The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I

Thursday, June 16, 2022 — 9:15 a.m. to 12:15 p.m.

MODEL RESPONSE SET

Table of Contents

25 Is the product of $\sqrt{1024}$ and -3.4 rational or irrational? Explain your answer.

$\sqrt{1024} = 32$

$32 \cdot -3.4 = -108.8$

The answer is rational because when you multiply $\sqrt{1024}$ and -3.4 you get -108.8 which can be represented as a fraction

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

25 Is the product of $\sqrt{1024}$ and -3.4 rational or irrational? Explain your answer.

$\sqrt{1024} = 32$ $32 \times -3.4 = \boxed{-108.8}$

The product of $\sqrt{1024}$ and -3.4 is rational because -108.8 is a terminating non-repeating decimal.

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

25 Is the product of $\sqrt{1024}$ and -3.4 rational or irrational? Explain your answer.

$$\sqrt{1024} \times -3.4 = -108.8$$

Rational

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

25 Is the product of $\sqrt{1024}$ and -3.4 rational or irrational? Explain your answer.

$$32 \times -3.4 = -108.8$$

Score 0: The student did not state rational and did not write an explanation.

25 Is the product of $\sqrt{1024}$ and -3.4 rational or irrational? Explain your answer.

I think this would be rational.

Score 0: The student did not write an explanation.

26 Describe the transformations performed on the graph of $f(x) = x^2$ to obtain the graph of $g(x)$ when $g(x) = (x - 3)^2 - 4$.

Shift down 4

Shift Right 3

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

26 Describe the transformations performed on the graph of $f(x) = x^2$ to obtain the graph of $g(x)$ when $g(x) = (x - 3)^2 - 4$.

Down 3

Right 4

Score 1: The student only wrote the directions of the shifts correctly.

26 Describe the transformations performed on the graph of $f(x) = x^2$ to obtain the graph of $g(x)$ when $g(x) = (x - 3)^2 - 4$.

Graph

|	$f(x) = x^2$	$g(x) = (x-3)^2 - 4$
0	0	5
1	1	0
2	4	-3
3	9	-4
4	16	-3

$y_1 = f(x)$ $y_2 = g(x)$
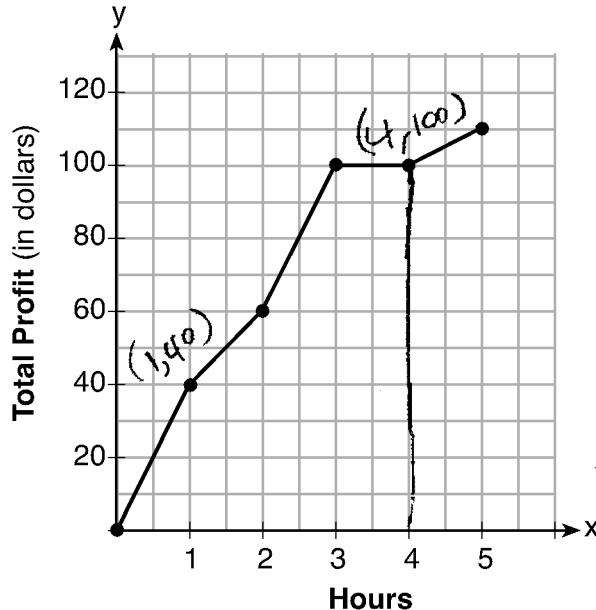
y_1 vertex is $(0, 0)$

y_2 vertex is $(2, -3)$

Score 0: The student did not describe the transformations.

27 The total profit earned at a garage sale during the first five hours is modeled by the graph shown below.
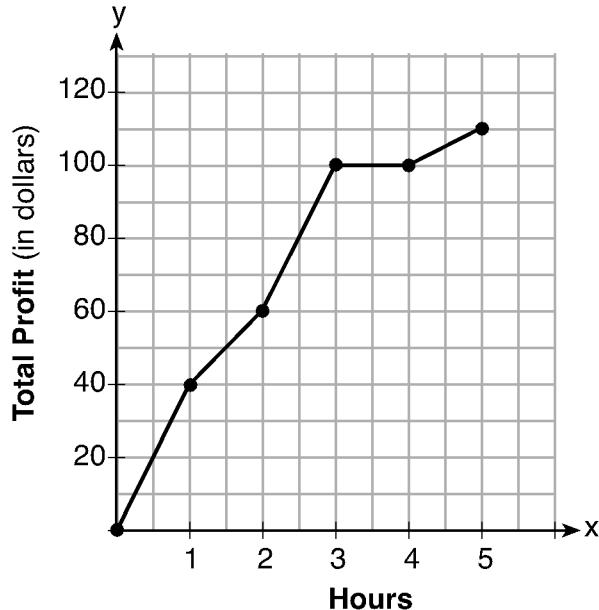

Determine the average rate of change, in dollars per hour, over the interval $1 \leq x \leq 4$.

The average rate of change is $\frac{20}{1}$.

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

27 The total profit earned at a garage sale during the first five hours is modeled by the graph shown below.
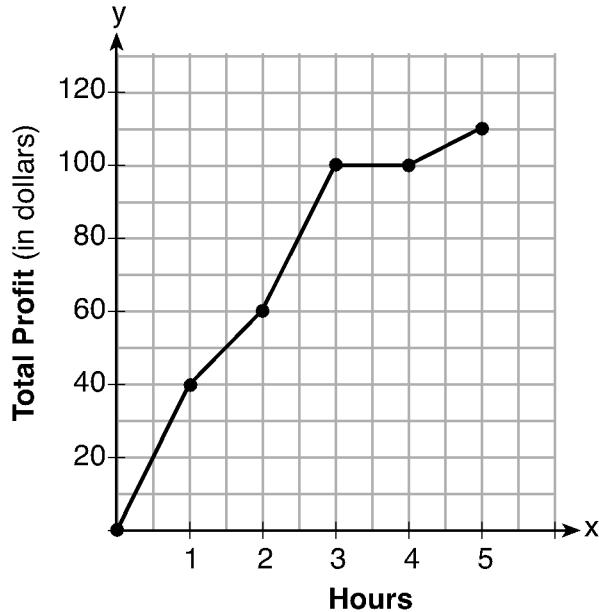

Determine the average rate of change, in dollars per hour, over the interval $1 \leq x \leq 4$.

$$\frac{60 - 40}{2 - 1} = \frac{20}{1} = 20$$

Score 1: The student correctly found the rate of change over the interval $1 \leq x \leq 2$.

27 The total profit earned at a garage sale during the first five hours is modeled by the graph shown below.

Determine the average rate of change, in dollars per hour, over the interval $1 \leq x \leq 4$.
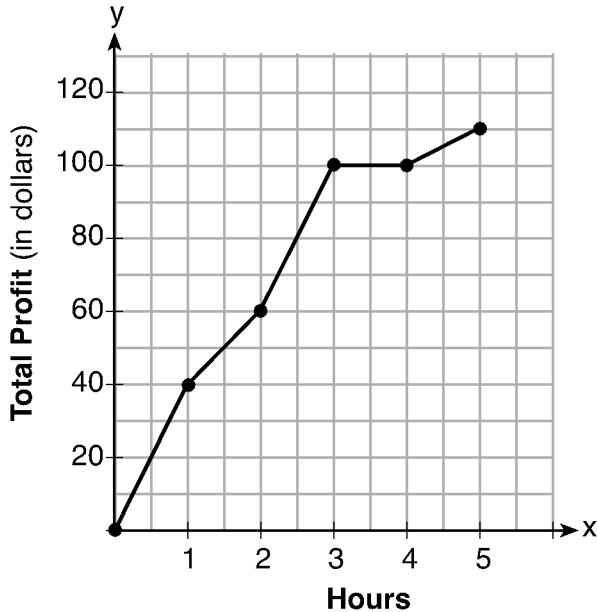
$$\left(\overset{x\,y}{1,40}\right) \left(\overset{x\,y}{4,100}\right)$$

$$\frac{4-1}{100-40} = \boxed{\frac{1}{20}}$$

Score 1: The student wrote the rate of change as $\dfrac{\text{change in } x}{\text{change in } y}$.

27 The total profit earned at a garage sale during the first five hours is modeled by the graph shown below.

Determine the average rate of change, in dollars per hour, over the interval $1 \le x \le 4$.

$(1, 40) \quad (2, 60)$

$$\frac{2-1}{60-40} = \boxed{\frac{1}{20}}$$

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

28 Subtract $3x(x - 2y)$ from $6(x^2 - xy)$ and express your answer as a monomial.

$3x^2 - 6xy \quad 6x^2 - 6xy$

$(6x^2 - 6xy) - (3x^2 - 6xy)$
$-3x^2 + 6xy$
_____
$3x^2$

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

28 Subtract $3x(x - 2y)$ from $6(x^2 - xy)$ and express your answer as a monomial.

$$3x(x-2y) - 6(x^2 - xy)$$

$$3x^2 - 6xy - 6x^2 + 6xy$$

$$\boxed{-3x^2}$$

$$-6xy - 3x^2 + 6xy$$

Score 1: The student subtracted the expressions in the wrong order.

28 Subtract $3x(x - 2y)$ from $6(x^2 - xy)$ and express your answer as a monomial.

$3x^2 - 6yx$ $6x^2 - 6xy$

$3x^2 - 12xy$

Score 1: The student made an error when subtracting the xy terms.
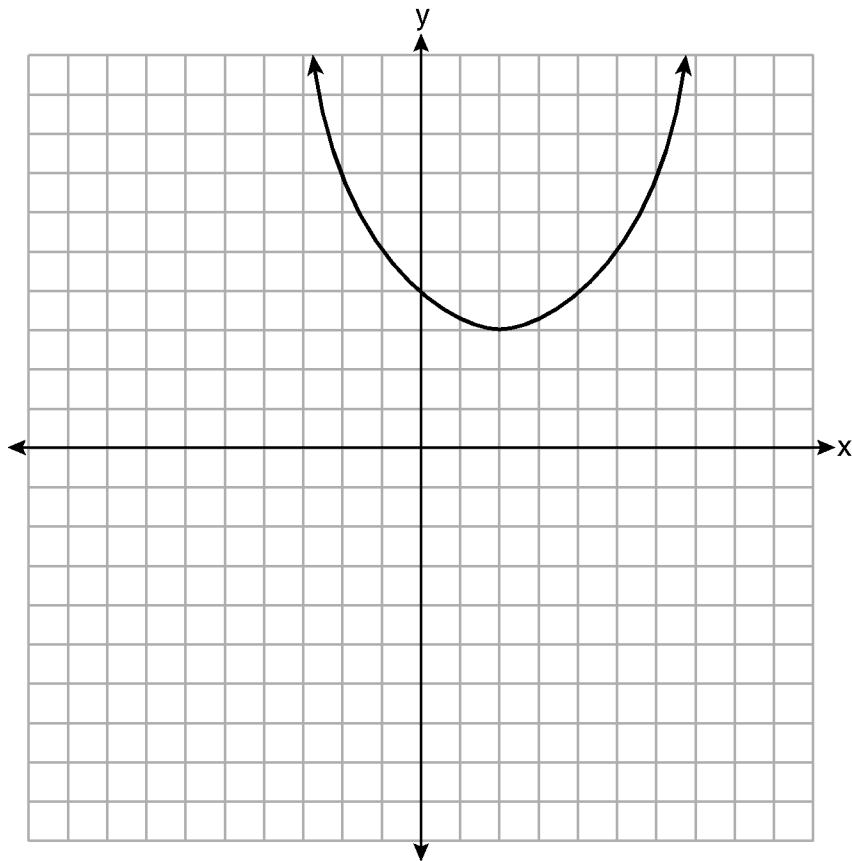
**28** Subtract $3x(x - 2y)$ from $6(x^2 - xy)$ and express your answer as a monomial.

$$3x^2 + 6xy - 6x^2 + 6xy$$

$$\underline{3x^2}$$

Score 0: The student made multiple errors in their work.

29 A function is graphed on the set of axes below.

State the domain of this function.

$$-\infty < X < \infty$$

State the range of this function.

$$Y \geq 3$$
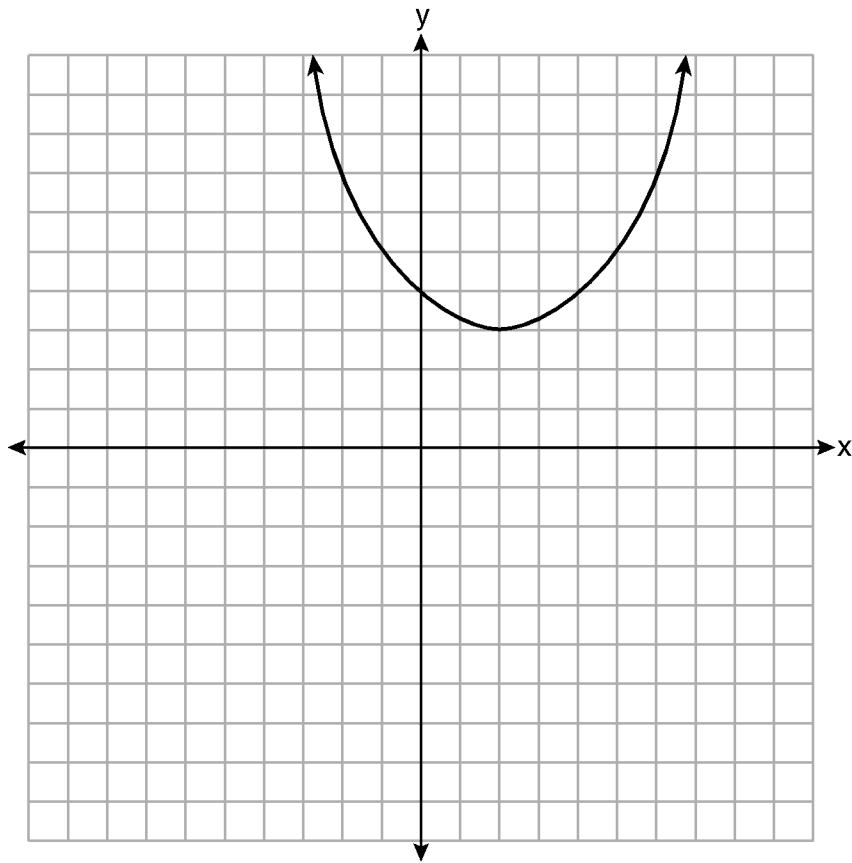
Score 2: The student gave a complete and correct response.

29 A function is graphed on the set of axes below.

State the domain of this function.

$$x = \mathbb{R}$$
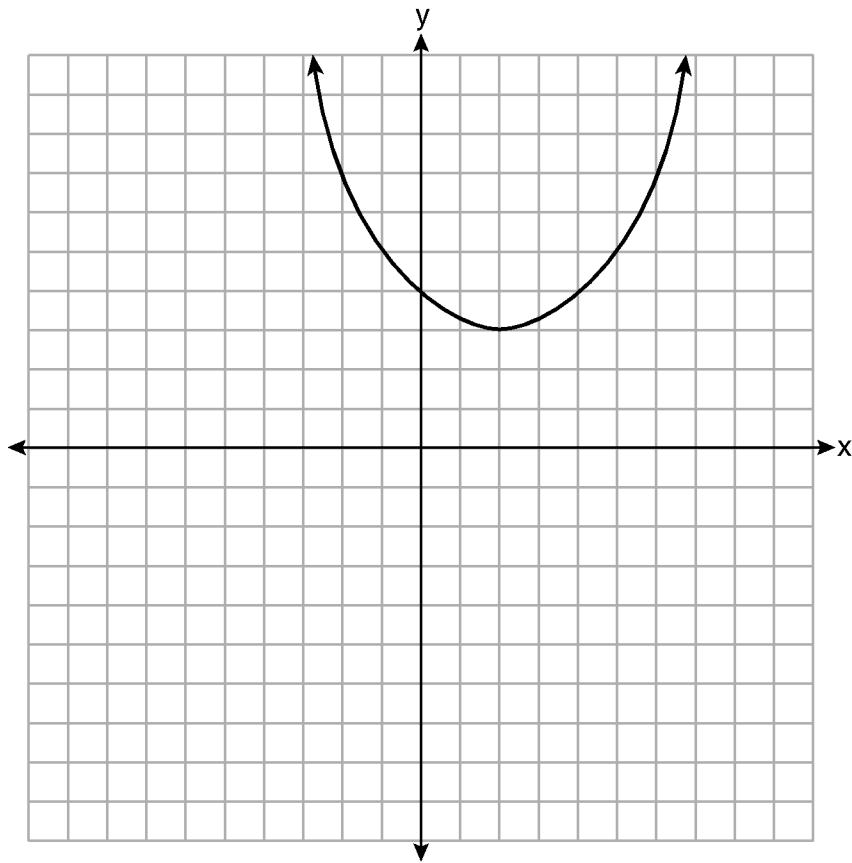
State the range of this function.

$$y \geq 3$$

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

29 A function is graphed on the set of axes below.

State the domain of this function.

$$(-\infty, \infty)$$
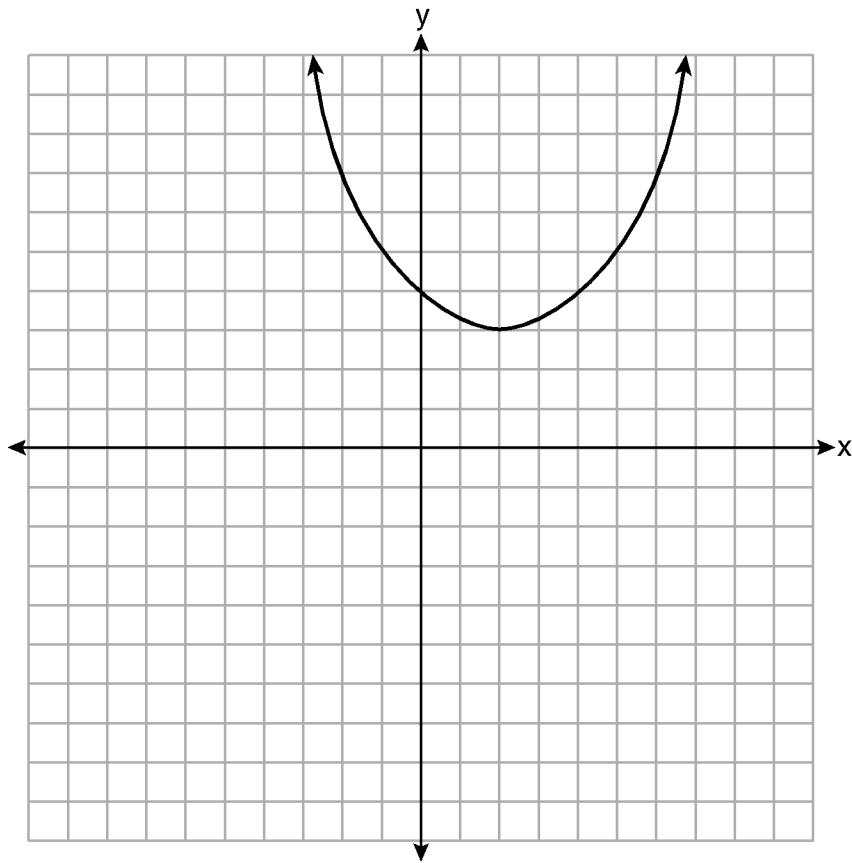
State the range of this function.

$$[3, \infty)$$

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

29 A function is graphed on the set of axes below.

State the domain of this function.

$[-\infty, \infty]$
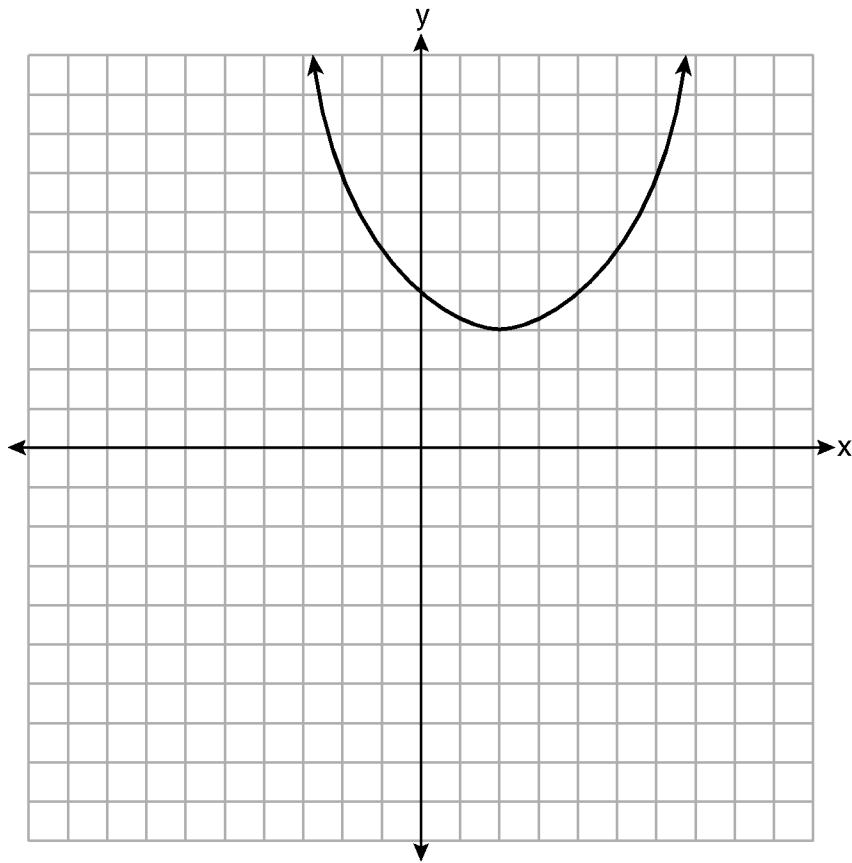
State the range of this function.

$[3, \infty]$

Score 1: The student used brackets with the infinity signs instead of parentheses.

29 A function is graphed on the set of axes below.

State the domain of this function.

$$y \geq 3$$
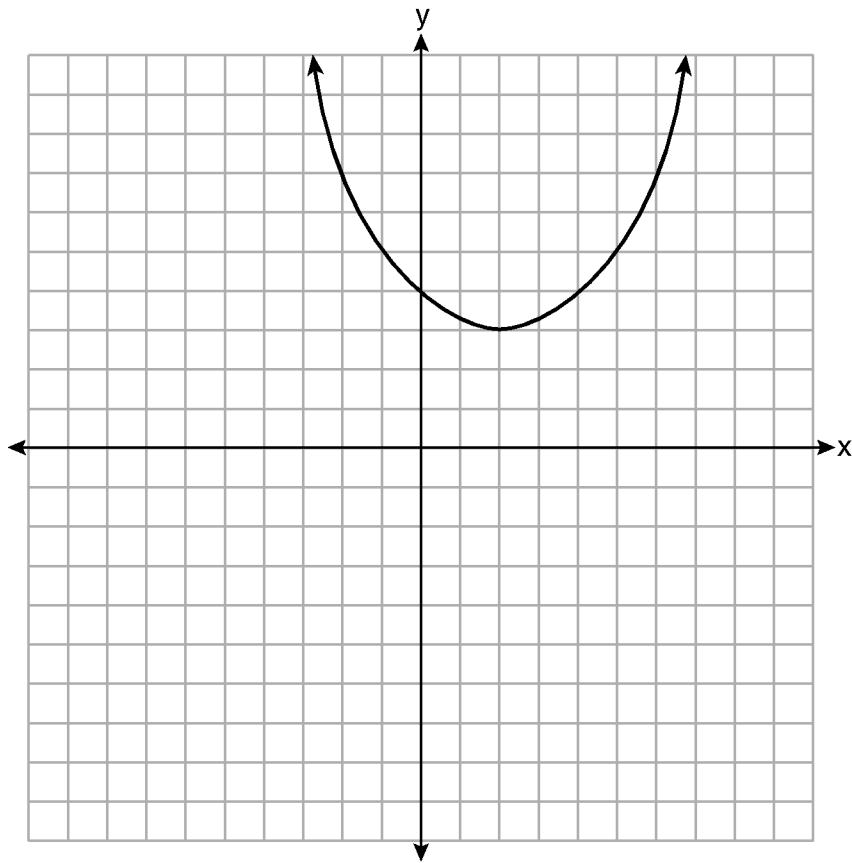
State the range of this function.

$$-\infty < x < \infty$$

Score 1:   The student reversed the domain and range.

29 A function is graphed on the set of axes below.

State the domain of this function.

Domain is X>2.

State the range of this function.

Range is Y>3.

Score 0: The student wrote an incorrect domain and an incorrect inequality symbol for the range.

30 Solve $6x^2 + 5x - 6 = 0$ algebraically for the exact values of x.

$6x^2 + 5x - 6 = 0$

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

$a = 6$
$b = 5$
$c = -6$

$$\frac{-5 \pm \sqrt{5^2 - 4(6)(-6)}}{2(6)}$$

$$\frac{-5 \pm \sqrt{169}}{12}$$

$$\frac{-5 \pm 13}{12}$$

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

30 Solve $6x^2 + 5x - 6 = 0$ algebraically for the exact values of x.

$$6x^2 + 5x - 6 = 0$$
$$(3x - 2)(2x + 3) = 0$$

$$3x - 2 = 0 \quad | \quad 2x + 3 = 0$$
$$+2 \ +2 \quad | \quad -3 \ -3$$
$$\frac{3x}{3} = \frac{2}{3} \quad | \quad \frac{2x}{2} = \frac{-3}{2}$$
$$x = \frac{2}{3} \quad | \quad x = -\frac{3}{2}$$

$$x = \left\{ \frac{2}{3}, -\frac{3}{2} \right\}$$

$$\begin{array}{c} -36 \\ -4 \diagdown 9 \\ 5 \end{array}$$

	$2x$	3
$3x$	$6x^2$	$9x$
-2	$-4x$	-6

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

30 Solve $6x^2 + 5x - 6 = 0$ algebraically for the exact values of x.

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

$$\frac{-5 \pm \sqrt{5^2 - 4(6)(-6)}}{2(6)}$$

$$\frac{-5 \pm 13}{12}$$

$$\frac{-5 + 13}{12} = .\overline{6}$$

$$\frac{-5 - 13}{12} = 1.5$$

Score 1: The student did not include the negative sign in front of 1.5.

30 Solve $6x^2 + 5x - 6 = 0$ algebraically for the exact values of x.

$$6\left(6x^2 + 5x - 6 = 0\right.$$

$$x^2 + 5x - 6 = 0$$

$$(x-1)(x+5)$$

$$x = -5 \qquad x = 1$$

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

31 Factor the expression $x^4 - 36x^2$ completely.

$$x^4 - 36x^2$$

$$x^2(x^2 - 36)$$

$$x^2(x-6)(x+6)$$

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

31 Factor the expression $x^4 - 36x^2$ completely.

$$x^4 - 36x^2$$

$$(x^2 - 6x)(x^2 + 6x)$$

$$x(x-6) \times (x+6)$$

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

31 Factor the expression $x^4 - 36x^2$ completely.

$$x^4 - 36x^2$$

$$x^2(x^2 - 36)$$

$$x^2(x + 6)(x - 6)$$

$$x + 6 = 0 \qquad x - 6 = 0$$
$$\boxed{x = -6} \qquad \boxed{x = 6}$$

Score 1: The student factored correctly, but attempted to solve the factored expression as an equation.

31 Factor the expression $x^4 - 36x^2$ completely.

$$x(x^3 - 36x)$$

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

32 Determine the exact values of x for $x^2 - 8x - 5 = 0$ by completing the square.

$$\left(\tfrac{b}{2}\right)^2 = \left(\tfrac{-8}{2}\right)^2 = (-4)^2 = 16$$

$$x^2 - 8x - 5 = 0$$
$$ +5 \quad +5$$
$$x^2 - 8x = 5$$
$$ +16 \quad +16$$
$$x^2 - 8x + 16 = 21$$
$$\sqrt{(x-4)^2} = \sqrt{21}$$
$$x - 4 = \pm\sqrt{21}$$
$$ +4 \qquad +4$$
$$x = 4 \pm \sqrt{21}$$

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

32 Determine the exact values of x for $x^2 - 8x - 5 = 0$ by completing the square.

$$x^2 - 8x - 5 = 0$$

$$b = -8$$
$$a = 1$$
$$c = -5$$

$$\frac{8 \pm \sqrt{(-8)^2 - 4(1)(-5)}}{2(1)}$$

$$\frac{8 \pm \sqrt{64 - (-20)}}{2}$$

$$\frac{8 \pm \sqrt{84}}{2}$$

$$4 \pm \frac{\sqrt{84}}{2}$$

$$4 \pm \frac{2\sqrt{21}}{2} \qquad \boxed{4 \pm \sqrt{21}}$$

$$84$$
$$\diagup \diagdown$$
$$42 \quad 2$$
$$\diagup \diagdown$$
$$21 \quad 2$$

Score 1: The student did not use the method of completing the square.

32 Determine the exact values of x for $x^2 - 8x - 5 = 0$ by completing the square.

$$x^2 - 8x - 5 = 0$$
$$ +5 \quad +5$$
$$x^2 - 8x = 5$$
$$x^2 - 8x + 16 = 5 + 16$$
$$x^2 - 8x + 16 = 21$$

$$(x-4)^2 = 21$$

$$x - 4 = 21$$
$$+4 \quad +4$$
$$x = 25$$

$$b = -8$$

$$\tfrac{1}{2}(-8) = -4$$

$$(-4)^2 = 16$$

Score 1: The student did not take the square root of 21.

32 Determine the exact values of x for $x^2 - 8x - 5 = 0$ by completing the square.

$$x^2 - 8x - 5 = 0$$

$$(x^2 - 8x + 16) - 16 - 5 = 0$$

$$(x - 4)(x - 4) - 21 = 0$$

$$\sqrt{(x-4)^2} = \sqrt{21}$$

$$x - 4 = \pm\sqrt{21}$$
$$+4 \qquad +4$$

$$x = 4 \pm\sqrt{21}$$

$$4 + \sqrt{21} = 8.58 \qquad 4 - \sqrt{21} = -.58$$

$$\{-.58, 8.58\}$$

$\frac{1}{2}(-8)$

$(-4)^2$

16

Score 1:   The student rounded off the solution.
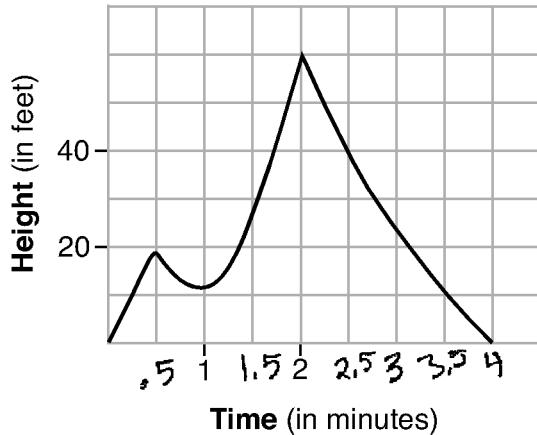
32 Determine the exact values of x for $x^2 - 8x - 5 = 0$ by completing the square.

$$x^2 - 8x - 5 = 0$$
$$+5 \quad +5$$
—————————————
$$x^2 - 8x + 16 = 5 + 16$$

$$\frac{8}{2} = 4 \rightarrow (4)^2 = 16$$

$$x^2 - 8x + 16 = 21$$

$$(x+4)(x-4) = 21$$

$x+4=21$	$x-4=21$
$-4 \quad -4$	$+4 \quad +4$
$x = 17$	$x = 25$

$$x = 17$$
$$\text{and}$$
$$x = 25$$

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

33 The graph below models the height of Sam's kite over a period of time.

Explain what the zeros of the graph represent in the context of the situation.

When the Kite is on the ground.

State the time intervals over which the height of the kite is increasing.

$$0 < X < .5$$

$$1 < X < 2$$
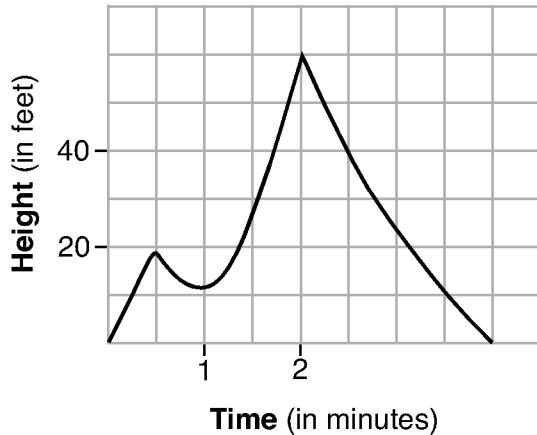
State the maximum height, in feet, that the kite reaches.

60 ft

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

33 The graph below models the height of Sam's kite over a period of time.

Explain what the zeros of the graph represent in the context of the situation.

The o's represent when sams kite hit the ground

State the time intervals over which the height of the kite is increasing.

0 - .5 min   1 - 2 min
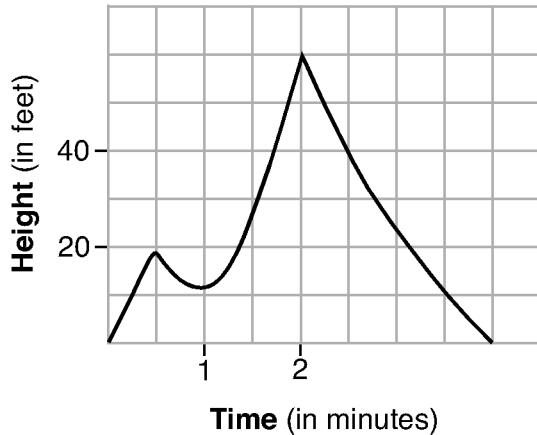
State the maximum height, in feet, that the kite reaches.

60

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

33 The graph below models the height of Sam's kite over a period of time.

Time (in minutes)

Explain what the zeros of the graph represent in the context of the situation.

The Kite is on the ground at
0 and 4 minutes.

State the time intervals over which the height of the kite is increasing.

[0, 0.5]
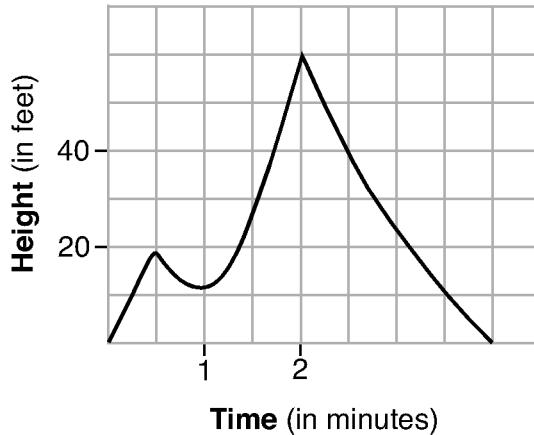
[1, 2]

State the maximum height, in feet, that the kite reaches.

Score 3: The student did not answer the maximum height.

33 The graph below models the height of Sam's kite over a period of time.

Explain what the zeros of the graph represent in the context of the situation.

Start and Finish

State the time intervals over which the height of the kite is increasing.

$0 \leq X \leq 0.5$

$1 \leq X \leq 2$
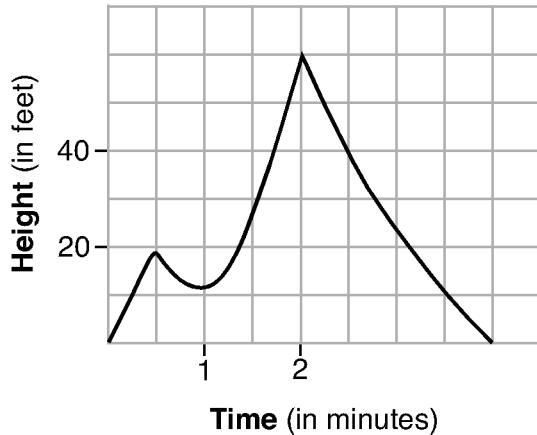
State the maximum height, in feet, that the kite reaches.

60

Score 3: The student wrote an incorrect explanation.

33 The graph below models the height of Sam's kite over a period of time.

Explain what the zeros of the graph represent in the context of the situation.

The zeros of the graph represents when the kite started and when the kite landed

State the time intervals over which the height of the kite is increasing.

The time is 2 minutes ~~overthepeak~~
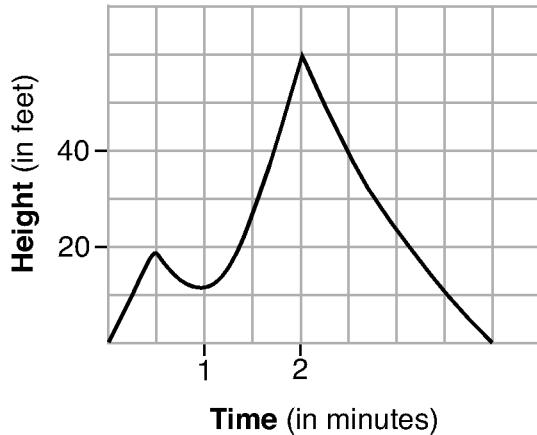
State the maximum height, in feet, that the kite reaches.

The height is 60 feet.

Score 2: The student did not state the intervals.

33 The graph below models the height of Sam's kite over a period of time.

Explain what the zeros of the graph represent in the context of the situation.

State the time intervals over which the height of the kite is increasing.

every minute, it goes up
10 ft
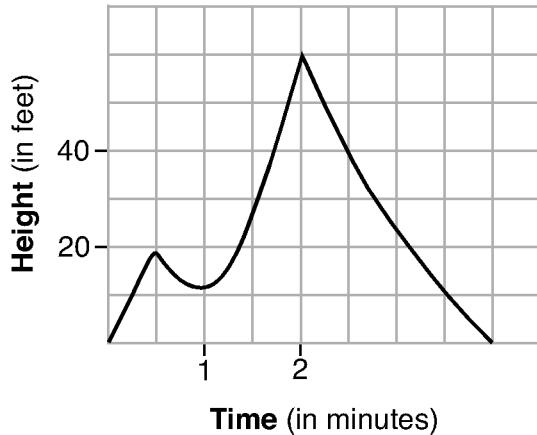
State the maximum height, in feet, that the kite reaches.

60 ft

Score 1: The student only stated the height correctly.

33 The graph below models the height of Sam's kite over a period of time.

Time (in minutes)

Explain what the zeros of the graph represent in the context of the situation.

The zeros are the kite starting and ending points.

State the time intervals over which the height of the kite is increasing.

(1.5, 30)
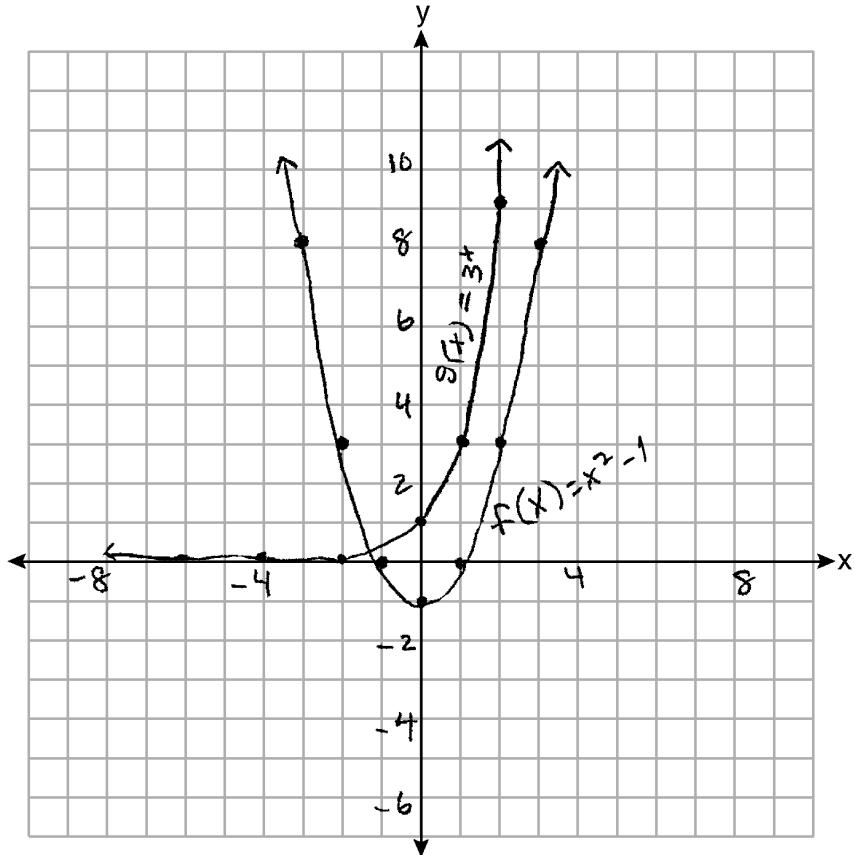
State the maximum height, in feet, that the kite reaches.

(2, 60)

Score 0: The student's explanation did not indicate time, and no further correct work was shown.

34 On the set of axes below, graph $f(x) = x^2 - 1$ and $g(x) = 3^x$.
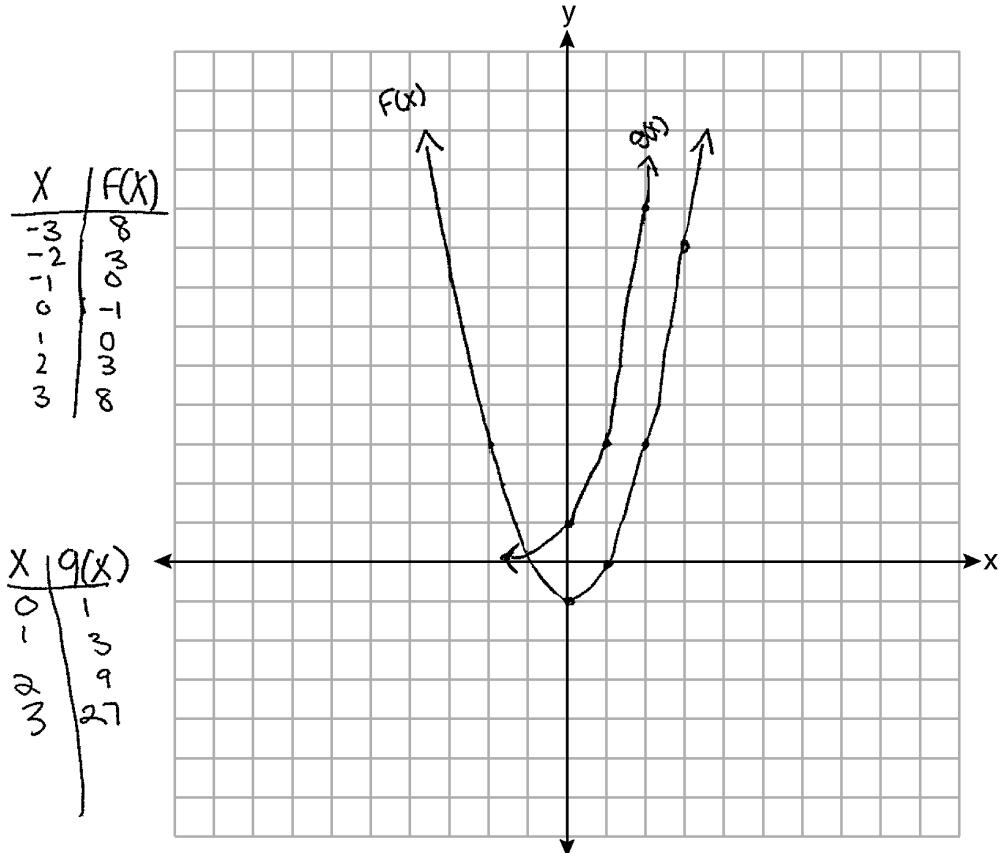
Based on your graph, for how many values of x does $f(x) = g(x)$? Explain your reasoning.

1, because the f(x) and g(x) only intersect at one point.

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

34 On the set of axes below, graph $f(x) = x^2 - 1$ and $g(x) = 3^x$.

X	F(X)
-3	8
-2	3
-1	0
0	-1
1	0
2	3
3	8

X	g(X)
0	1
1	3
2	9
3	27
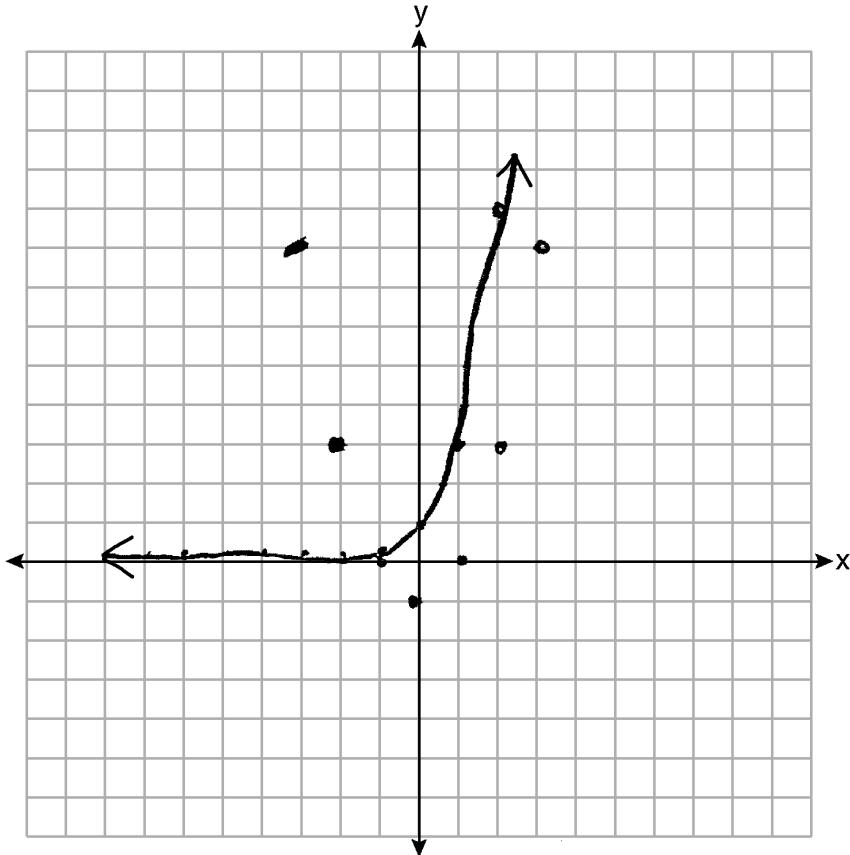
Based on your graph, for how many values of x does $f(x) = g(x)$? Explain your reasoning.

one

Score 3: The student did not write an explanation.

34 On the set of axes below, graph $f(x) = x^2 - 1$ and $g(x) = 3^x$.

Based on your graph, for how many values of x does $f(x) = g(x)$? Explain your reasoning.
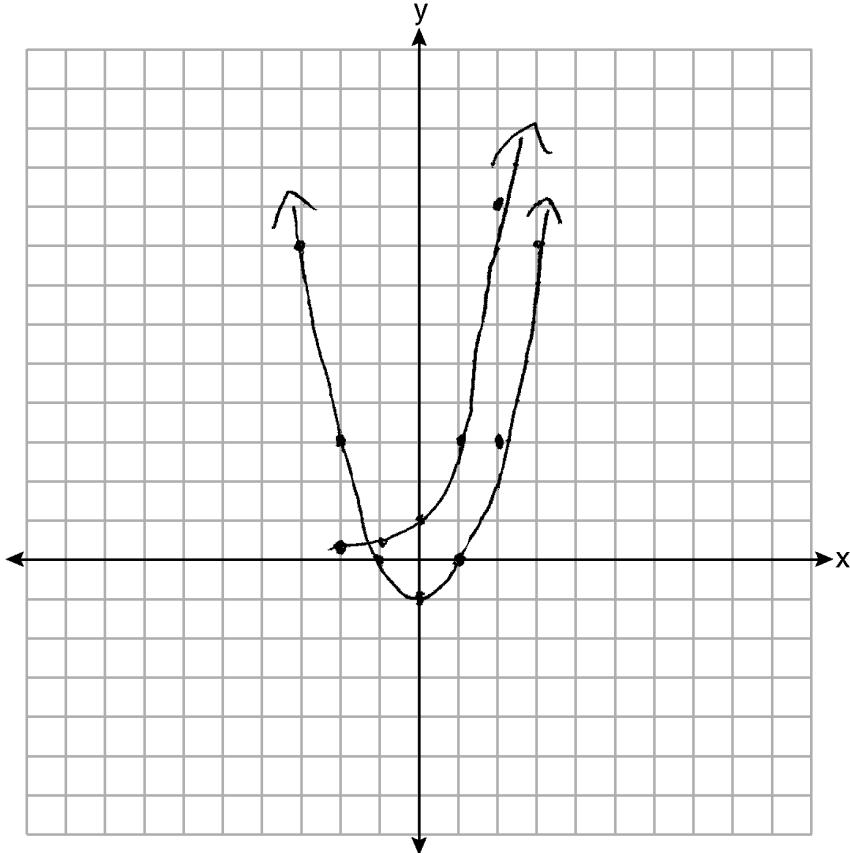
1 value

−1.13476

Score 2: The student did not complete the graph of $f(x)$ and did not write an explanation.

34 On the set of axes below, graph $f(x) = x^2 - 1$ and $g(x) = 3^x$.
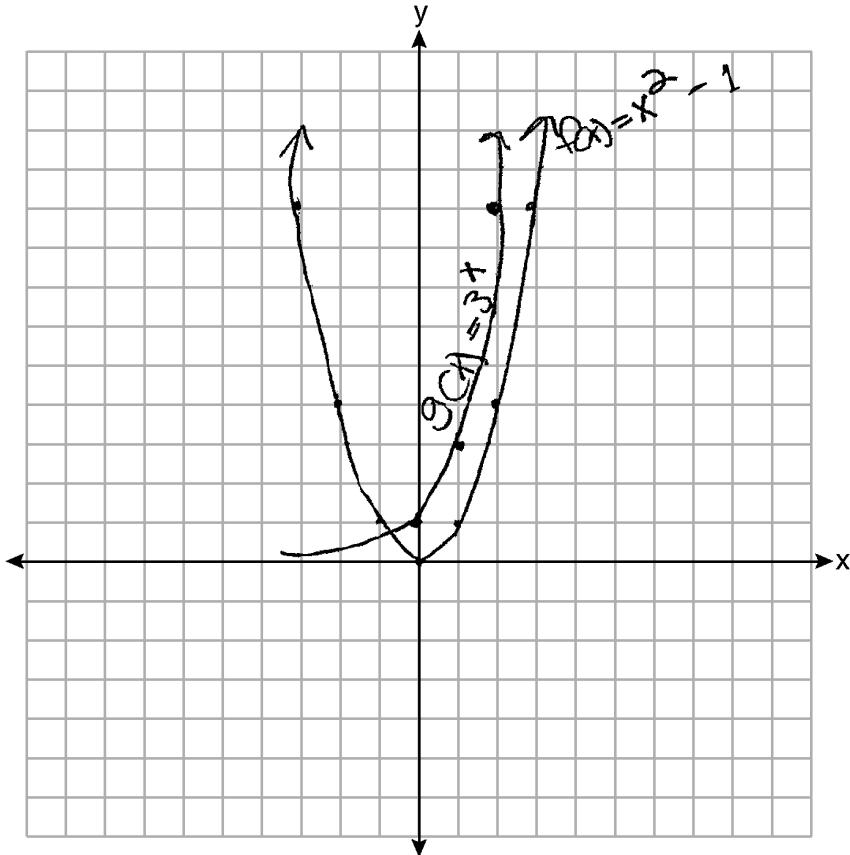
Based on your graph, for how many values of x does $f(x) = g(x)$? Explain your reasoning.

$$\left(1.2, .3\right)$$

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

34 On the set of axes below, graph $f(x) = x^2 - 1$ and $g(x) = 3^x$.

Based on your graph, for how many values of x does $f(x) = g(x)$? Explain your reasoning.

none, they cross but they Dont have a Pacific Point

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

35 An insurance agent is looking at records to determine if there is a relationship between a driver's age and percentage of accidents caused by speeding. The table below shows his data.

Age (x)	17	18	21	25	30	35	40	45	50	55	60	65
Percentage of Accidents Caused by Speeding (y)	49	49	48	38	31	33	24	25	16	10	5	6

State the linear regression equation that models the relationship between the driver's age, x, and the percentage of accidents caused by speeding, y. Round all values to the *nearest hundredth*.

$$y = ax + b$$

$$y = -0.96x + 64.74$$

State the value of the correlation coefficient to the *nearest hundredth*. Explain what this means in the context of the problem.

$r = -0.98$ The correlation coefficients means

there is a strong negative correlation. In the context of this problem it means that there is a strong relationship between the drivers age and accidents in that the younger you are the more likely you will experience an accident

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

35 An insurance agent is looking at records to determine if there is a relationship between a driver's age and percentage of accidents caused by speeding. The table below shows his data.

Age (x)	17	18	21	25	30	35	40	45	50	55	60	65
Percentage of Accidents Caused by Speeding (y)	49	49	48	38	31	33	24	25	16	10	5	6

State the linear regression equation that models the relationship between the driver's age, x, and the percentage of accidents caused by speeding, y. Round all values to the *nearest hundredth*.

$$-0.96x + 64.74 = y$$

State the value of the correlation coefficient to the *nearest hundredth*. Explain what this means in the context of the problem.

−0.98

This # signifies how well the data follows the same pattern. The highest that the correlation coefficient can go is 1 or −1. And from this number we can conclude that because it is so close to −1 the data points closely follow the trend pattern

Score 3: The student's explanation was not written in context.

35 An insurance agent is looking at records to determine if there is a relationship between a driver's age and percentage of accidents caused by speeding. The table below shows his data.

Age (x)	17	18	21	25	30	35	40	45	50	55	60	65
Percentage of Accidents Caused by Speeding (y)	49	49	48	38	31	33	24	25	16	10	5	6

State the linear regression equation that models the relationship between the driver's age, *x*, and the percentage of accidents caused by speeding, *y*. Round all values to the *nearest hundredth*.

$$y = ax + b$$

$$a = -.7628865979 \qquad a = -0.76$$
$$b = 55.6786941L \qquad b = -55.68$$
$$r = -.9115169471$$

State the value of the correlation coefficient to the *nearest hundredth*. Explain what this means in the context of the problem.

$$-0.91$$

The younger you are the better chance of you being in an accident

Score 3: The student made a data entry error, showed full calculator display, and gave an appropriate response based on the display.

35 An insurance agent is looking at records to determine if there is a relationship between a driver's age and percentage of accidents caused by speeding. The table below shows his data.

Age (x)	17	18	21	25	30	35	40	45	50	55	60	65
Percentage of Accidents Caused by Speeding (y)	49	49	48	38	31	33	24	25	16	10	5	6

State the linear regression equation that models the relationship between the driver's age, x, and the percentage of accidents caused by speeding, y. Round all values to the *nearest hundredth*.

$$y = -0.96x + 64.74$$
$$y = -0.96(17) + 64.74$$
$$y = 48.42$$

48.42% of accidents are caused by speeding.

State the value of the correlation coefficient to the *nearest hundredth*. Explain what this means in the context of the problem.

correlation coefficient = 0.96

This means that the accidents were most likely related to speeding

Score 2: The student only wrote the regression equation correctly.

35 An insurance agent is looking at records to determine if there is a relationship between a driver's age and percentage of accidents caused by speeding. The table below shows his data.

Age (x)	17	18	21	25	30	35	40	45	50	55	60	65
Percentage of Accidents Caused by Speeding (y)	49	49	48	38	31	33	24	25	16	10	5	6

State the linear regression equation that models the relationship between the driver's age, x, and the percentage of accidents caused by speeding, y. Round all values to the *nearest hundredth*.

$$y = ax + b$$
$$a = -.9606538681$$
$$b = 64.73845277$$
$$r = -.98456 44567$$

State the value of the correlation coefficient to the *nearest hundredth*. Explain what this means in the context of the problem.

$$r = -.985$$

Score 1: The student wrote an appropriate regression equation, but did not round correctly.

35 An insurance agent is looking at records to determine if there is a relationship between a driver's age and percentage of accidents caused by speeding. The table below shows his data.

Age (x)	17	18	21	25	30	35	40	45	50	55	60	65
Percentage of Accidents Caused by Speeding (y)	49	49	48	38	31	33	24	25	16	10	5	6

State the linear regression equation that models the relationship between the driver's age, *x*, and the percentage of accidents caused by speeding, *y*. Round all values to the *nearest hundredth*.

$$y = ax + b$$
$$y = 0.96x - 9.18$$

State the value of the correlation coefficient to the *nearest hundredth*. Explain what this means in the context of the problem.

$r = 0.99$ this means it will have a high correlation. It will be close to a straight line

Score 0: The student did not show enough correct work to receive any credit.
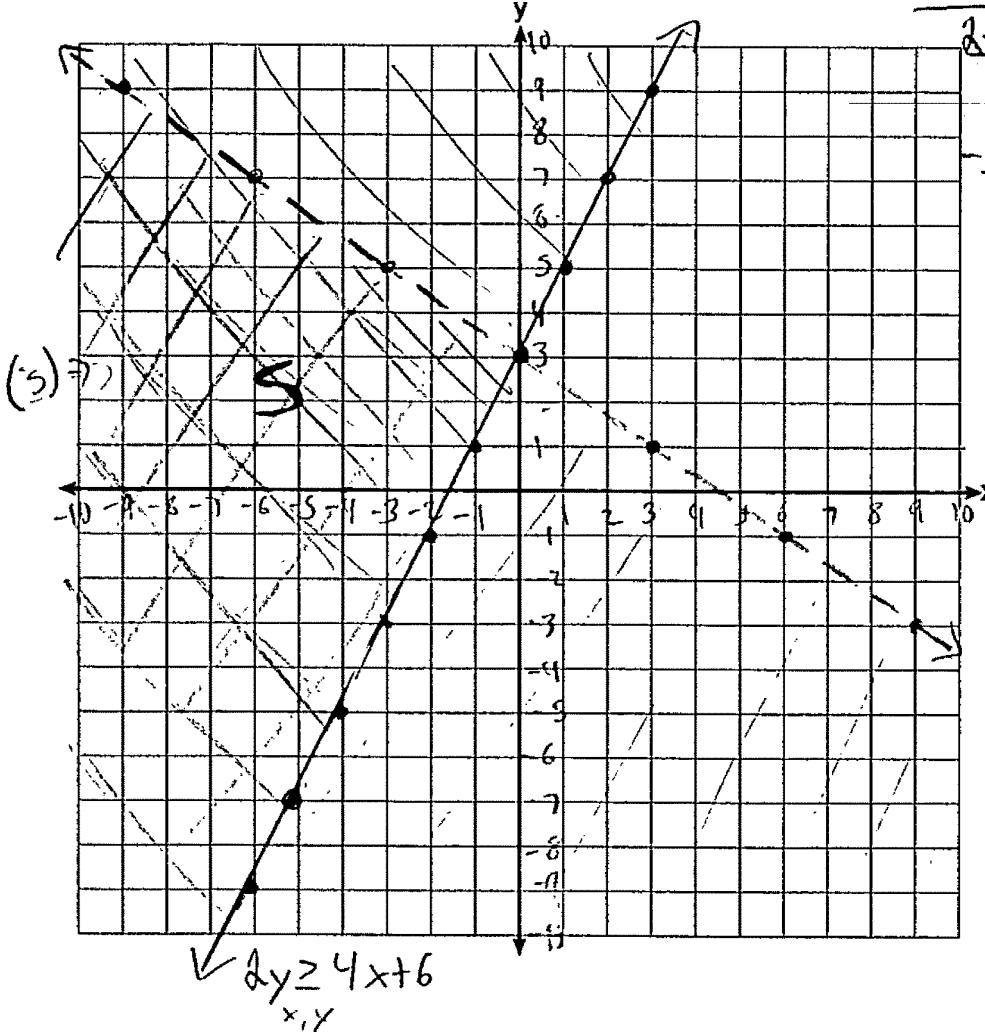
36 Solve the system of inequalities graphically on the set of axes below.
Label the solution set *S*.

$$2x + 3y < 9$$

$$2y \geq 4x + 6$$

$2x + 3y < 9$

$\underline{\quad -3y \quad -3y}$

$2x < 9 - 3y$

$\underline{-9 \quad\quad -9}$

$\dfrac{2x - 9}{-3} < \dfrac{-3y}{-3}$

$-\dfrac{2x}{3} + 3 > y$

$2y \geq 4x + 6$

$\Downarrow$

$\dfrac{2y}{2} \geq \dfrac{4x + 6}{2 \quad 2}$

$\boxed{y \geq 2x + 3}$

$\checkmark \; 2y \geq 4x + 6$
   x, y

Determine if the point (0,3) is a solution to this system of inequalities. Justify your answer.

$2(0) + 3(3) < 9 \qquad 2(3) \geq 4(0) + 6$

$\quad 0 + 9 < 9 \qquad\qquad 6 \geq 0 + 6$

$\qquad \boxed{9 < 9} \, \times \qquad\qquad \boxed{6 \geq 6} \checkmark$

$\left(\therefore \text{The point is not a solution to this system because } \atop 9 \text{ is not less than } 9. \right)$

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

36 Solve the system of inequalities graphically on the set of axes below. Label the solution set S.

$$2x + 3y < 9$$

$$2x + 3y < 9$$
$$\frac{-2x \quad\quad -2x}{}$$
$$\frac{3y}{3} < \frac{-2x}{3} + \frac{9}{3}$$
$$y_1 < \frac{-2x}{3} + 3$$

$$0 < 9$$
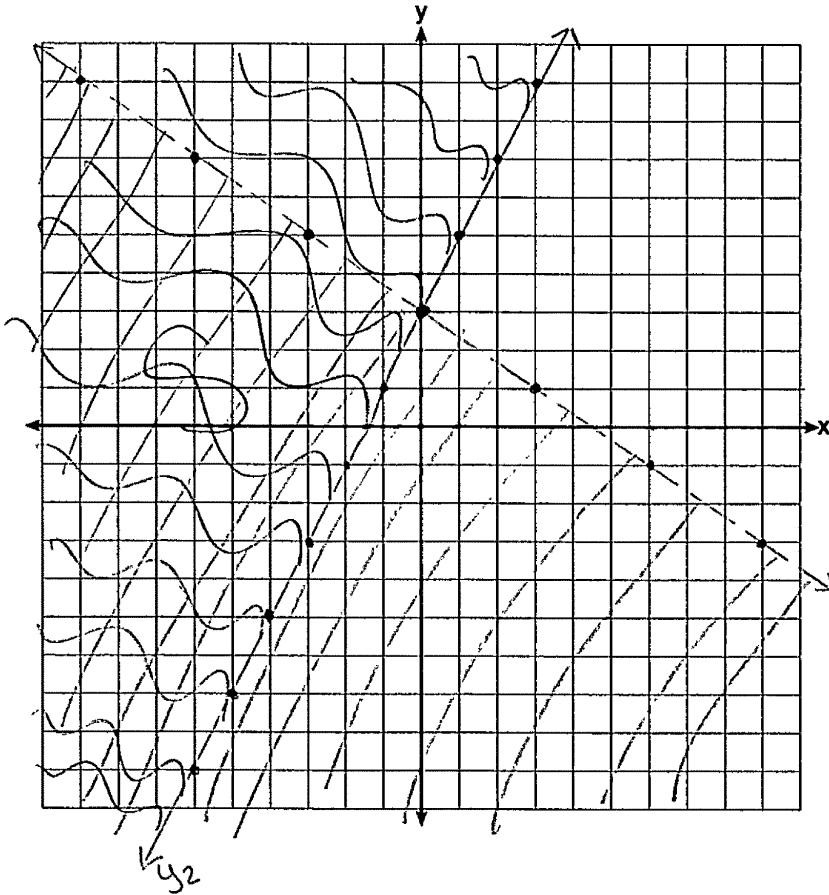
$$2y \geq 4x + 6$$
$$0 \geq 6 \; F$$

$$-4x + 2y \geq -6$$
$$\frac{+4x \quad\quad\quad +4x}{}$$
$$\frac{2y}{2} \geq \frac{4x}{2} + \frac{6}{2}$$
$$y_2 \geq 2x + 3$$

Determine if the point (0,3) is a solution to this system of inequalities. Justify your answer.

No, because at (0,3) one line is solid and the other is dashed.

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

36 Solve the system of inequalities graphically on the set of axes below. Label the solution set S.

$$2x + 3y < 9$$

$$2y \geq 4x + 6$$

(student work, handwritten)

$2x + 3y < 9$
$\quad -2x \quad\quad -2x$
$\dfrac{3y}{3} < \dfrac{-2x + 9}{3}$
$y < -\dfrac{2}{3}x + 3$

$\dfrac{2y}{2} \geq \dfrac{4x + 6}{2}$
$y \geq 2x + 3$
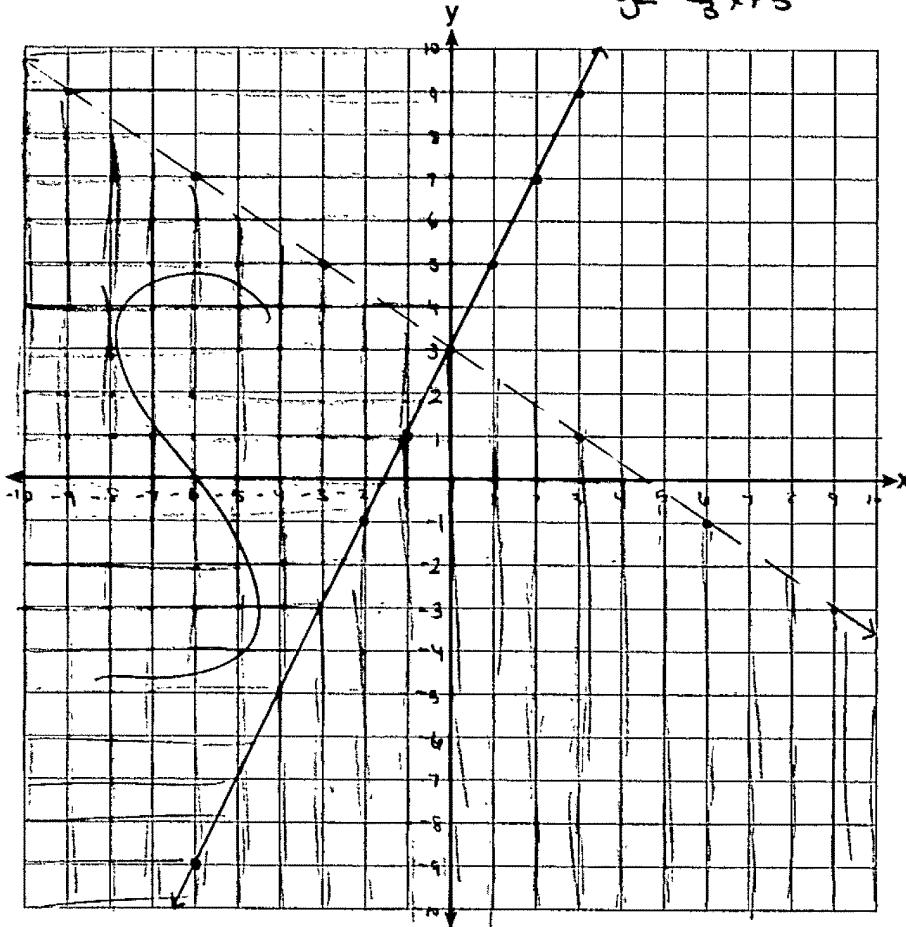
Determine if the point (0,3) is a solution to this system of inequalities. Justify your answer.

(0,3) is not a solution to this system of inequalities because it is on a line that is exclusive. This means that any point on this line is not considered a solution to the system of inequalities.

$2x + 3y < 9$
$2(0) + 3(3) < 9$
$2 + 9 < 9$
$11 < 9$ ✗ not a part of the solution set

Score 3: The student did not label at least one of the lines.

36 Solve the system of inequalities graphically on the set of axes below.
Label the solution set *S*.

$$2x + 3y < 9$$

$$2y \geq 4x + 6$$

down dash

$$\frac{2y}{2} \geq \frac{4x}{2} + \frac{6}{2}$$

up, solid, $y \geq \frac{4}{2}x + 3$

$$2x + 3y < 9$$
$$-2x \qquad -2x$$
$$\frac{3y}{3} < \frac{-2x}{3} + \frac{9}{3}$$

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

$$\downarrow$$
$$2x + 3y < 9$$

$$\leftarrow 2y \geq 4x + 6$$
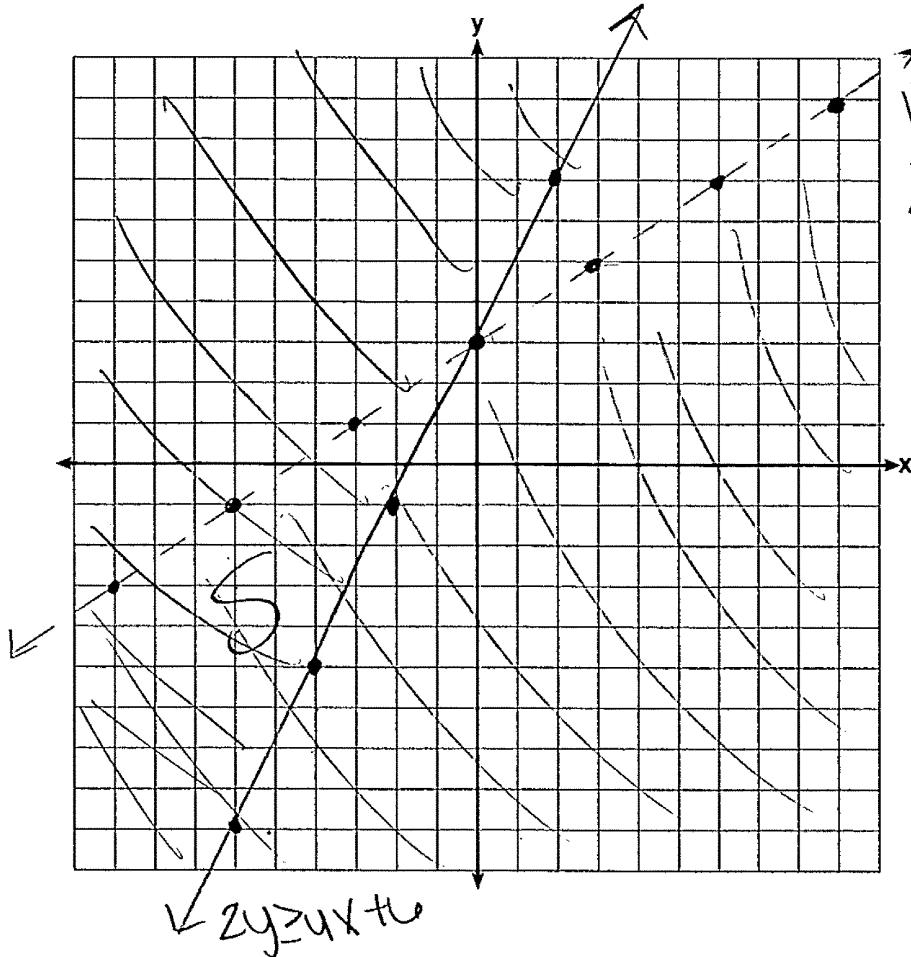
Determine if the point (0,3) is a solution to this system of inequalities. Justify your answer.

Yes its in the solution area
because its on a solid line

Score 2: The student graphed $2y > 4x + 6$ correctly and labeled their solution set with an *S*.
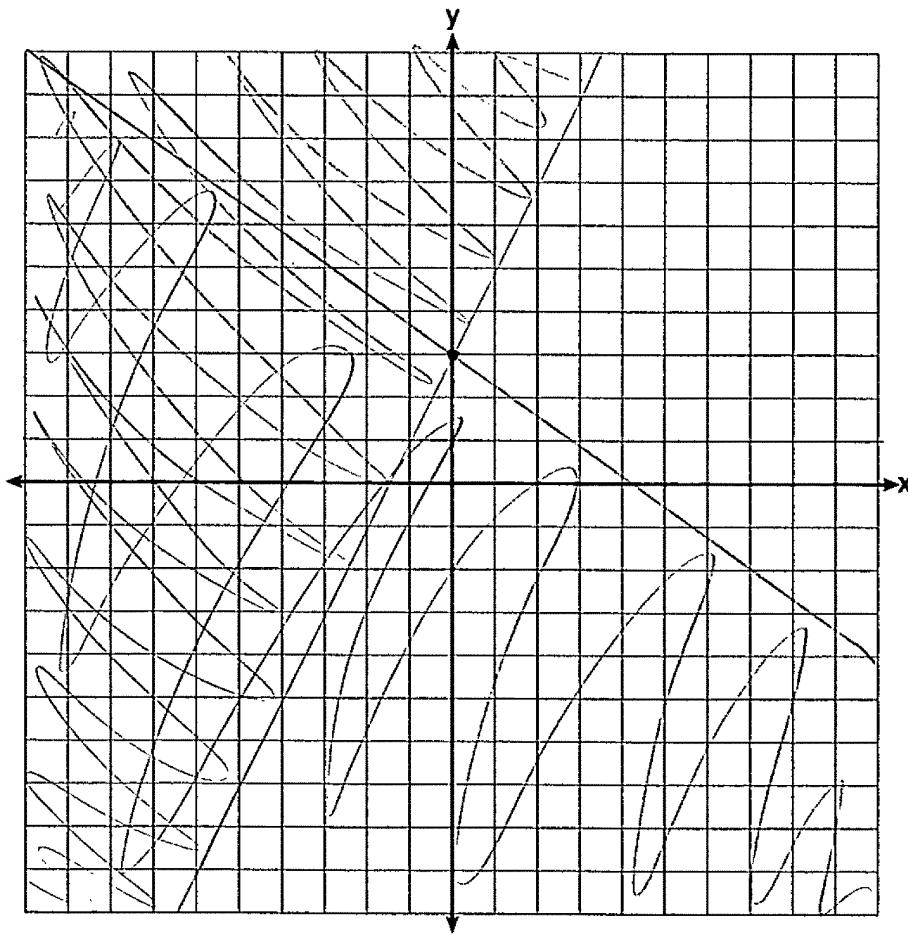
36 Solve the system of inequalities graphically on the set of axes below. Label the solution set S.

$$2x + 3y < 9 \qquad 3y < -2x + 9 \qquad y = \frac{-2}{3}x + 3$$

$$\frac{2y}{2} \geq \frac{4x + 6}{2} \qquad y \geq 2x + 3$$

Determine if the point $(0,3)$ is a solution to this system of inequalities. Justify your answer.

yes because if graphed its the intersection

Score 1: The student wrote an appropriate justification based on their graph.
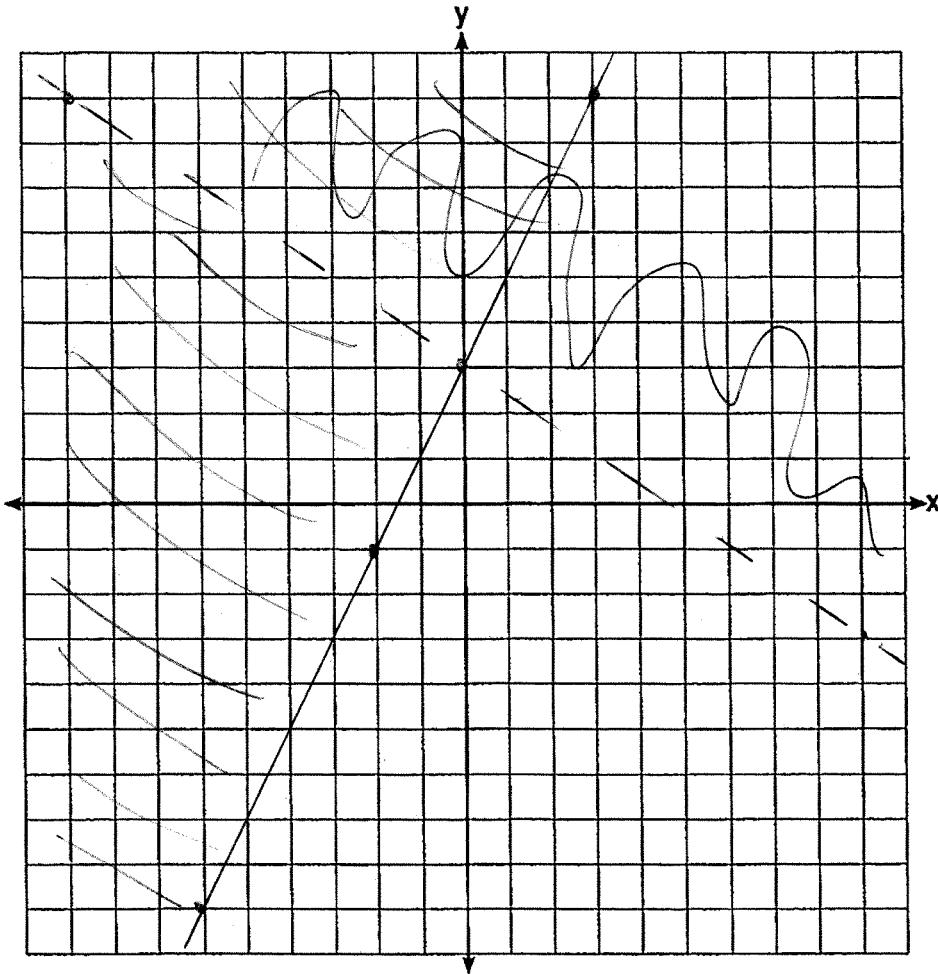
36 Solve the system of inequalities graphically on the set of axes below.
Label the solution set S.

$$2x + 3y < 9$$

$$2y \geq 4x + 6$$

Determine if the point $(0,3)$ is a solution to this system of inequalities. Justify your answer.

Yes, it's on both lines

**Score 0:** The student did not label either graph or the solution set and wrote an incorrect explanation.

37 At an amusement park, the cost for an adult admission is a, and for a child the cost is c. For a group of six that included two children, the cost was \$325.94. For a group of five that included three children, the cost was \$256.95. All ticket prices include tax.

Write a system of equations, in terms of a and c, that models this situation.

$$2c + 4a = 325.94$$
$$3c + 7a = 256.95$$

Use your system of equations to determine the exact cost of each type of ticket algebraically.

$2c + 4a = 325.94$

$-2(3c + 2a = 256.95)$

$-6c - 4a = -513.90$

$+ 2c + 4a = 325.94$

$-4c = -197.96$

-4

$c = 46.99$

$\boxed{\text{Children} = 46.99}$

$2(46.99) + 4a = 325.94$

$93.98 + 4a = 325.94$

-93.98

$4a = 231.96$

4

$a = 57.99$

$\boxed{\text{adults} = 57.99}$

Determine the cost for a group of four that includes three children.

$3c + a = x$

$3(46.99) + 57.99 = x$

$140.97 + 57.99 = x$

$\boxed{x = 198.96}$

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

37 At an amusement park, the cost for an adult admission is a, and for a child the cost is c. For a group of six that included two children, the cost was \$325.94. For a group of five that included three children, the cost was \$256.95. All ticket prices include tax.

Write a system of equations, in terms of a and c, that models this situation.

$$4a + 2c = 325.94$$
$$2a + 3c = 256.95$$

Use your system of equations to determine the exact cost of each type of ticket algebraically.

$$4a + 2c = 325.94$$
$$-4a - 5c = -513.90$$

$$\frac{-3c}{-3} = \frac{-187.96}{-3}$$

$$c = 62.65$$

$$4a + 2(62.65) = 325.94$$

$$4a + 125.30 = 325.94$$
$$ -125.30 \quad -125.30$$

$$\frac{4a}{4} = \frac{200.64}{4}$$

$$a = 50.16$$

Determine the cost for a group of four that includes three children.

$$
\begin{array}{r}
50.16 \\
62.65 \\
62.65 \\
62.65 \\
\hline
\$238.11
\end{array}
$$

Score 5: The student made an error when multiplying the second equation by 2. The value found for c was used appropriately in the rest of the problem.

37 At an amusement park, the cost for an adult admission is a, and for a child the cost is c. For a group of six that included two children, the cost was \$325.94. For a group of five that included three children, the cost was \$256.95. All ticket prices include tax.

Write a system of equations, in terms of a and c, that models this situation.

$$4a + 2c = 325.94$$

$$2a + 3c = 256.95$$

$a = 4 \qquad a = 2$

$c = 2 \qquad c = 3$

$325.94 \qquad 256.95$

Use your system of equations to determine the exact cost of each type of ticket algebraically.

$$4a + 2c = 325.94$$

$$-4a + -6c = -513.9$$

$$\dfrac{-4c}{-4} = \dfrac{-187.96}{-4}$$

$$c = 46.99$$

$$4a + 2(46.99) = 325.94$$

$$4a + 93.98 = 325.94$$

$$\ -93.98 \quad -93.98$$

$$4a = 230.96$$

$$A = 57.74$$

Determine the cost for a group of four that includes three children.

$$1a + 3c = ?$$

$$57.74 + 3(46.99) = 198.71$$

Score 5: The student determined $c = 46.99$ correctly and found an appropriate cost for a group of four based on an incorrect value for a.

37 At an amusement park, the cost for an adult admission is a, and for a child the cost is c. For a group of six that included two children, the cost was \$325.94. For a group of five that included three children, the cost was \$256.95. All ticket prices include tax.

Write a system of equations, in terms of a and c, that models this situation.

$$4a + 2c = 325.94$$
$$2a + 3c = 256.95$$

Use your system of equations to determine the exact cost of each type of ticket algebraically.

$$4a + 2c = 325.94$$
$$-4a \qquad\qquad -4a$$
$$\overline{}$$
$$2c = 325.94 - 4a$$
$$\dfrac{}{2}$$

$$\boxed{C = 162.97 - 2a}$$

$$C = 162.97 - 2(57.99)$$
$$162.97 - 115.98$$

$$\boxed{C = \$47.01}$$

$$2a + 3(162.97 - 2a) = 256.95$$
$$2a + 488.91 - 6a = 256.95$$
$$-4a + 488.91 = 256.95$$
$$\qquad -488.91 \qquad -488.91$$
$$\overline{}$$
$$\dfrac{-4a}{-4} = \dfrac{-231.96}{-4}$$

$$\boxed{a = \$57.99}$$

Determine the cost for a group of four that includes three children.

$$1a + 3c$$
$$57.99 + 3(47.01)$$
$$\boxed{\$199.02}$$

Score 5: The student made an error in finding the cost of a child's ticket.

37 At an amusement park, the cost for an adult admission is a, and for a child the cost is c. For a group of six that included two children, the cost was \$325.94. For a group of five that included three children, the cost was \$256.95. All ticket prices include tax.

Write a system of equations, in terms of a and c, that models this situation.

$$4a + 2c = 325.94$$
$$2a + 3c = 256.95$$

Use your system of equations to determine the exact cost of each type of ticket algebraically.

$$4a + 2c = 325.94$$
$$-2(2a + 3c) = 256.95)$$

$$4a + 2c = 325.94$$
$$-4a - 6c = -513.90$$

$$-4c = -187.96$$
$$\underline{-4} \qquad \underline{-4}$$
$$\boxed{c = \$46.99}$$

Determine the cost for a group of four that includes three children.

Score 4: The student found $c = 46.99$ correctly.

37 At an amusement park, the cost for an adult admission is a, and for a child the cost is c. For a group of six that included two children, the cost was $325.94. For a group of five that included three children, the cost was $256.95. All ticket prices include tax.

Write a system of equations, in terms of a and c, that models this situation.

$$4a + 2c = 325.94$$
$$2a + 3c = 256.95$$

Use your system of equations to determine the exact cost of each type of ticket algebraically.

$$2 \left(\begin{array}{l} 4a + 2c = 325.94 \\ 2a + 3c = 256.95 \end{array} \right)$$

$$\begin{array}{r} 4a + 2c = 325.94 \\ - \quad 4a + 6c = 513.90 \\ \hline 8c = -187.96 \\ c = 23.50 \end{array}$$

$$2a + 3(23.50) = 256.95$$
$$2a + 70.50 = 256.95$$
$$2a = 185.50$$
$$a = 92.75$$

Determine the cost for a group of four that includes three children.

$$3c + 1a$$

$$3(23.50) + 92.75$$
$$70.50 + 92.75$$
$$163.25$$

Score 3: The student wrote a correct system of equations and found an appropriate cost for a group of four based on incorrect values for a and c.

37 At an amusement park, the cost for an adult admission is a, and for a child the cost is c. For a group of six that included two children, the cost was \$325.94. For a group of five that included three children, the cost was \$256.95. All ticket prices include tax.

Write a system of equations, in terms of a and c, that models this situation.

6

$$2A + 3C = 256.95$$
$$4A + 2C = 325.94$$

Use your system of equations to determine the exact cost of each type of ticket algebraically.

30   6.99   48.99
30

2   3

4   2 $A = 30$
              $C = 8.99$

Determine the cost for a group of four that includes three children.

$$4 \times 30 = 120 \longrightarrow 146.97$$
$$8.99 \times 3 = 26.97$$

37 At an amusement park, the cost for an adult admission is a, and for a child the cost is c. For a group of six that included two children, the cost was \$325.94. For a group of five that included three children, the cost was \$256.95. All ticket prices include tax.

Write a system of equations, in terms of a and c, that models this situation.

Use your system of equations to determine the exact cost of each type of ticket algebraically.

$$a = 55.50 \qquad c = 43.75$$

Determine the cost for a group of four that includes three children.

$$a + 3c$$
$$55.50 + 3(43.75)$$
$$55.50 + 131.25$$
$$186.75$$

Score 1: The student found an appropriate cost for the group of four based on values they wrote for both a and c.

37 At an amusement park, the cost for an adult admission is a, and for a child the cost is c. For a group of six that included two children, the cost was \$325.94. For a group of five that included three children, the cost was \$256.95. All ticket prices include tax.

Write a system of equations, in terms of a and c, that models this situation.

$$6g + 2c \leq 325.94$$

$$5g + 3c \leq 256.95$$

Use your system of equations to determine the exact cost of each type of ticket algebraically.

$$5(6g + 2c \leq 325.94)$$
$$-6(5g + 3c \leq 256.95)$$

$$30g + 10c \leq 1629.7$$
$$-30g - 18c \leq -1541.7$$

$$\frac{8c \leq 3171.4}{8}$$

$$c \leq 396.425$$

$$5g + 3(396.125) \leq 256.9$$

$$5g + 1189.275 \leq 256.9$$
$$-1189.275 \quad -1189.2$$

$$\frac{5g \leq 138.675}{5} \quad \frac{}{5}$$

$$g \leq 27.735$$

Determine the cost for a group of four that includes three children.

$$4g + 3c$$

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