of equations

$m = matinees$
$r = regular-priced\ shows$

$$2m + 3r = 38.50$$
$$6m + r = 47.50$$

$39 + r = 47.50$
$r = 8.50$

$2m + 3r = 38.50$
$-18m + 3r = 142.50$
$-16m = -104.00$
$m \approx 6.50$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

Jen is incorrect because when you correctly solved the equation a matinee costs $6.50 and a regular-priced ticket costs $8.50

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

$2m + 3r = 38.50$
$3(6m + r = 47.50)$

$2m + 3r = 38.50$
$-18m + 3r = 142.50$
$-16m = -104$
$m = 6.50$

$m = matinees$
$r = regular-priced\ shows$

$6(6.5) + r = 47.50$
$39 + r = 47.50$
$r = 8.50$

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

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$$2m + 3r = 38.50$$
$$6m + 1r = 47.50$$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

$$2(5.75) + 3(9) = 38.50$$
$$38.50 = 38.50$$

No

$$6(5.75) + 1(9) = 47.50$$
$$43.50 \neq 47.50$$

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

$$2m + 3r = 38.50$$
$$-18m - 9r = -142.50$$
_____
$$\frac{-16m}{-16} = \frac{-104}{-16}$$

$$m = 6.50$$

Score 5: The student did not find r.

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$$2m + 3r = 38.50$$
$$6m + 1r = 47.50$$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

$$2(5.75) + 3(9) = 38.50$$
$$11.50 + 27 = 38.5$$
$$6(5.75) + 1(9) \neq 47.50$$

No, She is not Correct

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

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

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$$38.50 = 2m + 3r$$
$$47.50 = 6m + 1r$$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

$$2m + 3r = 2(5.75) + 3(9)$$
$$11.5 + 27 = 38.50$$

Jen is correct because when you multiply the cost of each ticket by the amount of tickets and add both amounts you get $38.50

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

Score 3:   This student wrote a correct system of equations and justified only in the first equation.

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$$M = 38.50 (n)$$
$$r =$$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

No, if Jen went to 6 matinees the (and one regular) price would have been 47.50 but 5.75 • 6 + 9 equals 43.50

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

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

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

$$27 + 11.50 = 38.50$$

$$2 \times 5.75 = 11.50$$

$$9 \times 3 = 27$$

Yes.

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

Score 1: The student justified only in the first equation.

35 Jen joined the Fan Favorite Movie Club at the local movie theater. At this theater, the cost of admission in May and June remains the same. In May, she saw 2 matinees and 3 regular-priced shows and spent $38.50. In June, she went to 6 matinees and one regular-priced show and spent $47.50.

Write a system of equations to represent the cost, m, of a matinee ticket and the cost, r, of a regular-priced ticket.

$$r = 38.50r - 38.50m$$
$$m = 47.50m - 47.50m$$

Jen said she spent $5.75 on each matinee and $9 on each regular show. Is Jen correct? Justify your answer.

yes because when you solve the
equation

Use your system of equations to algebraically determine both the actual cost of each matinee ticket and the actual cost of each regular ticket.

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