The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I

Wednesday, January 22, 2020 — 1:15 to 4:15 p.m.

MODEL RESPONSE SET

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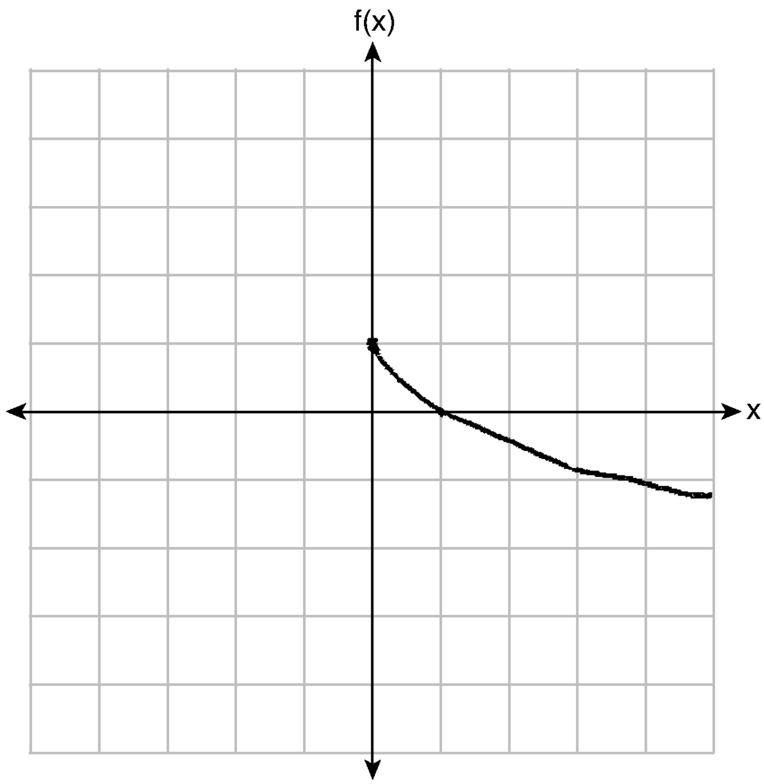
Question 25

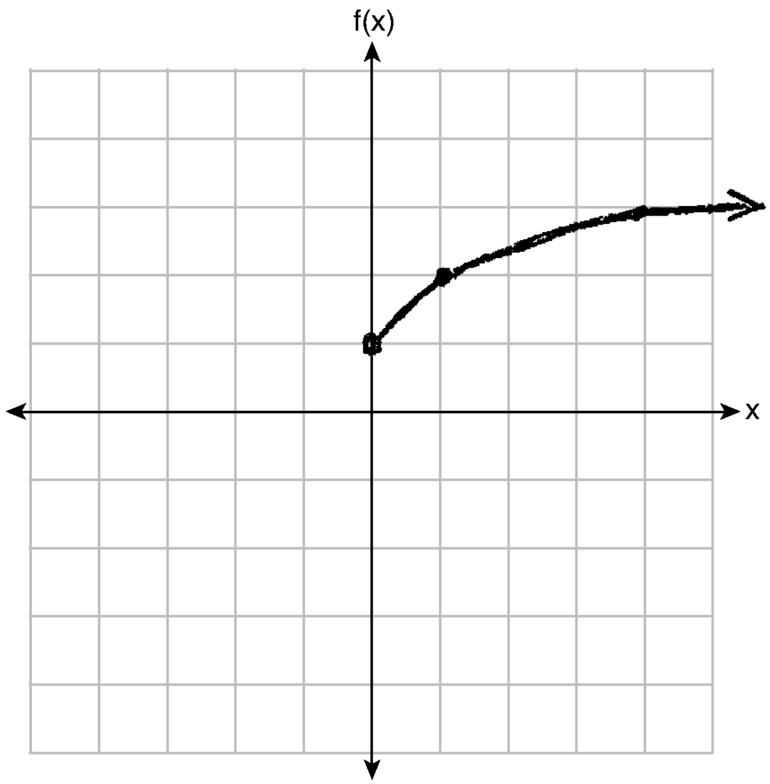
25 Graph $f(x) = -\sqrt{x} + 1$ on the set of axes below.



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

Question 25

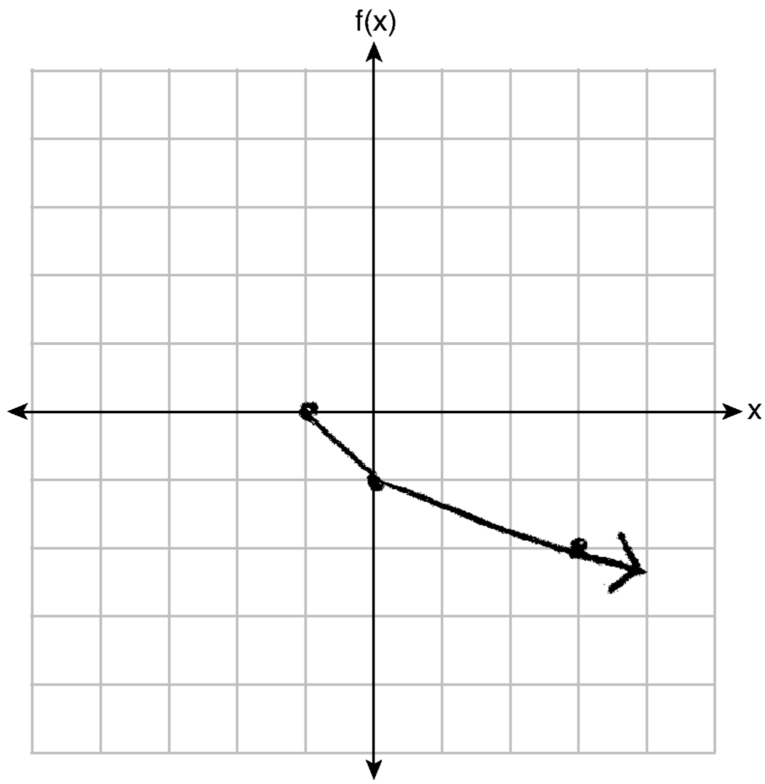
25 Graph $f(x) = -\sqrt{x} + 1$ on the set of axes below.



Score 1: The student graphed $f(x) = \sqrt{x} + 1$.

25 Graph $f(x) = -\sqrt{x} + 1$ on the set of axes below.

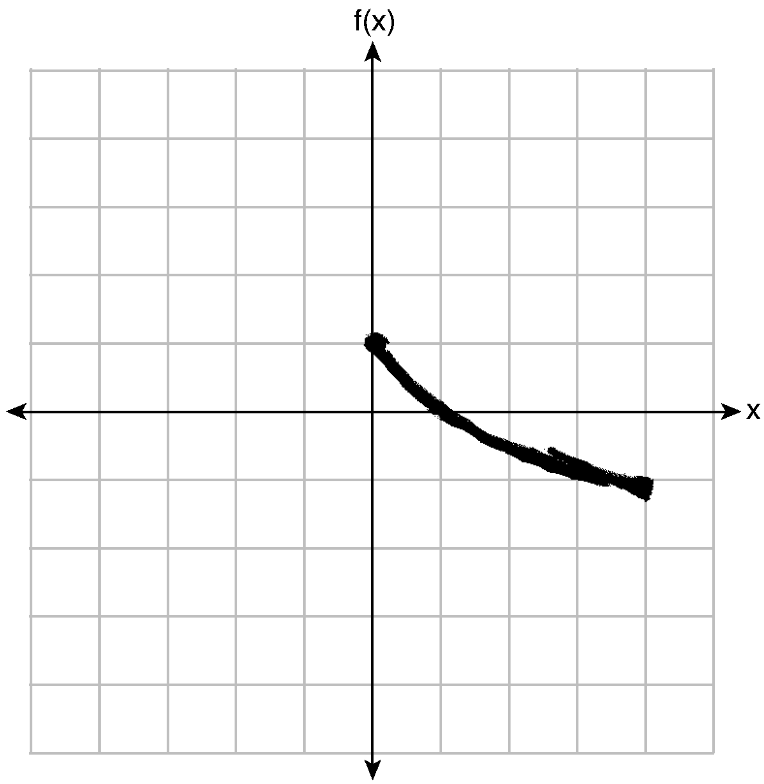
X	Y
-1	0
0	-1
3	-2
8	-3



Score 1: The student graphed $f(x) = -\sqrt{x+1}$.

Question 25

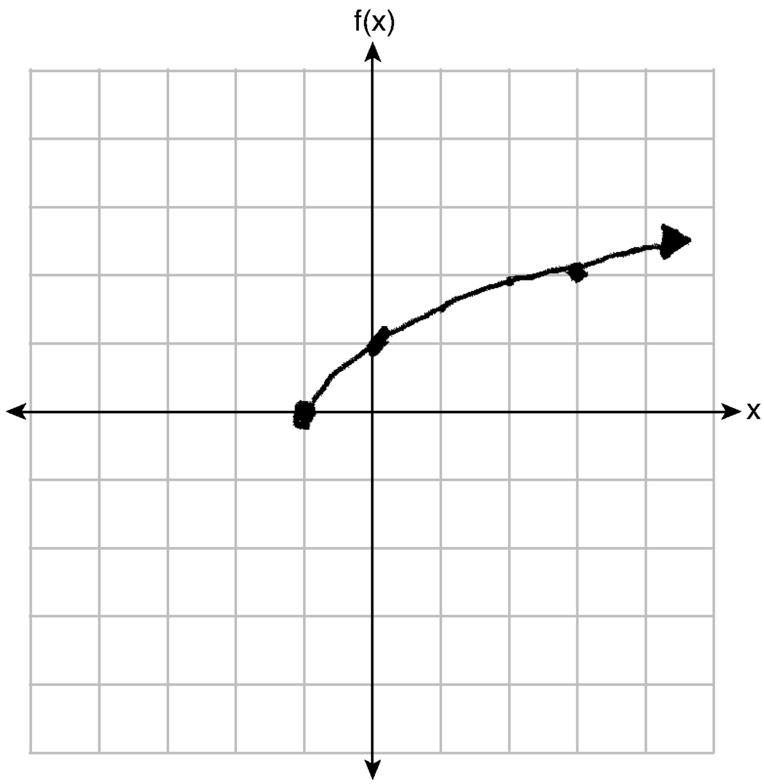
25 Graph $f(x) = -\sqrt{x} + 1$ on the set of axes below.



Score 1: The student only graphed $f(x) = -\sqrt{x} + 1$ over the interval $0 \le x \le 4$.

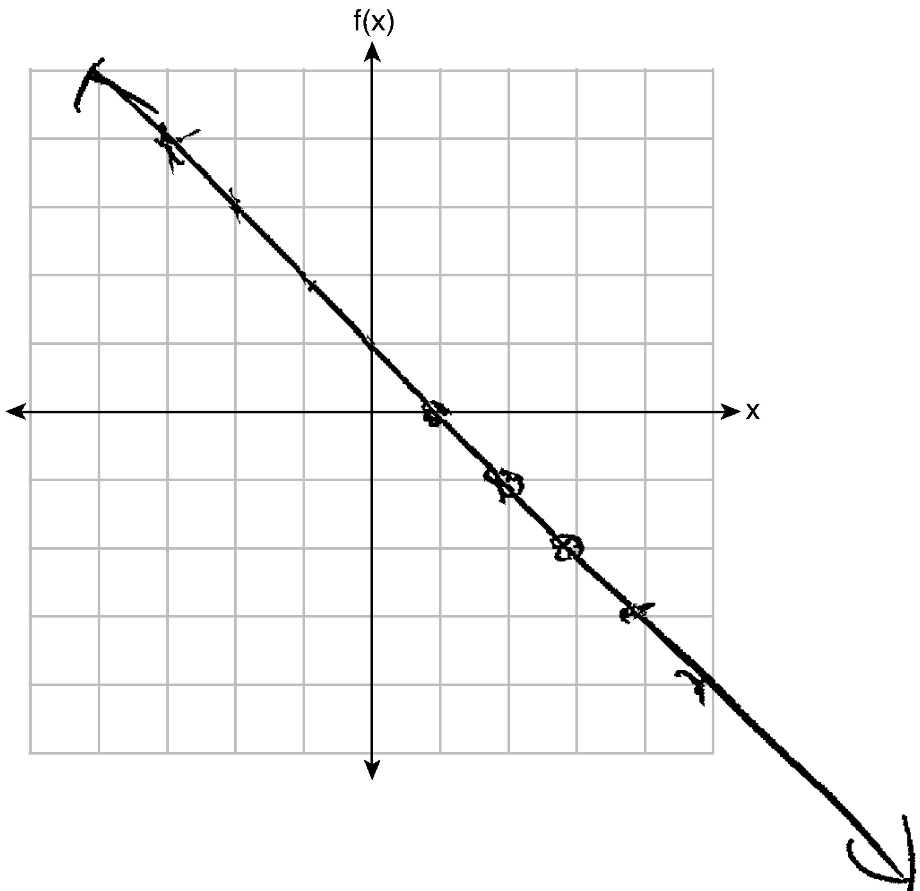
Question 25

25 Graph $f(x) = -\sqrt{x} + 1$ on the set of axes below.



Score 0: The student made two errors by graphing $f(x) = \sqrt{x+1}$.

25 Graph $f(x) = -\sqrt{x} + 1$ on the set of axes below.



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

26 Maria orders T-shirts for her volleyball camp. Adult-sized T-shirts cost \$6.25 each and youth-sized T-shirts cost \$4.50 each. Maria has \$550 to purchase both adult-sized and youth-sized T-shirts. If she purchases 45 youth-sized T-shirts, determine algebraically the maximum number of adult-sized T-shirts she can purchase.

Adult size = x
Youth size = y

$6.25x + 4.50y \leq 550$

$6.25x + 4.50(45) \leq 550$

$6.25x + 202.5 \leq 550$

$-202.5 \quad -202.5$

$\frac{6.25x}{6.25} \leq \frac{347.50}{6.25}$

$x \leq 55.6$

The maximum # of Adult size tshirts maria can order is 55.

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

Question 26

26 Maria orders T-shirts for her volleyball camp. Adult-sized T-shirts cost \$6.25 each and youth-sized T-shirts cost \$4.50 each. Maria has \$550 to purchase both adult-sized and youth-sized T-shirts. If she purchases 45 youth-sized T-shirts, determine algebraically the maximum number of adult-sized T-shirts she can purchase.

$$45(4.50) + x(6.25) = 550$$
$$202.50 + 6.25x = 550$$
$$6.25x = 347.50$$
$$x = 55.6$$

Score 1: The student wrote a correct equation, but did not state the correct number of adult T-shirts.

Question 26

26 Maria orders T-shirts for her volleyball camp. Adult-sized T-shirts cost $6.25 each and youth-sized T-shirts cost $4.50 each. Maria has $550 to purchase both adult-sized and youth-sized T-shirts. If she purchases 45 youth-sized T-shirts, determine algebraically the maximum number of adult-sized T-shirts she can purchase.

adult
$6.25 youth
$4.50

$550 total

550.00
− 202.50
347.50
÷ 6.25
55.6

45
×4.50
202.50

Maria will be able to order 55 adult t-shirst

Score 1: The student used a method other than algebraic to get 55.

26 Maria orders T-shirts for her volleyball camp. Adult-sized T-shirts cost \$6.25 each and youth-sized T-shirts cost \$4.50 each. Maria has \$550 to purchase both adult-sized and youth-sized T-shirts. If she purchases 45 youth-sized T-shirts, determine algebraically the maximum number of adult-sized T-shirts she can purchase.

Adult	Youth	Total	Ordered
6.25	4.50	550	45 youth

$45 \times 4.50 = 202.50$

$550 - 202.50 = 297.50$

$297.50 \div 6.25 = 47.6$

Maria can order 47 adult shirts

Score 0: The student made a computational error and solved the problem arithmetically.

Question 27

27 A news report suggested that an adult should drink a minimum of 4 pints of water per day. Based on this report, determine the *minimum* amount of water an adult should drink, in fluid ounces, per week.

16 ounces per pint

16 ounces
x 4 pints
64 ounces

64 ounces
x 7 days
448 ounces

The minimum mumber of ounces per week is 448 ounces

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

Question 27

27 A news report suggested that an adult should drink a minimum of 4 pints of water per day. Based on this report, determine the *minimum* amount of water an adult should drink, in fluid ounces, per week.

$$\frac{4 \text{ pints}}{1 \text{ day}} \times \frac{7 \text{ days}}{1 \text{ week}} \times \frac{2 \text{ cups}}{1 \text{ pint}} \times \frac{8 \text{ fl oz}}{1 \text{ cup}} = \boxed{\frac{448 \text{ oz}}{1 \text{ week}}}$$

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

Question 27

27 A news report suggested that an adult should drink a minimum of 4 pints of water per day. Based on this report, determine the *minimum* amount of water an adult should drink, in fluid ounces, per week.

$$\frac{4 \text{ p}\cancel{\text{ints}}}{1\ \cancel{\text{day}}} = \frac{7\ \cancel{\text{days}}}{1 \text{ week}} = \frac{64 \text{ ounces}}{4\ \cancel{\text{pints}}}$$

$$\frac{4 \cdot 7 \cdot 64}{4}$$

Score 1: The student made an error by writing equal signs between the fractions, but gave a solution equivalent to 448.

Question 27

27 A news report suggested that an adult should drink a minimum of 4 pints of water per day. Based on this report, determine the *minimum* amount of water an adult should drink, in fluid ounces, per week.

$$\frac{4 \text{ pints}}{1 \text{ day}} \cdot \frac{7 \text{ days}}{1 \text{ week}} = \frac{28 \text{ pints}}{1 \text{ week}}$$

$$\frac{28 \text{ pints}}{1 \text{ week}} \cdot \frac{2 \text{ cups}}{1 \text{ pint}}$$

$$\frac{56 \text{ cups}}{\text{week}}$$

Score 1: The student did not convert 56 cups to 448 ounces.

27 A news report suggested that an adult should drink a minimum of 4 pints of water per day. Based on this report, determine the *minimum* amount of water an adult should drink, in fluid ounces, per week.

4 pints = 16 cups

16 x 8 = 128 fluid ounces

1 cup = 8 ounces

Score 0: The student made an error converting pints to cups and did not determine the number of fluid ounces per week.

Question 28

28 Express $(3x - 4)(x + 7) - \frac{1}{4}x^2$ as a trinomial in standard form.

$\cancel{3x^2} + 21x - 4x - 28 \cancel{-\frac{1}{4}x^2}$

$2.75x^2 + 17x - 28$

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

Question 28

28 Express $(3x - 4)(x + 7) - \frac{1}{4}x^2$ as a trinomial in standard form.

$3x^2 + 21x - 4x - 28$

$\boxed{(3x^2 + 17x - 28) - \frac{1}{4}x^2}$

Score 1: The student did not write their answer as a trinomial.

Question 28

28 Express $(3x - 4)(x + 7) - \frac{1}{4}x^2$ as a trinomial in standard form.

$(3x-4)(x+7)-\frac{1}{4}x^2$

$3x^2+21x-4x-28-\frac{1}{4}x^2$

$17x+3x^2-28-\frac{1}{4}x^2$

$-28+17x+2.75x^2$

Score 1: The student did not write the trinomial in standard form.

Question 28

28 Express $(3x - 4)(x + 7) - \frac{1}{4}x^2$ as a trinomial in standard form.

$3x^2 + 21 - 4x - 28 - 1/4x^2$

$\boxed{2.75x^2 - 7 - 4x}$

Score 0: The student made an error when multiplying $3x$ and 7 and did not express their answer in standard form.

Question 29

29 John was given the equation $4(2a + 3) = -3(a - 1) + 31 - 11a$ to solve. Some of the steps and their reasons have already been completed. State a property of numbers for each missing reason.

$4(2a + 3) = -3(a - 1) + 31 - 11a$	Given
$8a + 12 = -3a + 3 + 31 - 11a$	Distrubution
$8a + 12 = 34 - 14a$	Combining like terms
$22a + 12 = 34$	Addition

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

Question 29

29 John was given the equation $4(2a + 3) = -3(a - 1) + 31 - 11a$ to solve. Some of the steps and their reasons have already been completed. State a property of numbers for each missing reason.

$4(2a + 3) = -3(a - 1) + 31 - 11a$	Given
$8a + 12 = -3a + 3 + 31 - 11a$	Distribution
$8a + 12 = 34 - 14a$	Combining like terms
$+14a \quad\quad +14a$	
$22a + 12 = 34$	Equally adding to both sides

$$4(2a+3) = -3(a-1) + 31 - 11a$$

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

Question 29

29 John was given the equation $4(2a + 3) = -3(a - 1) + 31 - 11a$ to solve. Some of the steps and their reasons have already been completed. State a property of numbers for each missing reason.

$4(2a + 3) = -3(a - 1) + 31 - 11a$	Given
$8a + 12 = -3a + 3 + 31 - 11a$	Distribution
$8a + 12 = 34 - 14a$	Combining like terms
$22a + 12 = 34$	Zero Property of Addition.

Score 1: The student wrote one property correctly.

Question 29

29 John was given the equation $4(2a + 3) = -3(a - 1) + 31 - 11a$ to solve. Some of the steps and their reasons have already been completed. State a property of numbers for each missing reason.

$4(2a + 3) = -3(a - 1) + 31 - 11a$	Given
$8a + 12 = -3a + 3 + 31 - 11a$	solve parenthsis
$8a + 12 = 34 - 14a$	Combining like terms
$22a + 12 = 34$	moving to one side of the =

Score 0: The student wrote both properties incorrectly.

Question 30

30 State whether the product of $\sqrt{3}$ and $\sqrt{9}$ is rational or irrational. Explain your answer.

multiply

$\sqrt{3} = 1.732050808$

$\sqrt{9} = 3$

$\sqrt{3} \cdot 3 = 5.196152423$

Cannot be put into fraction

The product of $\sqrt{3}$ and $\sqrt{9}$ is irrational because when you multiply them you get the number 5.196152423 which cannot be put into a fraction.

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

Question 30

30 State whether the product of $\overset{I}{\sqrt{3}}$ and $\overset{R}{\sqrt{9}}$ is rational or irrational. Explain your answer.

IRRATIONAL because $I \cdot R = I$

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

Question 30

30 State whether the product of $\sqrt{3}$ and $\sqrt{9}$ is rational or irrational. Explain your answer.

$\sqrt{3} = 1.732080808$

$\sqrt{9} = 3$

$\sqrt{3}$ is irrational because it has decimals that do not repeat or stop.

$\sqrt{9}$ is rational because its answer is 3 and 3 is a whole number.

Score 1: The student correctly classified and explained both $\sqrt{3}$ and $\sqrt{9}$, but did not address their product.

Question 30

30 State whether the product of $\sqrt{3}$ and $\sqrt{9}$ is rational or irrational. Explain your answer.

$\sqrt{3}$ is irrational because it goes on forever. $\sqrt{9}$ is rational because it stops and has an exact amount.

Score 0: The student wrote an incomplete explanation for $\sqrt{3}$ and did not address the product of $\sqrt{3}$ and $\sqrt{9}$.

Question 30

30 State whether the product of $\sqrt{3}$ and $\sqrt{9}$ is rational or irrational. Explain your answer.

$\sqrt{3} \cdot \sqrt{9}$

Irrational

Score 0: The student did not explain why the product is irrational.

Question 31

31 Use the method of completing the square to determine the exact values of x for the equation $x^2 - 8x + 6 = 0$.

$\left(\frac{-8}{2}\right)^2$

$-6 \quad -6$

$x^2 - 8x + \underline{16} = -6 + \underline{16}$

$x^2 - 8x + 16 = 10$

$(x-4)^2 = 10$

$x = 4 \pm \sqrt{10}$

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

Question 31

31 Use the method of completing the square to determine the exact values of x for the equation $x^2 - 8x + 6 = 0$.

$$x^2 - 8x + 6 = 0$$

$$x = \frac{8 \pm \sqrt{(-8)^2 - 4(1)(6)}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{40}}{2} \nearrow \frac{8 + \sqrt{40}}{2}$$

$$\searrow \frac{8 - \sqrt{40}}{2}$$

Score 1: The student used a method other than completing the square to determine $\frac{8 \pm \sqrt{40}}{2}$, which is an equivalent answer.

Question 31

31 Use the method of completing the square to determine the exact values of x for the equation $x^2 - 8x + 6 = 0$.

$$\cancel{x^2 - \underset{2}{8x} + 6 = 0}$$
$$\cancel{x^2 - 8x - 4 = 6 - 4}$$
$$\cancel{(x \quad)^2 = 2}$$

$$x^2 - \underset{2}{8x} + 6 \cancel{= 0}$$
$$x^2 - 8x - 16 = 6 - 16$$
$$\sqrt{(x-4)^2} = \sqrt{-10}$$
$$x - 4 = \pm\sqrt{10}$$

Score 0: The student made multiple errors.

31 Use the method of completing the square to determine the exact values of x for the equation $x^2 - 8x + 6 = 0$.

$a = 1$

$b = -8$

$c = 6$

$$x = \frac{--8 \pm \sqrt{(-8)^2 - 4(1)(6)}}{2(1)}$$

$$x = \frac{8 \pm \sqrt{40}}{2}$$

7.16227766

0.83772233398

Score 0: The student used the quadratic formula and expressed answers as decimals.

Question 32

32 A formula for determining the finite sum, S, of an arithmetic sequence of numbers is $S = \frac{n}{2}(a + b)$, where n is the number of terms, a is the first term, and b is the last term. Express b in terms of a, S, and n.

$$2S = n(a+b)$$

$$\frac{2S}{n} = a+b$$

$$\frac{2S}{n} - a = b$$

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

Question 32

32 A formula for determining the finite sum, S, of an arithmetic sequence of numbers is $S = \frac{n}{2}(a + b)$, where n is the number of terms, a is the first term, and b is the last term. Express b in terms of a, S, and n.

$$\left(\tfrac{2}{n}\right)S = \cancel{\tfrac{n}{2}}(a+b)\left(\cancel{\tfrac{2}{n}}\right)$$

$$\tfrac{2}{n}S = \cancel{a}+b$$

$$-a \qquad \cancel{-a}$$

$$S\left(\tfrac{2}{n}\right) - a = b$$

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

32 A formula for determining the finite sum, S, of an arithmetic sequence of numbers is $S = \frac{n}{2}(a + b)$, where n is the number of terms, a is the first term, and b is the last term. Express b in terms of a, S, and n.

$\frac{2}{n} \cdot \quad \frac{2}{n} \cdot$

$S = \frac{n}{2}(a + b)$

$\frac{n}{2} S = a + b$

$-a \qquad -a$

$\frac{n}{2} S - a = b$

Score 1: The student made a transcription error when going from the first to the second line.

32 A formula for determining the finite sum, S, of an arithmetic sequence of numbers is $S = \frac{n}{2}(a + b)$, where n is the number of terms, a is the first term, and b is the last term. Express b in terms of a, S, and n.

$S = \frac{n}{2}(a+b)$

$a+S = \frac{n}{2}(b)$

$2a+2S = n(b)$

$2a+2S = bn$

$2a = bn-2S$

$a = \frac{bn-2S}{2}$

In terms of S the equation stays the same $S = \frac{n}{2}(a+b)$

$S = \frac{n}{2}(a+b)$

$\frac{S}{n} = 2(a+b)$

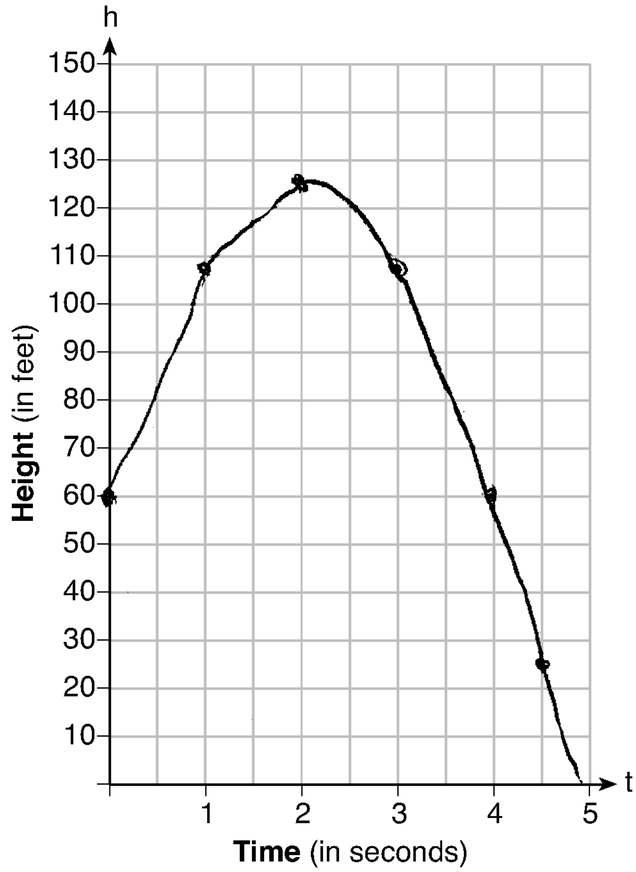
$\frac{S}{n} = 2a+2b$

$n = 2aS+2bS$

Score 0: The student made multiple errors.

Question 33

33 Michael threw a ball into the air from the top of a building. The height of the ball, in feet, is modeled by the equation $h = -16t^2 + 64t + 60$, where t is the elapsed time, in seconds. Graph this equation on the set of axes below.



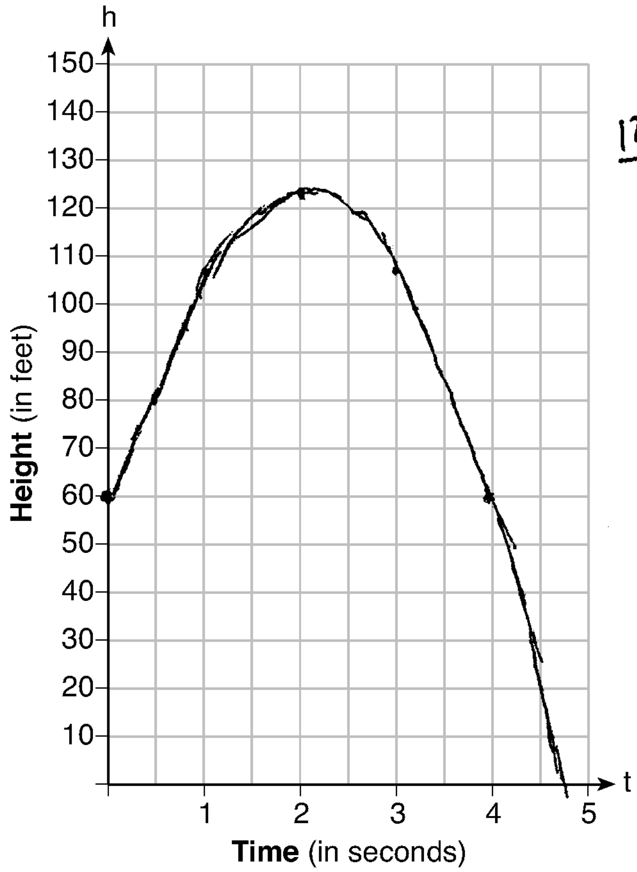
Determine the average rate of change, in feet per second, from when Michael released the ball to when the ball reached its maximum height.

$$\frac{124-60}{2-0} = \frac{64}{2} = 32 \text{ ft/sec}$$

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

Question 33

33 Michael threw a ball into the air from the top of a building. The height of the ball, in feet, is modeled by the equation $h = -16t^2 + 64t + 60$, where t is the elapsed time, in seconds. Graph this equation on the set of axes below.



$\frac{124-60}{2-0}$

$\frac{64}{2} = 32$

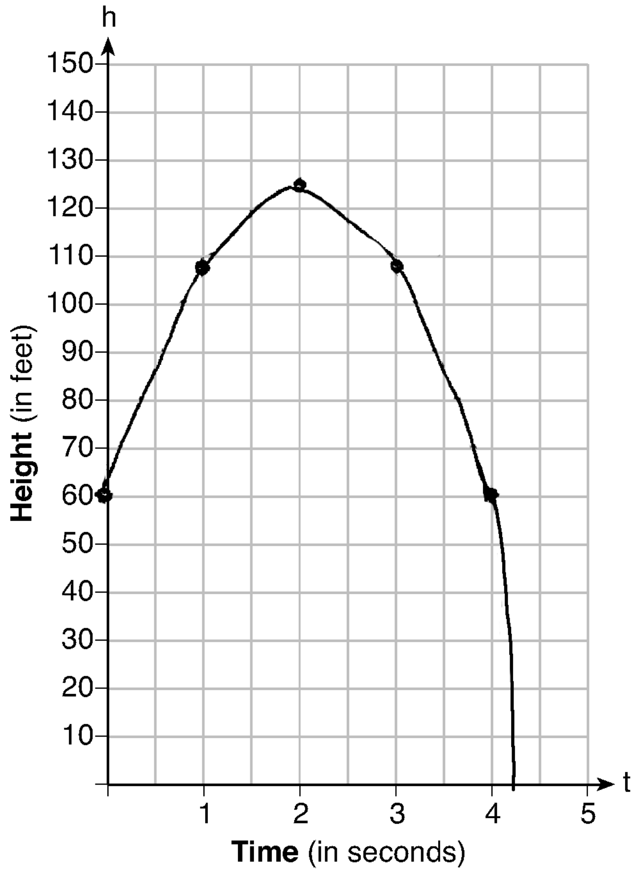
Determine the average rate of change, in feet per second, from when Michael released the ball to when the ball reached its maximum height.

32ft/sec

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

Question 33

33 Michael threw a ball into the air from the top of a building. The height of the ball, in feet, is modeled by the equation $h = -16t^2 + 64t + 60$, where t is the elapsed time, in seconds. Graph this equation on the set of axes below.



t	h
0	60
1	108
2	124
3	108
4	60

Determine the average rate of change, in feet per second, from when Michael released the ball to when the ball reached its maximum height.

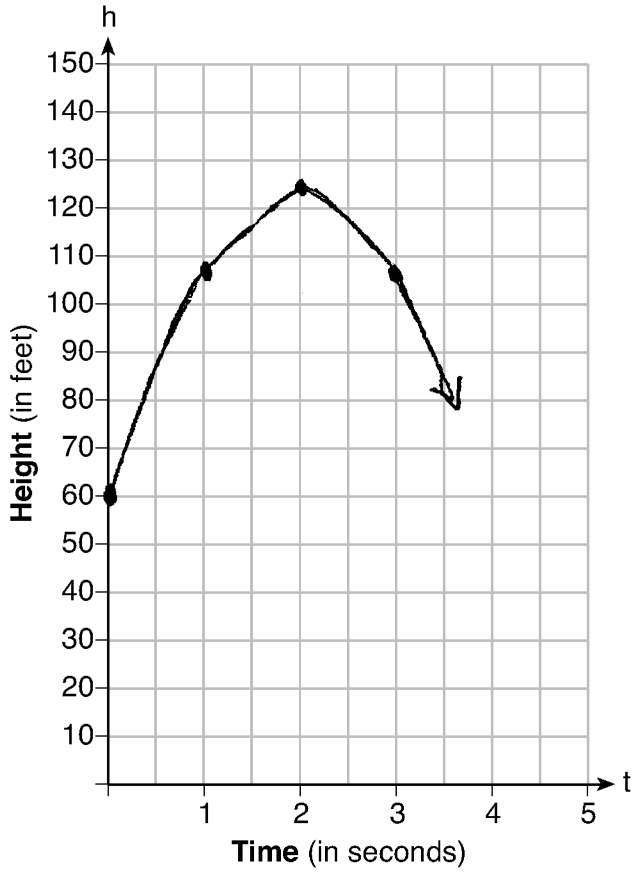
A FA B FB

(0, 60) (2, 124)

$$\frac{124 - 60\text{ft}}{2 - 0\text{sec}} = \frac{64}{2} = \boxed{32 \text{ Ft/sec}}$$

Score 3: The student made an error when graphing points on the parabola past the point (4,60).

33 Michael threw a ball into the air from the top of a building. The height of the ball, in feet, is modeled by the equation $h = -16t^2 + 64t + 60$, where t is the elapsed time, in seconds. Graph this equation on the set of axes below.



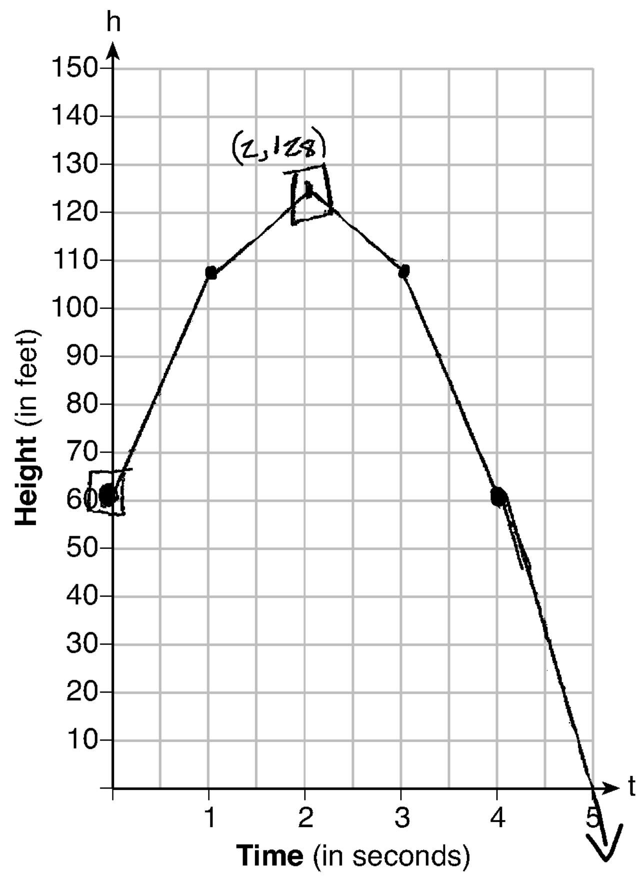
Determine the average rate of change, in feet per second, from when Michael released the ball to when the ball reached its maximum height.

$$\frac{124-60}{2-0} = \frac{64}{2} \Rightarrow \boxed{34 \text{ ft per second}}$$

Score 3: The student made a computational error when calculating the average rate of change.

Question 33

33 Michael threw a ball into the air from the top of a building. The height of the ball, in feet, is modeled by the equation $h = -16t^2 + 64t + 60$, where t is the elapsed time, in seconds. Graph this equation on the set of axes below.



Determine the average rate of change, in feet per second, from when Michael released the ball to when the ball reached its maximum height.

$\frac{128-60}{2-0} = \frac{68}{2}$ 34ft/sec

Score 2: The student stated an appropriate rate of change based on an incorrect vertex and continued the graph below the horizontal axis.

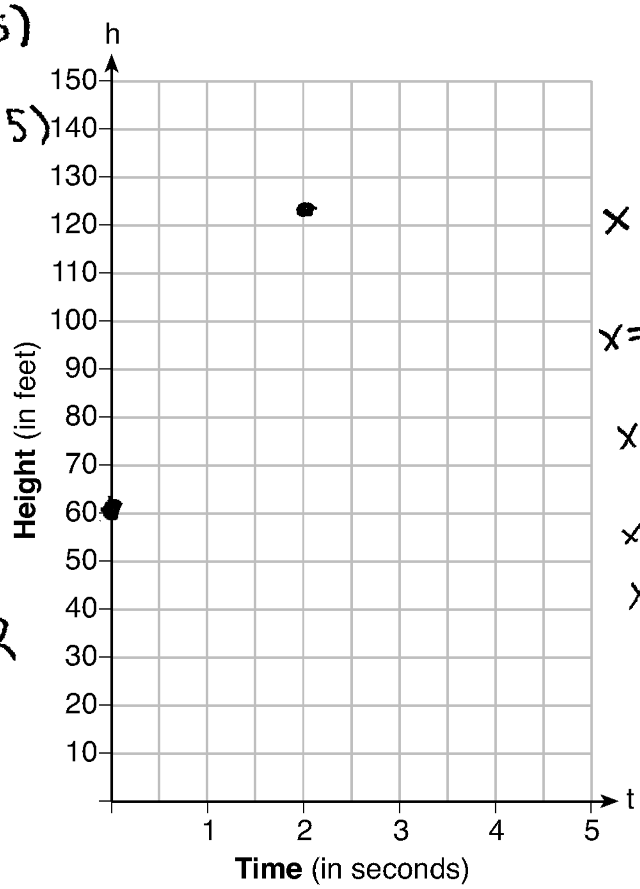
Question 33

33 Michael threw a ball into the air from the top of a building. The height of the ball, in feet, is modeled by the equation $h = -16t^2 + 64t + 60$, where t is the elapsed time, in seconds. Graph this equation on the set of axes below.

ax^2+bx+c $a=-16$ $b=64$ $c=60$

$4(-4t^2+16t-15)$

$(2t+3)(2t-5)$



$x=\frac{-b}{2a}$

$x=\frac{-64}{-32}$

$x=2$

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

$x=\frac{-64\pm\sqrt{(64)^2-4(-16)(60)}}{-32}$

$x=\frac{-64+\sqrt{7936}}{-32}$

$x=\frac{-64+\sqrt{7936}}{-32}$

$x=-.78388$

$x=\frac{-64+\sqrt{7936}}{-32}$

$x=$

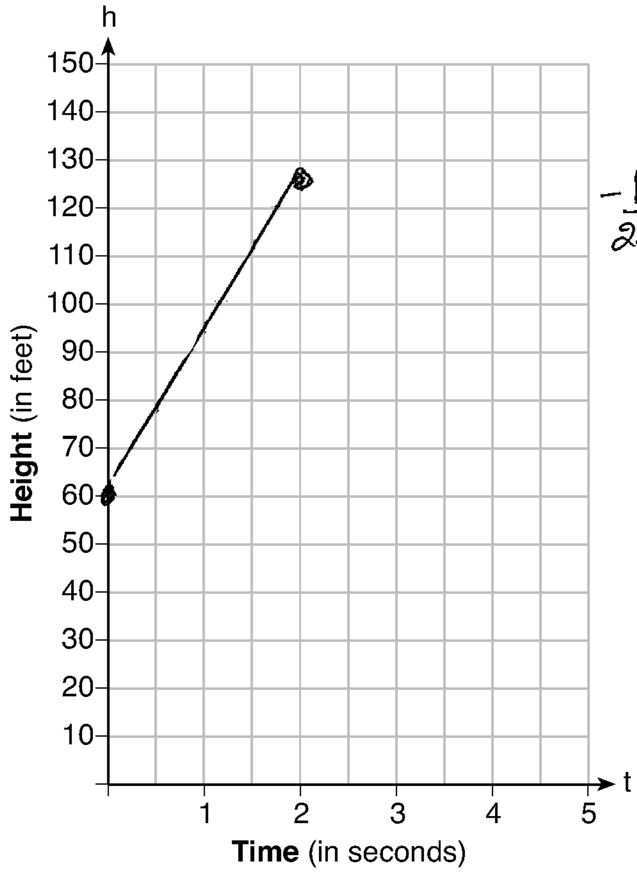
Determine the average rate of change, in feet per second, from when Michael released the ball to when the ball reached its maximum height.

$\frac{60}{0} \rightarrow \frac{124}{2} = \frac{60}{1}$ $\frac{108}{1}$ $.120$

32 feet per second

Score 1: The student stated a correct average rate of change.

33 Michael threw a ball into the air from the top of a building. The height of the ball, in feet, is modeled by the equation $h = -16t^2 + 64t + 60$, where t is the elapsed time, in seconds. Graph this equation on the set of axes below.



$$\frac{-b}{2a} = \frac{-64}{2(-16)} = \frac{-64}{-32} =$$

$$2$$

Determine the average rate of change, in feet per second, from when Michael released the ball to when the ball reached its maximum height.

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

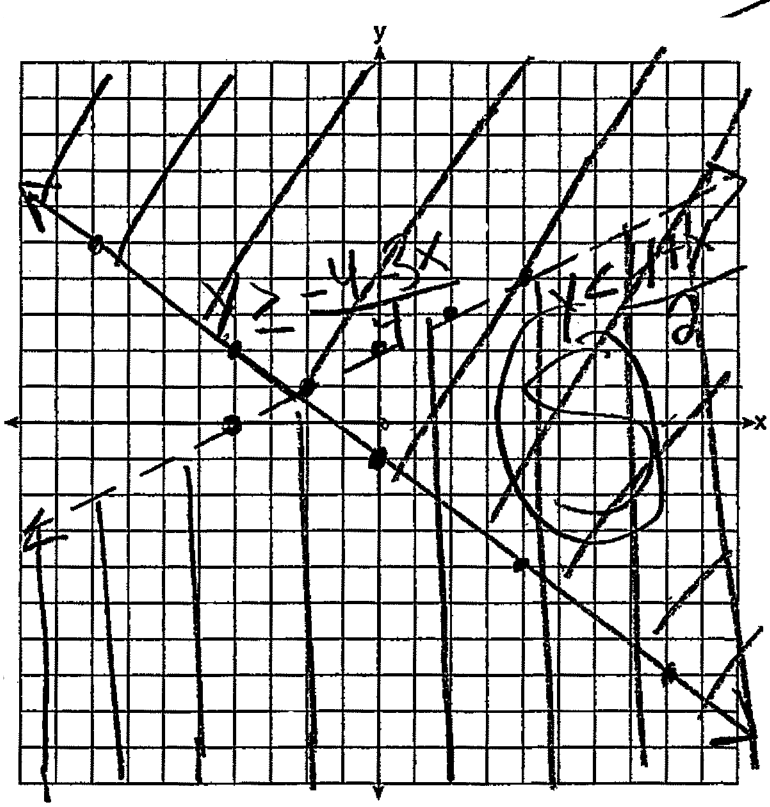
Question 34

34 Graph the system of inequalities:

$$-x + 2y - 4 < 0$$
$$3x + 4y + 4 \geq 0$$

$3x+4y+4 \geq 0$
$\quad\quad\;\; -4 \;\; -4$
$3x+4y \geq -4$
$-3x \quad\quad\; -3x$
$\frac{4y}{4} \geq \frac{-4-3x}{4}$
$\boxed{y \geq \frac{-4-3x}{4}}$

$-x+2y-4<0$
$+x \quad\quad\quad\; +x$
$2y-4 < 0+x$
$\quad +4 \quad\; +4$
$\frac{2y}{2} < \frac{4+x}{2}$
$\boxed{y < \frac{4+x}{2}}$



Stephen says the point (0,0) is a solution to this system. Determine if he is correct, and explain your reasoning.

Stephen is correct because (0,0) is in the area of the solution and it is not on the line.

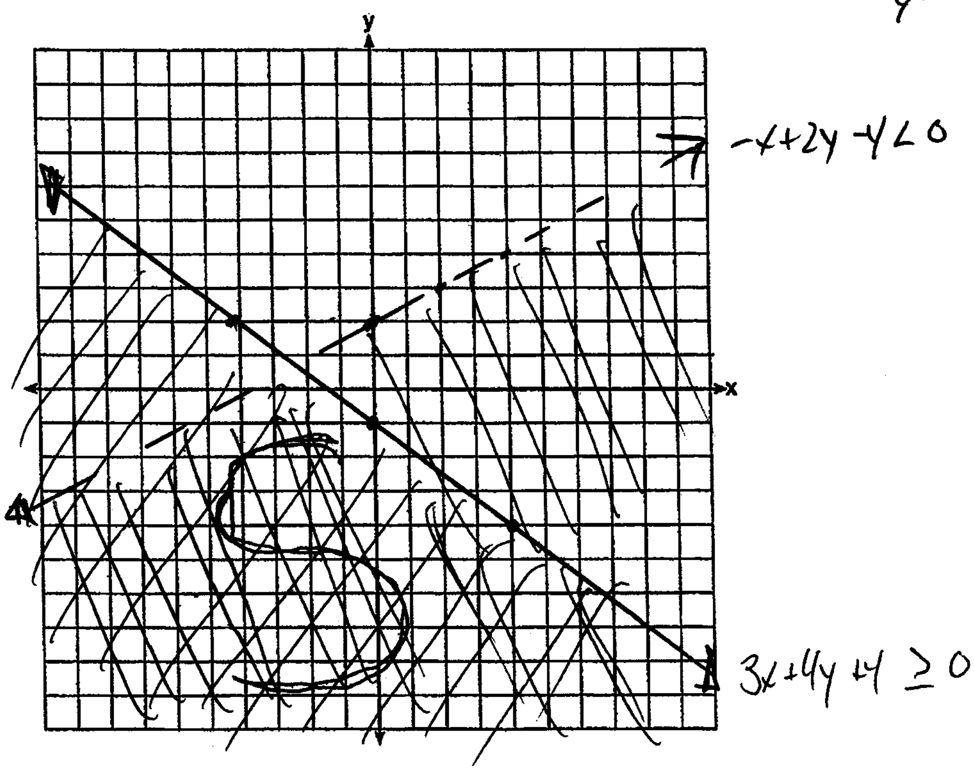
Score 4: The student gave a complete and correct response.

34 Graph the system of inequalities:

$$-x + 2y - 4 < 0$$
$$3x + 4y + 4 \geq 0$$

$3x+4y+4 \geq 0$
$3x+4y \geq -4$
$4y \geq -3x - 4$
$y \geq -\frac{3}{4}x - 1$

$-x+2y-4 < 0$
$-x+2y < 4$
$2y < x+4$
$y < \frac{1}{2}x+2$



Stephen says the point (0,0) is a solution to this system. Determine if he is correct, and explain your reasoning.

No the point (0,0) is only in the solution of $-x+2y-4<0$.

Score 3: The student shaded $3x + 4y + 4 \geq 0$ incorrectly, but wrote an appropriate explanation based on the graph.

Question 34

34 Graph the system of inequalities:

$$-x + 2y - 4 < 0$$
$$3x + 4y + 4 \geq 0$$

$-x+2y-4<0$

$2y-x-4<0$
$+4 \quad +4$

$2y-x<0+4$
$+x \quad +x$

$\frac{2y}{2}<\frac{0}{2}+\frac{4}{2}+\frac{x}{2}$

$y<0+2+\frac{x}{2}$

x	y
0	2
1	2.5
2	3
3	3.5
4	4
5	4.5
6	5

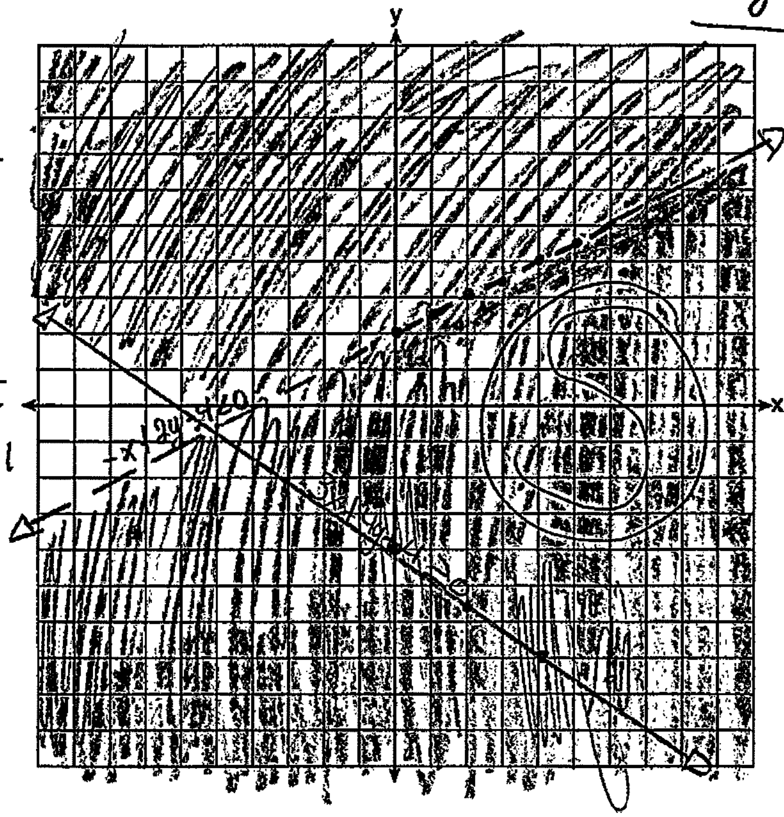
$3x+4y+4\geq 0$
$-3x \quad -3x$

$4y+4\geq 0-3x$
$-4 \quad -4$

$\frac{4y}{4}\geq \frac{0}{4}-\frac{3x}{4}-\frac{4}{4}$

$y\geq 0-\frac{3x}{4}-1$

x	y
0	-4
2	-5.5
4	-7



Stephen says the point (0,0) is a solution to this system. Determine if he is correct, and explain your reasoning.

Stephen is correct because (0,0) is in the areas were both graphs cross and were they are shaded.

Score 3: The student graphed the wrong y-intercept for $3x + 4y + 4 \geq 0$.

Question 34

34 Graph the system of inequalities:

$$-x + 2y - 4 < 0$$
$$3x + 4y + 4 \geq 0$$

$2y < x + 4$

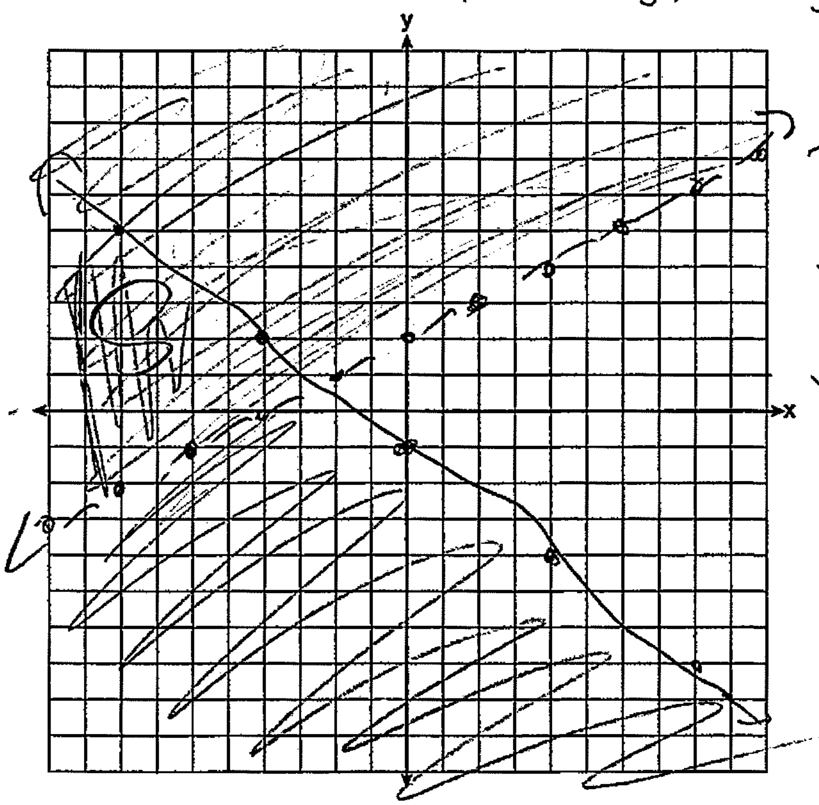
$3x + 4y \geq -4$

$-4 \quad -4 \qquad -3x \quad -3x$

$\frac{4y}{4} \geq \frac{-3x}{4} \frac{-4}{4}$

$y \geq -\frac{3x}{4} - 1$

$y < \frac{1}{2}x + 2$



Stephen says the point (0,0) is a solution to this system. Determine if he is correct, and explain your reasoning.

No, because (0,0) isn't in the solution set.

Score 2: The student made two errors by shading both inequalities incorrectly and not labeling either inequality.

34 Graph the system of inequalities:

$$-x + 2y - 4 < 0$$
$$3x + 4y + 4 \geq 0$$

$x+4y+4 \geq 0$

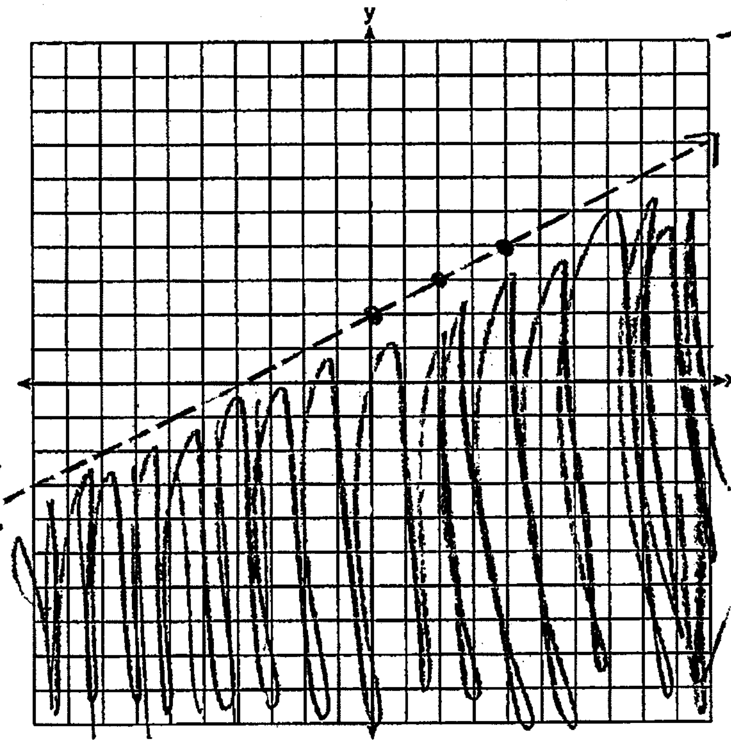
$-4 \quad -4$

$3x+4y \geq -4$

$x \quad -3x$

$\frac{4y}{4} \geq \frac{-3x}{4} \frac{-4}{4}$

$y \geq -3/4x - 1$



$-x+2y-4<0$

$+4 \quad +4$

$-x+2y<4$

$+x \quad +x$

$\frac{2y}{2} < \frac{x}{2} + \frac{4}{2}$

$y < \frac{1}{2}x + 2$

Stephen says the point (0,0) is a solution to this system. Determine if he is correct, and explain your reasoning.

Stephen is correct because (0,0) isnt on the dotted line or non-shaded. Its on the shaded part of the graph.

Score 2: The student solved both inequalities for y correctly and wrote an appropriate explanation based on their graph of only one inequality, not the given system.

Question 34

34 Graph the system of inequalities:

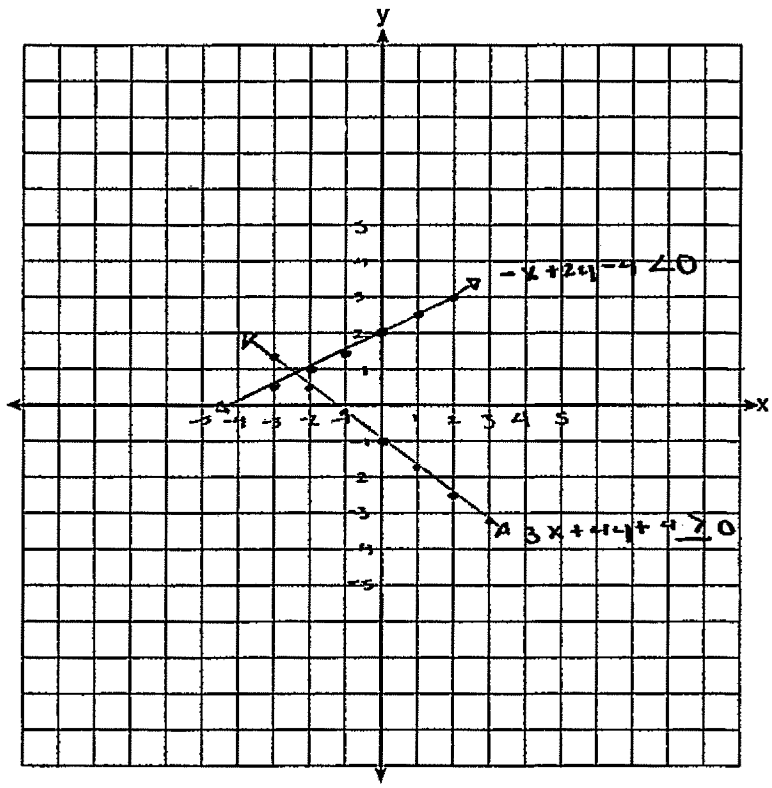
$$-x + 2y - 4 < 0$$
$$3x + 4y + 4 \geq 0$$

$-x + 2y - 4 = 0$
$\underline{-2y \qquad -2y}$
$\frac{-x - 4}{-2} = \frac{-2y}{-2}$

$\frac{1}{2}x + 2 = y$

$3x + 4y + 4 = 0$
$\underline{-4y \qquad -4y}$
$\frac{3x + 4}{-4} = \frac{-4y}{-4}$

$\frac{3}{4}x - 1 = y$



Stephen says the point (0,0) is a solution to this system. Determine if he is correct, and explain your reasoning.

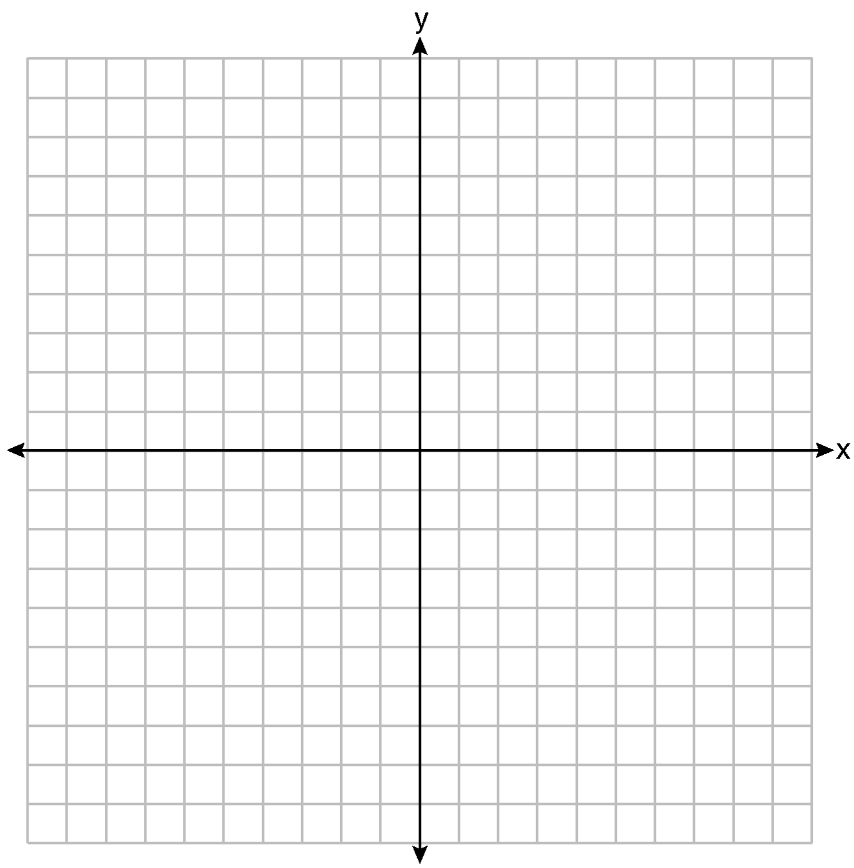
He is not correct because none of the lines cross (0,0).

Score 1: The student graphed $-x + 2y - 4 = 0$ and $3x + 4y + 4 = 0$ correctly, but showed no further correct work.

Question 34

34 Graph the system of inequalities:

$$-x + 2y - 4 < 0$$
$$3x + 4y + 4 \geq 0$$



Stephen says the point (0,0) is a solution to this system. Determine if he is correct, and explain your reasoning.

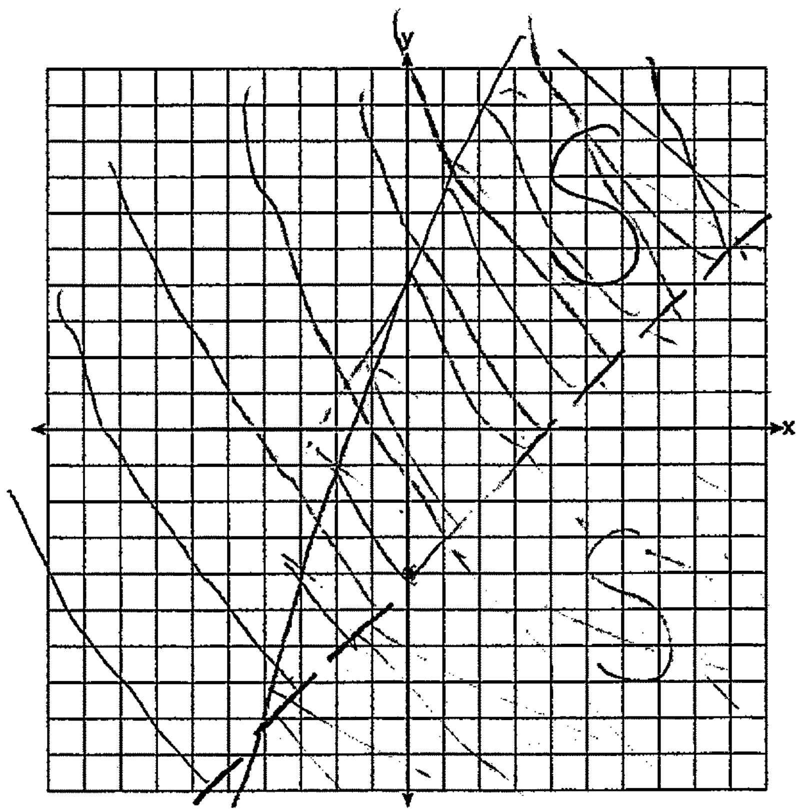
Yes he is correct because in the first equation it would be $-0+2(0)-4<0$ and $-4<0$ and zero is bigger than a negative number so that is right & for the second equation it would be $3(0)+4(0)+4\geq 0$ and $4\geq 0$ which is also right because 4 is bigger than zero.

Score 1: The student wrote a correct explanation.

Question 34

34 Graph the system of inequalities:

$$-x + 2y - 4 < 0$$
$$3x + 4y + 4 \geq 0$$



Stephen says the point (0,0) is a solution to this system. Determine if he is correct, and explain your reasoning.

He is Correct because You Plug in 0 for the Varibles and it will tell You where to Put the lines to find the Solution.

Score 0: The student showed no correct work.

Question 35

35 The following table represents a sample of sale prices, in thousands of dollars, and number of new homes available at that price in 2017.

Sale Price, p (in thousands of dollars)	160	180	200	220	240	260	280
Number of New Homes Available f(p)	126	103	82	75	82	40	20

State the linear regression function, $f(p)$, that estimates the number of new homes available at a specific sale price, p. Round all values to the *nearest hundredth*.

$y = ax + b$

[f(p)]

$\boxed{f(p) = -.79p + 249.86}$

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

$-.95$

This is a strong negative correlation. This is because the higher the price of the house, the less homes are available

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

35 The following table represents a sample of sale prices, in thousands of dollars, and number of new homes available at that price in 2017.

Sale Price, p (in thousands of dollars)	160	180	200	220	240	260	280
Number of New Homes Available f(p)	126	103	82	75	82	40	20

State the linear regression function, $f(p)$, that estimates the number of new homes available at a specific sale price, p. Round all values to the *nearest hundredth*.

$f(p) = -0.79p + 249.86$

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

The correlation coefficent is -0.95.
This means in the context of this problem
is as the price increases the number
of homes avaliable decreses

Score 3: The student did not indicate the strength of the correlation coefficient in their explanation.

Question 35

35 The following table represents a sample of sale prices, in thousands of dollars, and number of new homes available at that price in 2017.

Sale Price, p (in thousands of dollars)	160	180	200	220	240	260	280
Number of New Homes Available f(p)	126	103	82	75	82	40	20

State the linear regression function, $f(p)$, that estimates the number of new homes available at a specific sale price, p. Round all values to the *nearest hundredth*.

$y = -0.79x + 249.86$

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

The correlation coefficient is -0.95. It means the higher the house prices the less available, and the equation is a good fit for this data.

Score 3: The student wrote a regression equation in terms of x and y.

35 The following table represents a sample of sale prices, in thousands of dollars, and number of new homes available at that price in 2017.

Sale Price, p (in thousands of dollars)	160	180	200	220	240	260	280
Number of New Homes Available f(p)	126	103	82	75	82	40	20

State the linear regression function, $f(p)$, that estimates the number of new homes available at a specific sale price, p. Round all values to the *nearest hundredth*.

$y = ax + b$

$a = -.875$

$b = 271.2142857$

$r^2 = .9070783087$

$r = -.9524065879$

$f(p) = -.88p + 271.21$

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

$-.95$ There is a strong relationship between the sale price and the number of homes at that price.

Score 3: The student made an error entering data in the calculator, but used the table in the calculator display appropriately.

Question 35

35 The following table represents a sample of sale prices, in thousands of dollars, and number of new homes available at that price in 2017.

Sale Price, p (in thousands of dollars)	160	180	200	220	240	260	280
Number of New Homes Available f(p)	126	103	82	75	82	40	20

State the linear regression function, $f(p)$, that estimates the number of new homes available at a specific sale price, p. Round all values to the *nearest hundredth*.

$f(p) = -.79p + 249.86$

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

.95 this means that the linear regression line can rather accurately predict the price of homes depending on number of homes available

Score 2: The correlation coefficient is incorrect, and the explanation is written backwards.

Question 35

35 The following table represents a sample of sale prices, in thousands of dollars, and number of new homes available at that price in 2017.

Sale Price, p (in thousands of dollars)	160	180	200	220	240	260	280
Number of New Homes Available f(p)	126	103	82	75	82	40	20

23 21 7 7 42 20

State the linear regression function, $f(p)$, that estimates the number of new homes available at a specific sale price, p. Round all values to the *nearest hundredth*.

$-.79p + 249.86$

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

.95 Very strong relationship

Score 1: The student wrote an appropriate expression.

Question 35

35 The following table represents a sample of sale prices, in thousands of dollars, and number of new homes available at that price in 2017.

Sale Price, p (in thousands of dollars)	160	180	200	220	240	260	280
Number of New Homes Available f(p)	126	103	82	75	82	40	20

State the linear regression function, $f(p)$, that estimates the number of new homes available at a specific sale price, p. Round all values to the *nearest hundredth*.

$y = -.8x + 249.9$

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

Its a negative correlation

Score 0: The student made multiple errors.

36 The length of a rectangular sign is 6 inches more than half its width. The area of this sign is 432 square inches. Write an equation in one variable that could be used to find the number of inches in the dimensions of this sign.

let x = width

let $\frac{1}{2}x + 6$ = length

$$\boxed{\frac{1}{2}x^2 + 6x - 432 = 0}$$

Solve this equation algebraically to determine the dimensions of this sign, in inches.

$$\frac{1}{2}x^2 + 6x - 432 = 0$$

216

12 18

$$\frac{1}{2}x^2 + 18x - 12x - 432 = 0$$

$\frac{1}{2}x$ -12

$$\frac{1}{2}x(x+36) - 12(x+36) = 0$$

$$(x+36)\left(\frac{1}{2}x - 12\right)$$

$x + 36 = 0$ -36 -36

reject $x = -36$

$\frac{1}{2}x - 12 = 0$ $+12$ $+12$

$\frac{1}{2}x = 12$

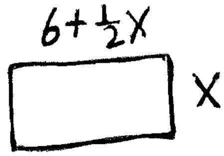
$x = 24$

$\boxed{\text{Width} = 24 \quad \text{length} = 18}$

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

Question 36

36 The length of a rectangular sign is 6 inches more than half its width. The area of this sign is 432 square inches. Write an equation in one variable that could be used to find the number of inches in the dimensions of this sign.



$$x(6+.5x)=432$$

Solve this equation algebraically to determine the dimensions of this sign, in inches.

$$.5x^2+6x-432=0$$

$$x=\frac{-6\pm\sqrt{36-4(.5)(-432}}{2(.5)}$$

$$x=\frac{-6\pm\sqrt{900}}{1}$$

$$x=-6+30 \qquad \cancel{x=-6-30}$$

$$x=24$$

$$6+\frac{1}{2}x=18$$

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

Question 36

36 The length of a rectangular sign is 6 inches more than half its width. The area of this sign is 432 square inches. Write an equation in one variable that could be used to find the number of inches in the dimensions of this sign.

$l = 6 + \frac{1}{2}w$ $\quad$ $l \cdot w = 432$

$l - 6 = \frac{1}{2}w$ $\quad$ $l(2l - 12) = 432$

$2l - 12 = w$

Solve this equation algebraically to determine the dimensions of this sign, in inches.

$2l^2 - 12l - 432 = 0$

$2(l^2 - 6l - 216) = 0$

$l^2 - 6l - 216 = 0$

$(l + 12)(l - 18) = 0$

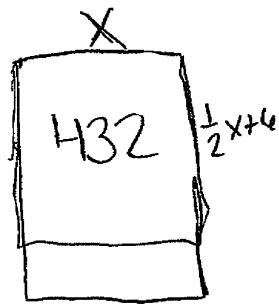
$l + 12 = 0$ $\quad$ $l - 18 = 0$

$l = -12$ R $\quad$ $l = 18$

Score 3: The student used a system of equations to write a single equation, but only found one dimension.

Question 36

36 The length of a rectangular sign is 6 inches more than half its width. The area of this sign is 432 square inches. Write an equation in one variable that could be used to find the number of inches in the dimensions of this sign.



$L \cdot W = A$

$X \cdot (\frac{1}{2}x+6) = 432$

Solve this equation algebraically to determine the dimensions of this sign, in inches.

$X \cdot (\frac{1}{2}x+6) = 432$

$24 \cdot (\frac{1}{2}(24)+6)$

$24 \cdot (12+6)$

$24 \cdot (18)$

$24 \cdot 18 = 432$

Length = 18 inches

Width = 24 inches

Score 3: The student wrote a correct equation and stated the dimensions of the sign, but showed no algebraic work.

Question 36

36 The length of a rectangular sign is 6 inches more than half its width. The area of this sign is 432 square inches. Write an equation in one variable that could be used to find the number of inches in the dimensions of this sign.

$$432 = w\left(\frac{1}{2}w + 6\right)$$

Solve this equation algebraically to determine the dimensions of this sign, in inches.

$$432 = w\left(\frac{1}{2}w + 6\right)$$

$$432 \cdot 2 = 2 \cdot \frac{1}{2}w^2 + 6w \cdot 2$$

$$\frac{864}{12} = w^2 + \frac{12w}{12}$$

$$\sqrt{72} = \sqrt{w^2}$$

$$8.485281374 = w$$

Score 2: The student wrote a correct equation.

Question 36

36 The length of a rectangular sign is 6 inches more than half its width. The area of this sign is 432 square inches. Write an equation in one variable that could be used to find the number of inches in the dimensions of this sign.

Solve this equation algebraically to determine the dimensions of this sign, in inches.

24 inch
18 inch

x	y
17	23
18	24
14	22

412

737

1214
18
− 6

Score 1: The student stated the correct dimensions.

Question 36

36 The length of a rectangular sign is 6 inches more than half its width. The area of this sign is 432 square inches. Write an equation in one variable that could be used to find the number of inches in the dimensions of this sign.

$6+w \div 2 \cdot w = 432$

Solve this equation algebraically to determine the dimensions of this sign, in inches.

Score 0: The student wrote an incorrect equation.

37 Two families went to Rollercoaster World. The Brown family paid $170 for 3 children and 2 adults. The Peckham family paid $360 for 4 children and 6 adults.

If x is the price of a child's ticket in dollars and y is the price of an adult's ticket in dollars, write a system of equations that models this situation.

$+90 \quad -90$

$90 + 2y = 170$

$2y = 80$

$\frac{2y}{2} = \frac{80}{2}$

$y = 40$

$\times 3$

$$\boxed{\begin{aligned} 3x + 2y &= 170 \\ 4x + 6y &= 360 \end{aligned}}$$

$9x + 6y = 510$

$4x + 6y = 360$

$5x = 150$

$\frac{5x}{5} = \frac{150}{5}$

$x = 30$

Children = \$30

Adults = \$40

Graph your system of equations on the set of axes below.

$-3x$

$3x + 2y = 170 \quad -3x$

$\frac{2y}{2} = \frac{170 - 3x}{2}$

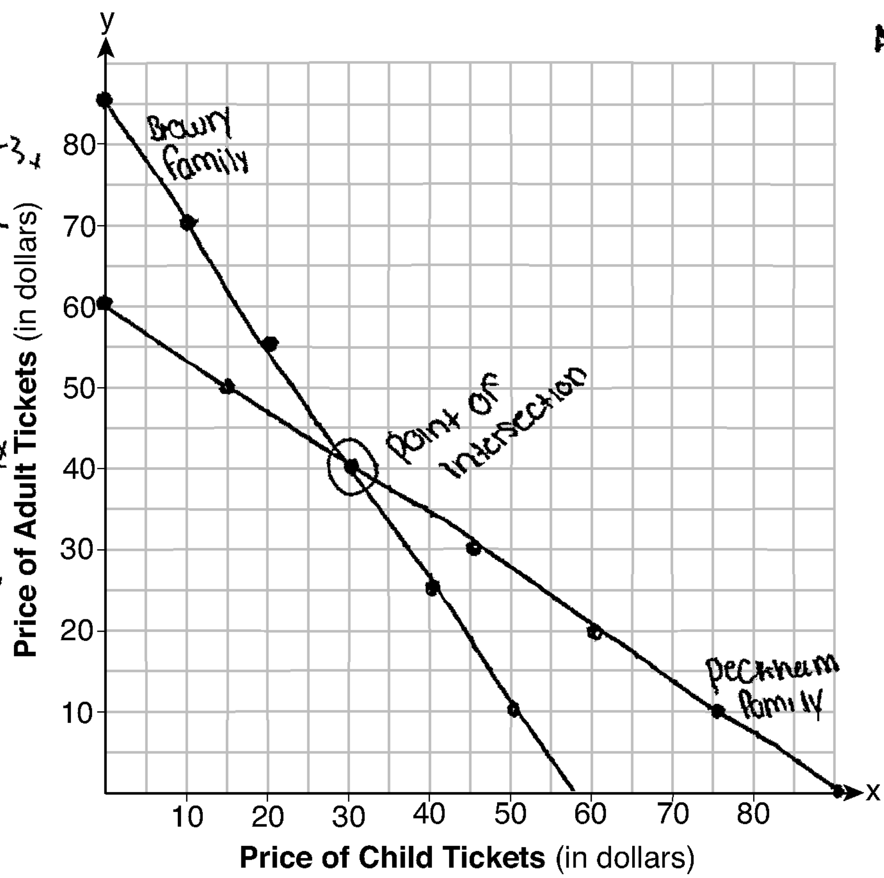
$y = 85 - \frac{3}{2}x$

$-4x$

$4x + 6y = 360 - 4x$

$\frac{6y}{6} = \frac{360 - 4x}{6}$

$y = 60 - \frac{2}{3}x$



Question 37 is continued on the next page.

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

Question 37 continued

State the coordinates of the point of intersection.

(30,40)

Explain what each coordinate of the point of intersection means in the context of the problem.

It means that the price of Children tickets are $30 while the price of adults is $40.

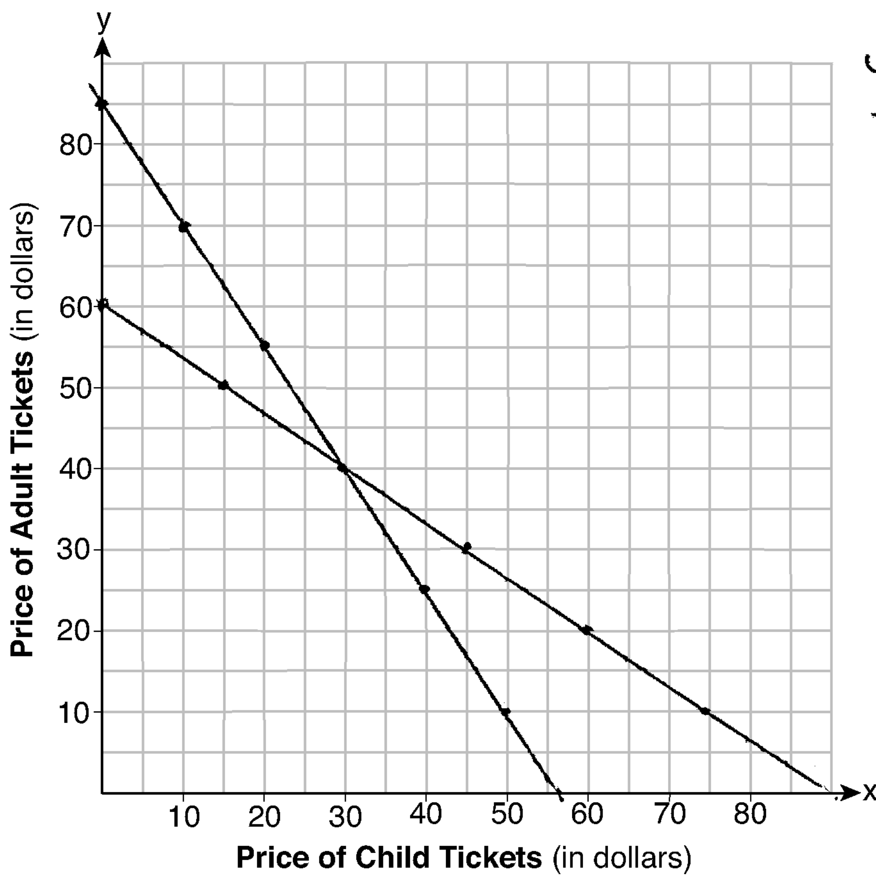
37 Two families went to Rollercoaster World. The Brown family paid \$170 for 3 children and 2 adults. The Peckham family paid \$360 for 4 children and 6 adults.

If x is the price of a child's ticket in dollars and y is the price of an adult's ticket in dollars, write a system of equations that models this situation.

$3x + 2y = 170$
$4x + 6y = 360$

Graph your system of equations on the set of axes below.

$3x + 2y = 170$
$-3x \quad -3x$
$\frac{2y}{2} = \frac{170 - 3x}{2}$
$y = 85 - \frac{3}{2}x$



$4x + 6y = 360 - 4x$
$-4x$
$\frac{6y}{6} = \frac{360 - 4x}{6}$
$y = 60 - \frac{2}{3}x$

Question 37 is continued on the next page.

Score 5: The student did not label either equation on the line.

Question 37 continued

State the coordinates of the point of intersection.

(30,40)

Explain what each coordinate of the point of intersection means in the context of the problem.

30 is what each child ticket costs and
40 is what each adult ticket
costs.

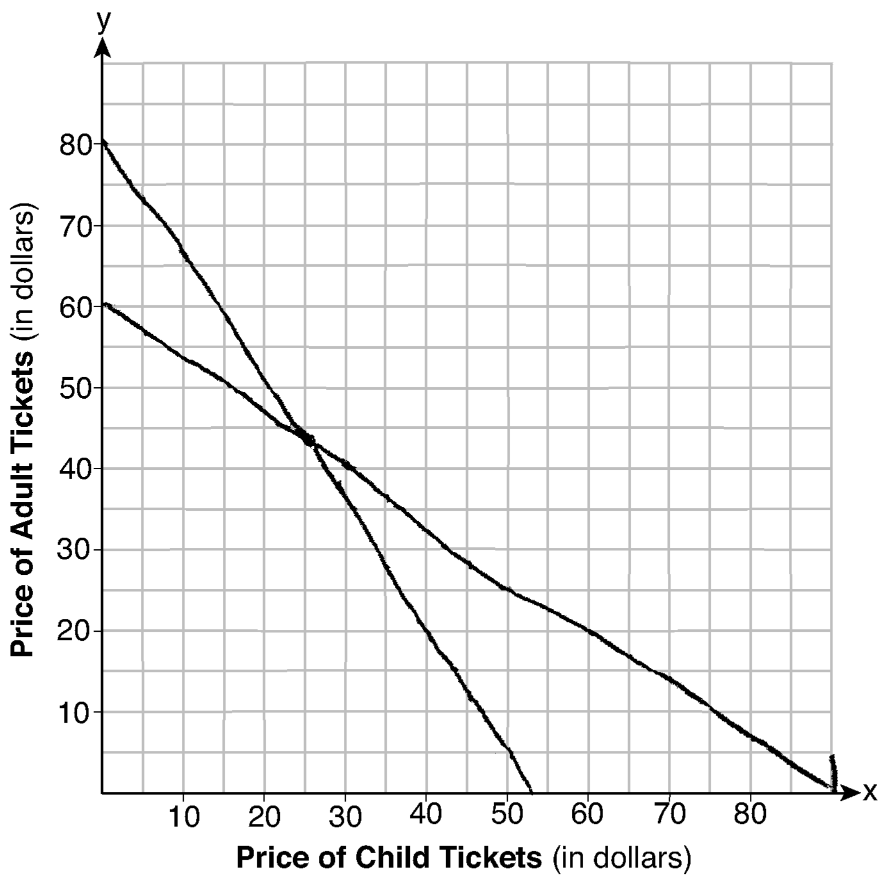
Question 37

37 Two families went to Rollercoaster World. The Brown family paid $170 for 3 children and 2 adults. The Peckham family paid $360 for 4 children and 6 adults.

If x is the price of a child's ticket in dollars and y is the price of an adult's ticket in dollars, write a system of equations that models this situation.

$4x+6y=360$
$3x+2y=170$

Graph your system of equations on the set of axes below.



Question 37 is continued on the next page.

Score 4: The student graphed one line incorrectly and did not label either line.

Question 37 continued

State the coordinates of the point of intersection.

(30,40)

Explain what each coordinate of the point of intersection means in the context of the problem.

30 is the price of a child's ticket, while 40 is an adult's ticket price.

Question 37

37 Two families went to Rollercoaster World. The Brown family paid \$170 for 3 children and 2 adults. The Peckham family paid \$360 for 4 children and 6 adults.

If x is the price of a child's ticket in dollars and y is the price of an adult's ticket in dollars, write a system of equations that models this situation.

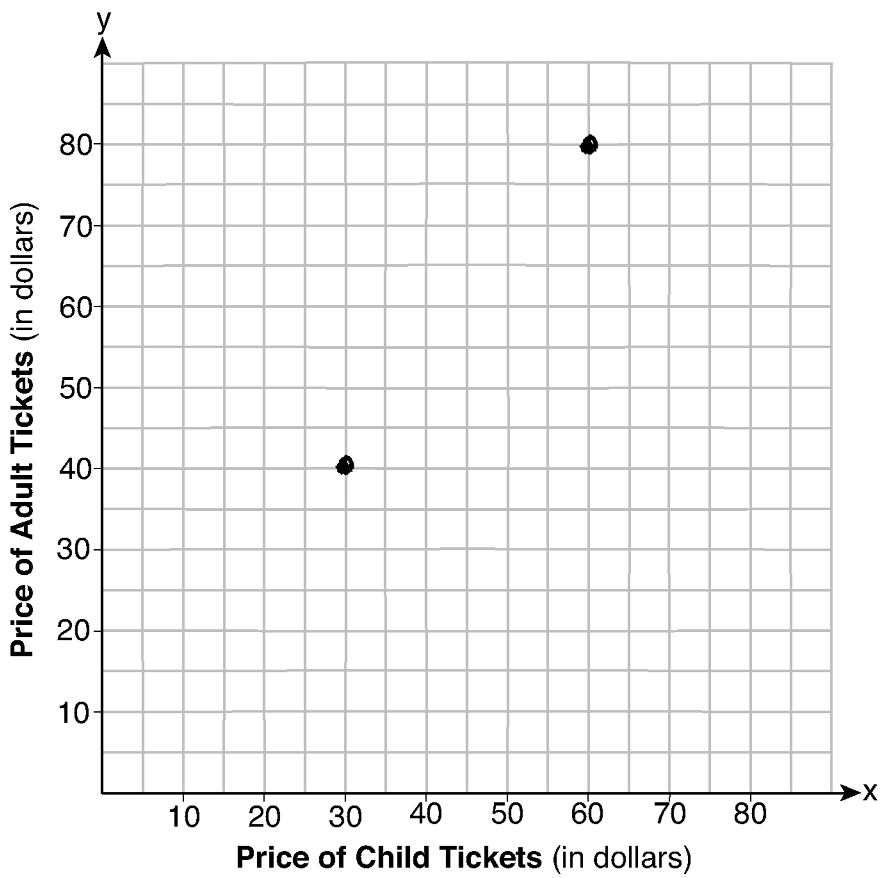
$3x+2y=170$

$4x+6y=360$

$x=30$

$y=40$

Graph your system of equations on the set of axes below.



Question 37 is continued on the next page.

Score 3: The student wrote a correct system of equations and stated (30,40).

Question 37

Question 37 continued

State the coordinates of the point of intersection.

(30, 40)

Explain what each coordinate of the point of intersection means in the context of the problem.

Each coordinate represents the price of the tickets

37 Two families went to Rollercoaster World. The Brown family paid \$170 for 3 children and 2 adults. The Peckham family paid \$360 for 4 children and 6 adults.

If x is the price of a child's ticket in dollars and y is the price of an adult's ticket in dollars, write a system of equations that models this situation.

let c = children
let a = adults

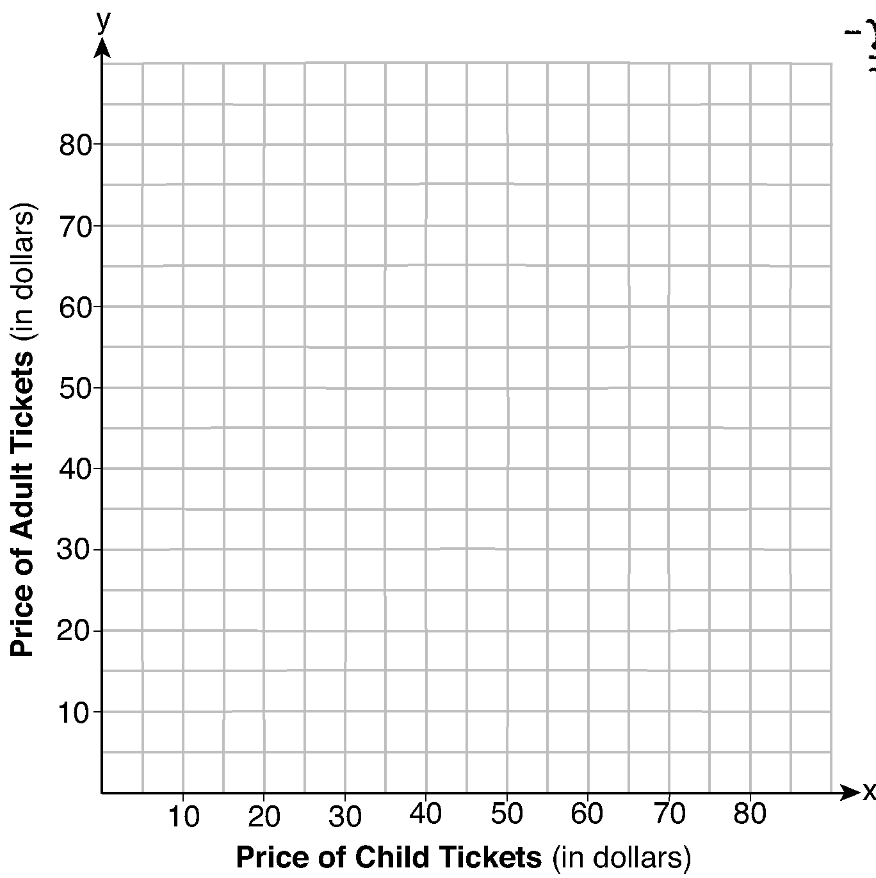
Brown family
$3c + 2a = 170$

Peckham family
$4c + 6a = 360$

$-3 \cdot$
$3c + 2a = 170$
$-6c - 6a = -510$
$4c + 6a = 360$
$\frac{-2c}{-2} = \frac{-150}{-2}$
$c = 75$

C =

Graph your system of equations on the set of axes below.



Question 37 is continued on the next page.

Score 2: The student redefined the variables and wrote a correct system of equations.

Question 37

Question 37 continued

State the coordinates of the point of intersection.

Explain what each coordinate of the point of intersection means in the context of the problem.

Question 37

37 Two families went to Rollercoaster World. The Brown family paid \$170 for 3 children and 2 adults. The Peckham family paid \$360 for 4 children and 6 adults.

If x is the price of a child's ticket in dollars and y is the price of an adult's ticket in dollars, write a system of equations that models this situation.

Key → 170 for 3 kids, 2 adults

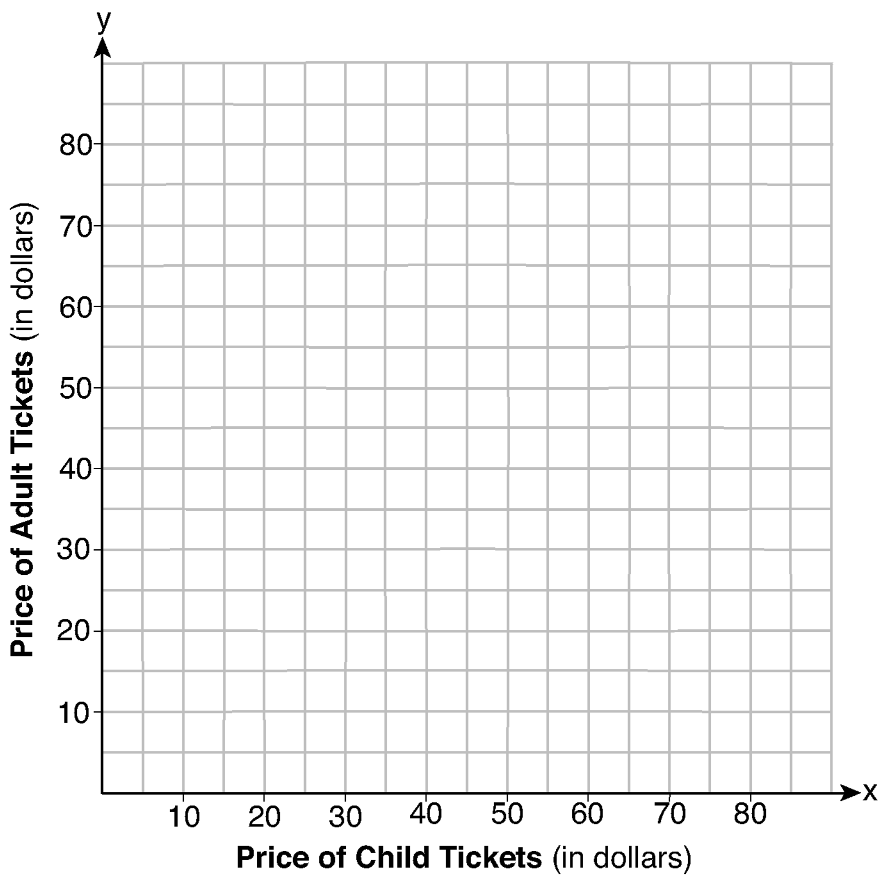
The price is \$30 for kids and \$40 for adults

x, y

\$30 for kids
\$40 for adults
$30 \times 3 = 90$
$170 - 90 = 80 \div 2 = 40$
Brown family

\$30 for kids
\$40 for adults
$30 \times 4 = 120$
$360 - 120 = 240 \div 6 = 40$
Peckham family

Graph your system of equations on the set of axes below.



Question 37 is continued on the next page.

Score 1: The student wrote a correct explanation.

Question 37

Question 37 continued

State the coordinates of the point of intersection.

Explain what each coordinate of the point of intersection means in the context of the problem.

Question 37

37 Two families went to Rollercoaster World. The Brown family paid \$170 for 3 children and 2 adults. The Peckham family paid \$360 for 4 children and 6 adults.

If x is the price of a child's ticket in dollars and y is the price of an adult's ticket in dollars, write a system of equations that models this situation.

80

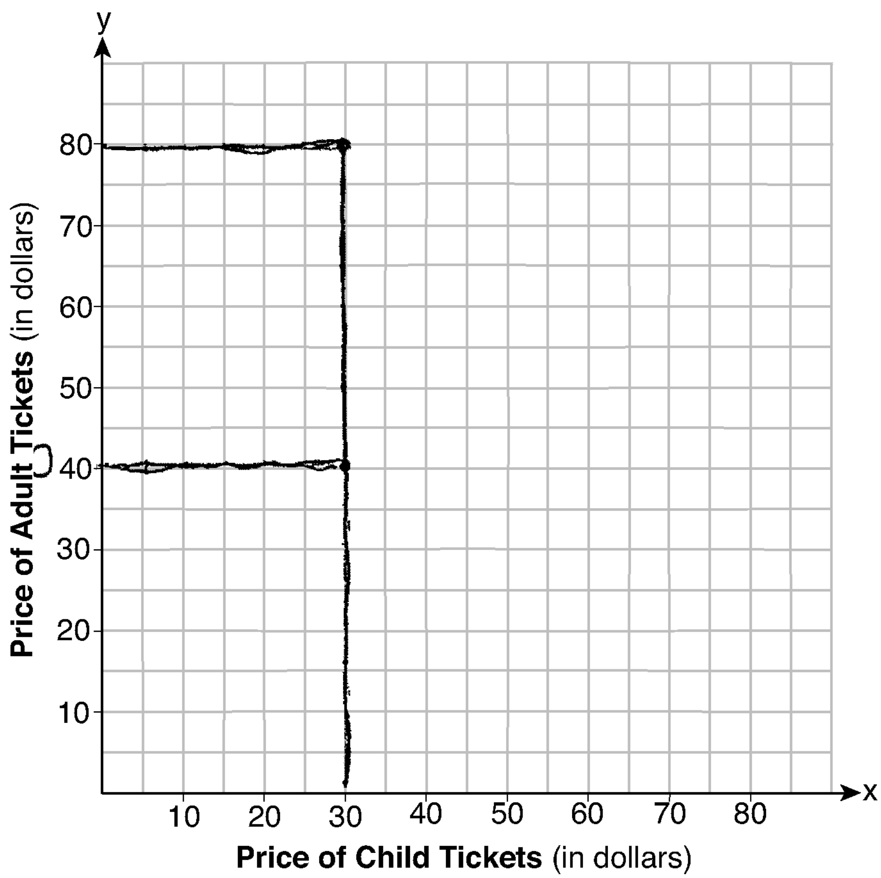
3C

B-\$170 3 children, 2 adults

P- \$360 4 children, 6 adults

30 40

Graph your system of equations on the set of axes below.



Question 37 is continued on the next page.

Score 0: The student stated 30, 40, but did not write them as coordinates, and no further work was correct.

Question 37

Question 37 continued

State the coordinates of the point of intersection.

30,40

Explain what each coordinate of the point of intersection means in the context of the problem.

When the two coordinates intersect in this case it means both childrens tickets equal $30.