The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

Tuesday, June 13, 2017 — 1:15 to 4:15 p.m.

MODEL RESPONSE SET

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Question 25

25 Express in simplest form: $(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$

$$\begin{array}{r} 3x^2+4x-8 \\ \overset{+}{-}2x^2\overset{-}{+}4x\overset{-}{+}2 \\ \hline \end{array}$$

$$\begin{array}{r} 3x^2\cancel{+4x}-8 \\ +\ 2x^2\cancel{-4x}-2 \\ \hline 5x^2-10 \end{array}$$

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

Question 25

25 Express in simplest form: $(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$

$$
\begin{array}{r}
3x^2 + \cancel{4x} - 8 \\
+ \quad 2x^2 - \cancel{4x} - 2 \\
\hline
x^2 - 10
\end{array}
$$

Score 1: The student did not add $3x^2$ and $2x^2$.

Question 25

25 Express in simplest form: $(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$

$$(3x^2+4x-8)+(-2x^2+4x+2)$$

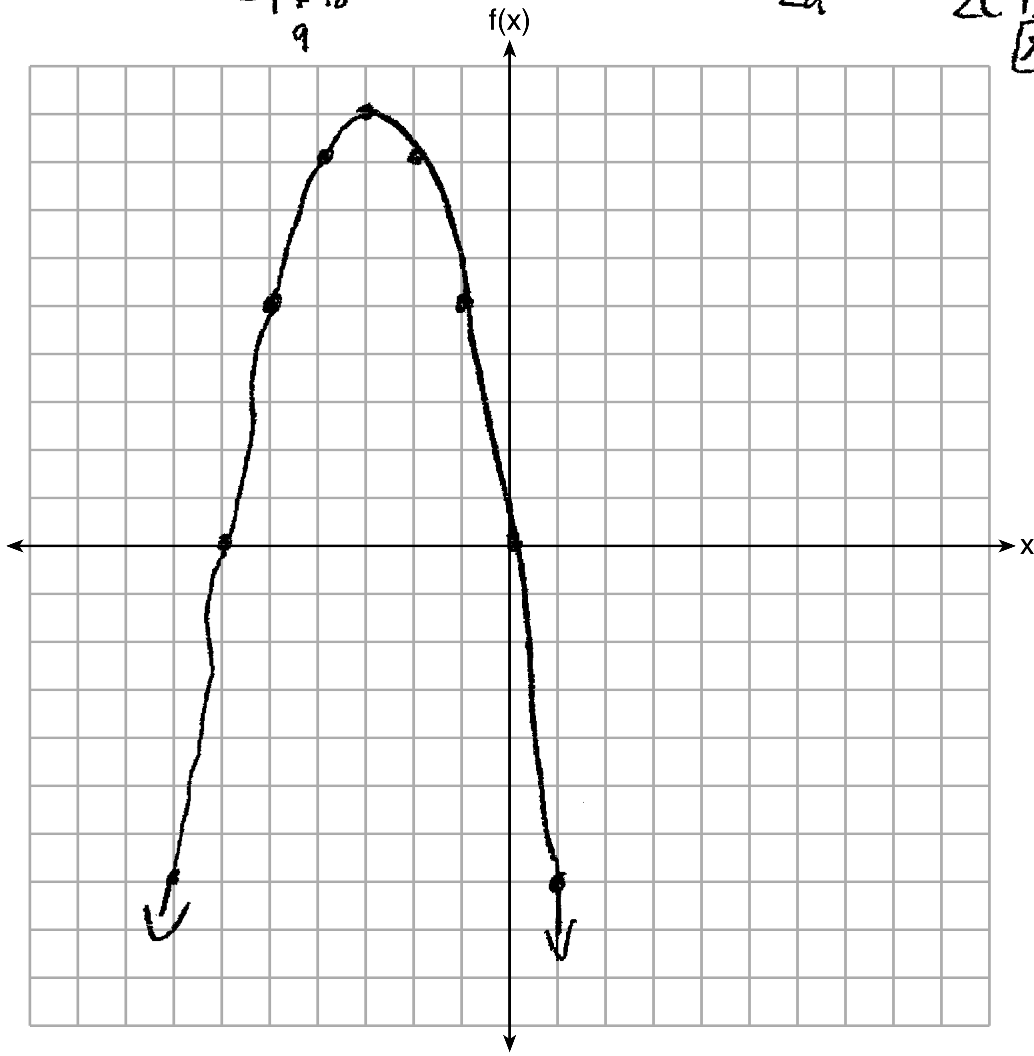
$$1x^2+8x+6$$

Score 0: The student wrote the problem as addition and combined the constant terms incorrectly.

26 Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.

$-(-3)^2 - 6(-3)$
$-9 + 18$
9

$\frac{-b}{2a}$ $\frac{-(-6)}{2(-1)}$ $\frac{6}{-2}$ $\boxed{x = \boxed{-3}}$



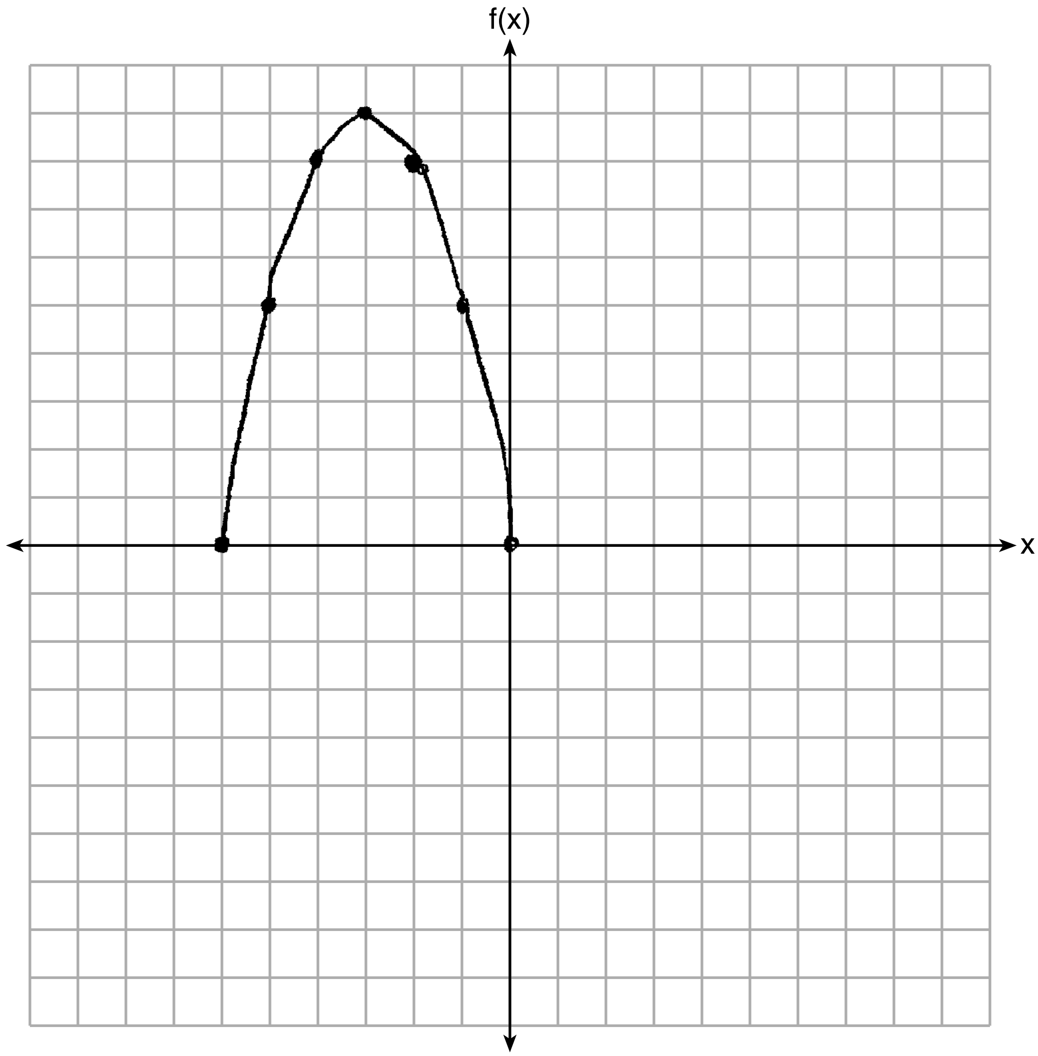
State the coordinates of the vertex of the graph.

$(-3, 9)$

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

Question 26

26 Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.



State the coordinates of the vertex of the graph.

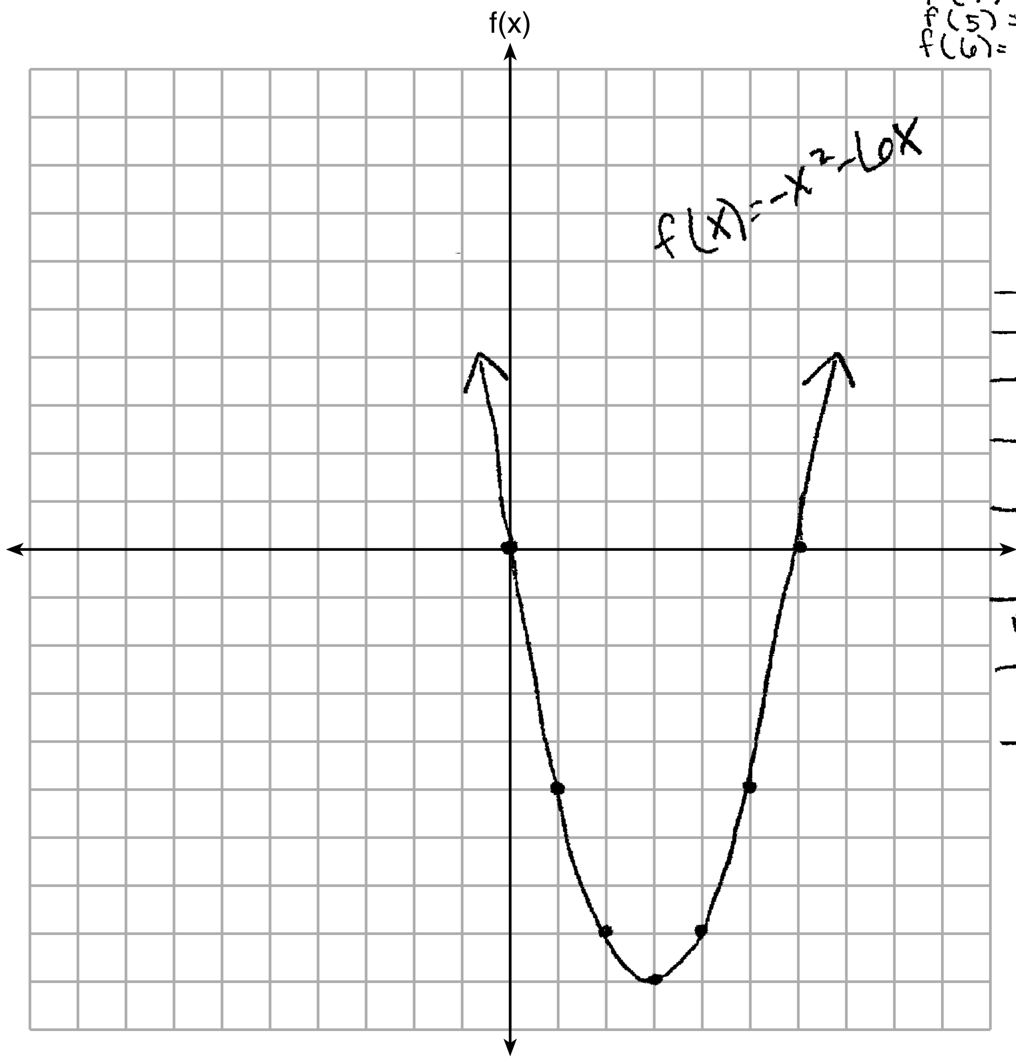
(-3, 9)

Score 1: The student only graphed $f(x)$ over the interval -6 to 0.

Question 26

26 Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.

$f(1) = -5$ $f(7) =$
$f(2) = -8$
$f(3) = -9$
$f(4) = -8$
$f(5) = -5$
$f(6) = 0$



x	y
0	0
1	-5
2	-8
3	-9
4	-8
5	-5
6	0

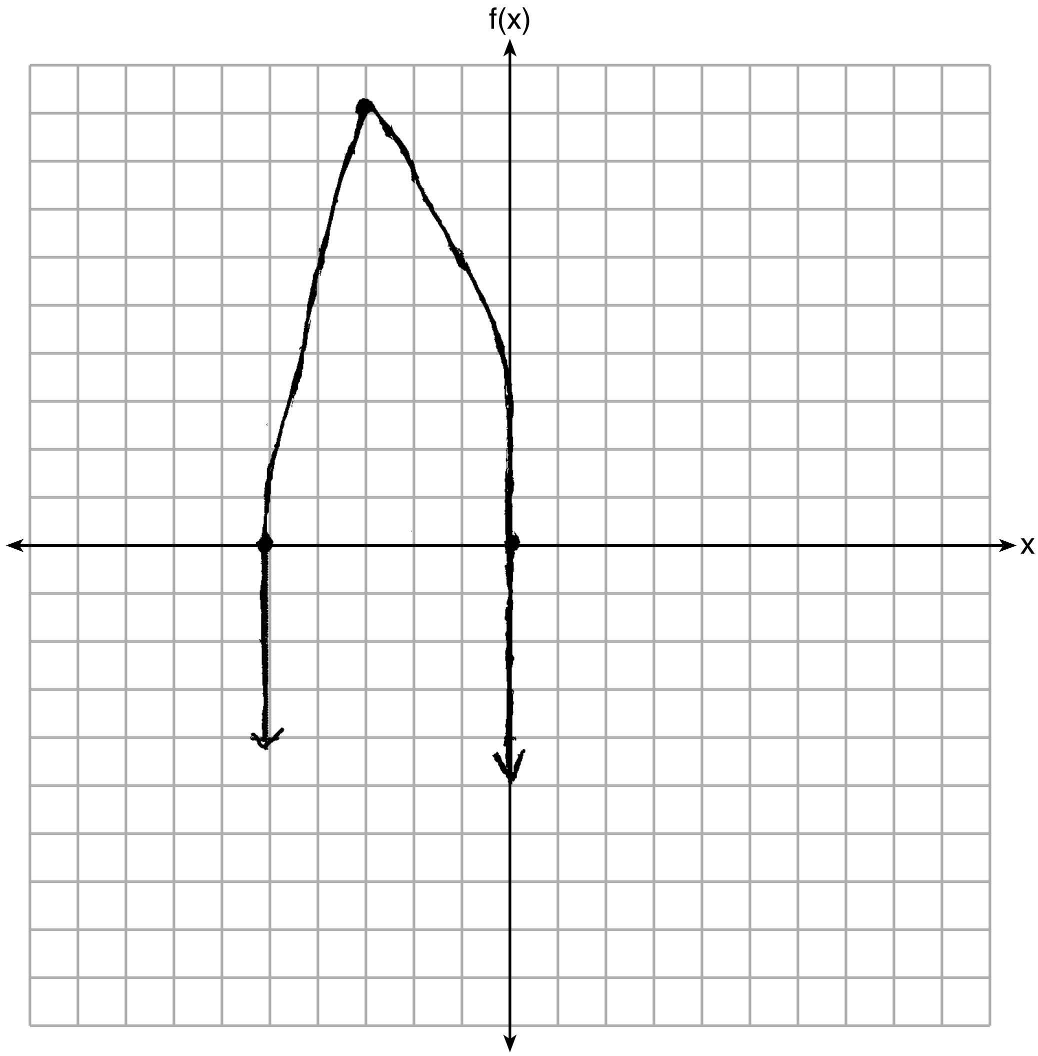
State the coordinates of the vertex of the graph.

$(3, -9)$

Score 1: The student graphed $f(x)$ incorrectly, but stated an appropriate vertex.

Question 26

26 Graph the function $f(x) = -x^2 - 6x$ on the set of axes below.



State the coordinates of the vertex of the graph.

Score 0: The student drew an incorrect graph and did not state a vertex.

27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

irrationall

The difference of a rational and irrational numbeo is always irrational

7 is rationall
but the $\sqrt{2}$ is
irrattional
therefore $7 - \sqrt{2}$ = irrational

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

Question 27

27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

The difference of a rational number and an irrational number is irrational.

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

Question 27

27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

$7 - \sqrt{2} = 5.5857...$

$7 - \sqrt{2}$ is irrational because $\sqrt{2}$ is irrational. There is no two same numbers that will multiply to a product of 2, thus making $\sqrt{2}$ radical or a decimal that cannot be converted into a fraction or a terminating decimal. By subtracting ~~radical 2~~ $\sqrt{2}$ from 7 you are decreasing 7 by a radical number, therefore ~~resett~~ resulting in an irrattional answer.

Score 1: The student made an error in describing an irrational number.

Question 27

27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

Irrational; because 2 is not a perfect squre so is Irrational

Score 1: The student only explained why $\sqrt{2}$ is irrational. The student did not address the difference.

Question 27

27 State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.

$7 - \sqrt{2}$

5.585

Irrational, It isnt a whole number

Score 0: The student did not write the full display of the calculator and wrote an incorrect explanation.

Question 28

28 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.

The car's value decreases by 15% every year. A 10000 dollar car would be 8500 dollars the next year because $10{,}000(.85)^1 = 8500$. It's the same as multiplying 10;000 by .15 then subtracting your answer from 10,000, because of its annual 15% value decrease.

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

Question 28

28 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.

$P\boxed{(.85)^t}$

$100 - 85 = 15$

$\boxed{15\%}$

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

Question 28

28 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.

$1 - .85 = .15$

Score 1: The student wrote an appropriate justification, but did not state the percent of decrease.

Question 28

28 The value, $v(t)$, of a car depreciates according to the function $v(t) = P(.85)^t$, where P is the purchase price of the car and t is the time, in years, since the car was purchased. State the percent that the value of the car *decreases* by each year. Justify your answer.

$P = 25,000$

$y = 5$

$V = 25,000(.85)^5$

$V = 21250^5 = 4.3306E21$

$V = 4.3306E21$

By 4.33% each year

the car will go down

Score 0: The student wrote a completely incorrect response.

29 A survey of 100 students was taken. It was found that 60 students watched sports, and 34 of these students did not like pop music. Of the students who did *not* watch sports, 70% liked pop music. Complete the two-way frequency table.

	Watch Sports	Don't Watch Sports	Total
Like Pop	26	28	54
Don't Like Pop	34	12	46
Total	60	40	100

100

40 students

60 students

$40 \times .70$

28 like pop

34 dont like pop

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

29 A survey of 100 students was taken. It was found that 60 students watched sports, and 34 of these students did not like pop music. Of the students who did *not* watch sports, 70% liked pop music. Complete the two-way frequency table.

	Watch Sports	Don't Watch Sports	Total
Like Pop	26	25	51
Don't Like Pop	34	15	49
Total	60	40	100

Score 1: The student made an error when calculating 70% of 40, but then completed the table appropriately.

Question 29

29 A survey of 100 students was taken. It was found that 60 students watched sports, and 34 of these students did not like pop music. Of the students who did *not* watch sports, 70% liked pop music. Complete the two-way frequency table.

	Watch Sports	Don't Watch Sports	Total
Like Pop	18	12	30
Don't Like Pop	34	28	62
Total	60	40	100

$60 - 34 = 26$

$26 \times .7 = 18.2 \approx 18$

$$\begin{array}{r} 100 \\ -60 \\ \hline 40 \end{array}$$

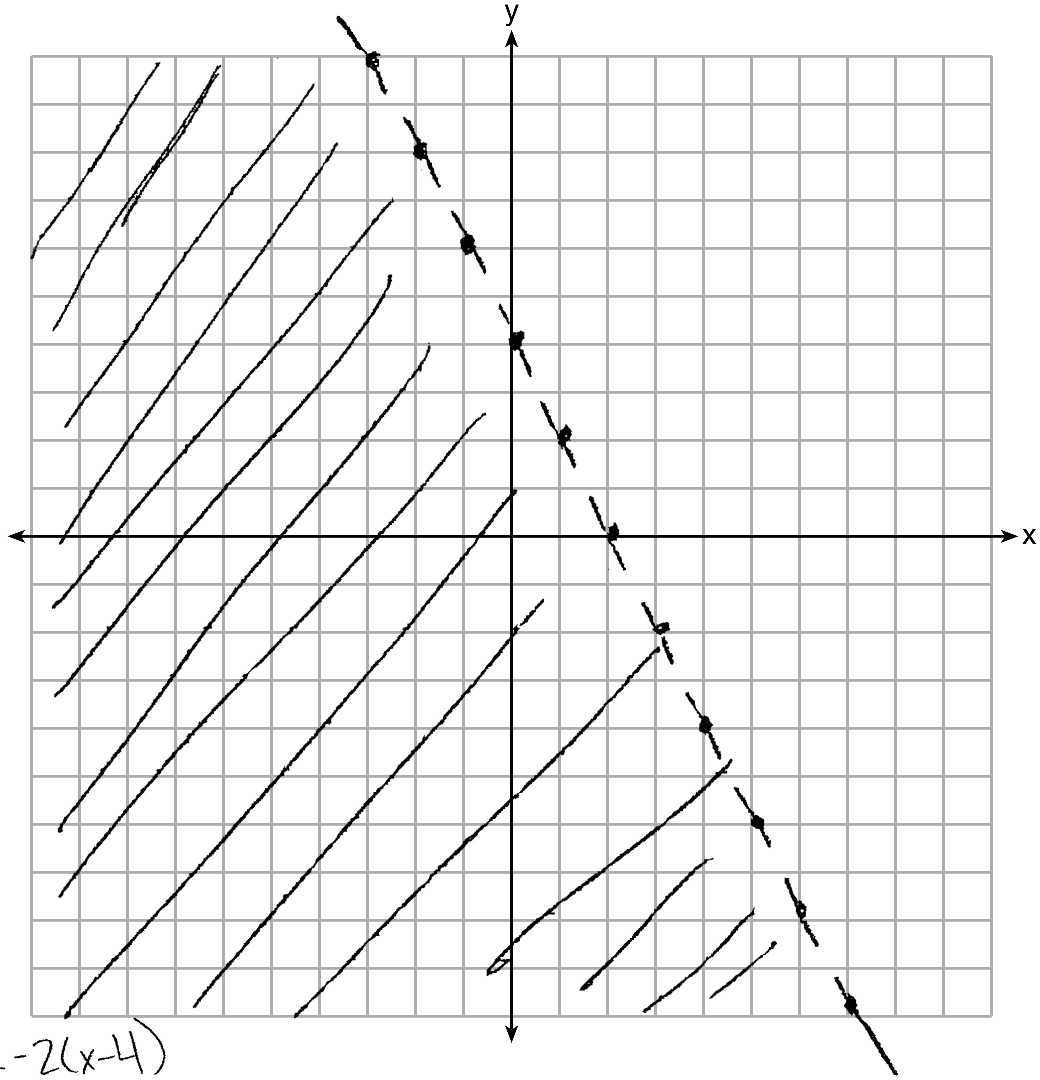
$40 \times .7 = 28$

$$\begin{array}{r} 40 \\ -28 \\ \hline 12 \end{array}$$

Score 0: The student made multiple errors.

Question 30

30 Graph the inequality $y + 4 < -2(x - 4)$ on the set of axes below.



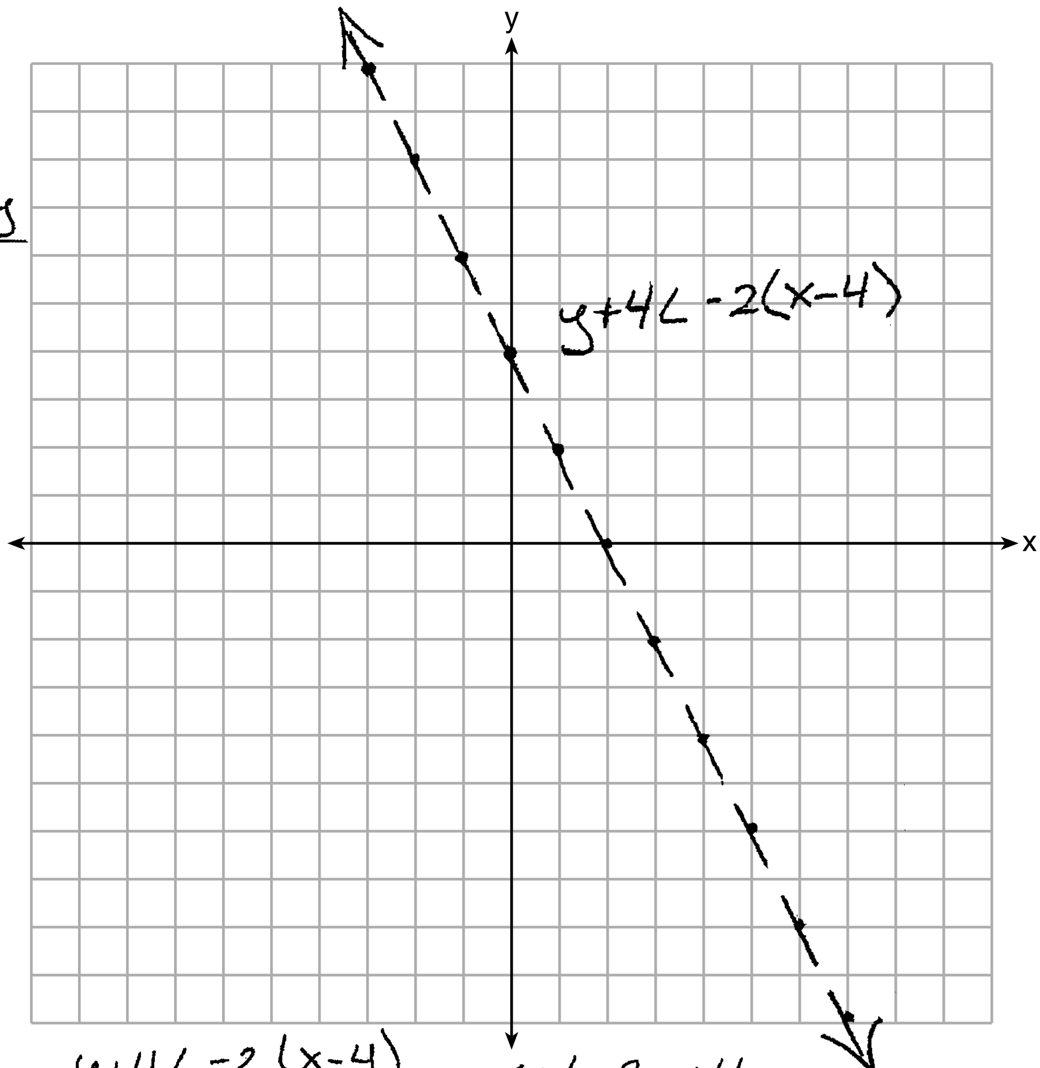
$y+4 < -2(x-4)$
$-4 \quad -4$
$y < -2(x-4)-4$

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

Question 30

30 Graph the inequality $y + 4 < -2(x - 4)$ on the set of axes below.

x	y
-5	14
-4	12
-3	10
-2	8
-1	6
0	4
1	2
2	0
3	-2
4	-4
5	-6



$y+4 < -2(x-4)$

$y+4 < -2x+8$

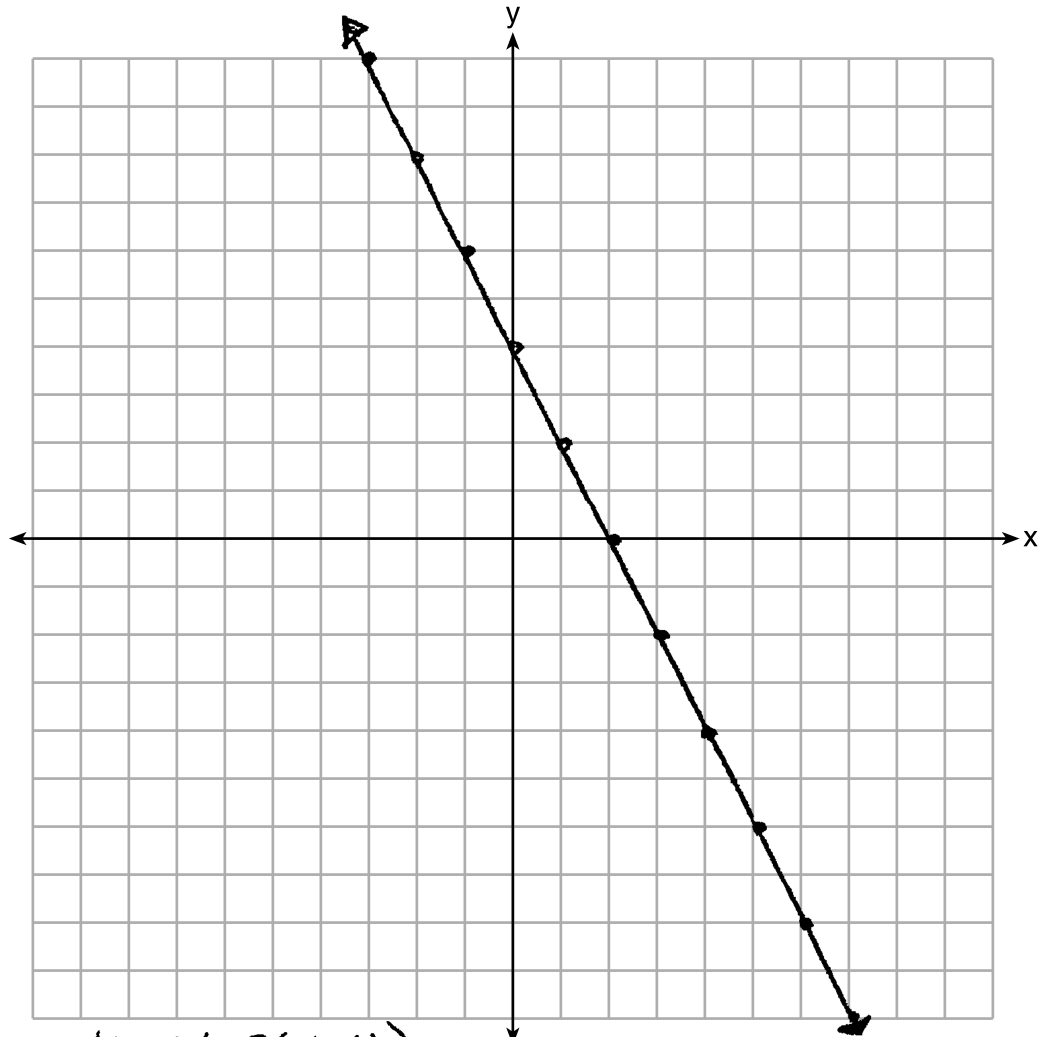
$-4 \qquad\quad -4$

$y < -2x+4$

Score 1: The student graphed the dotted line correctly, but did not shade the inequality.

Question 30

30 Graph the inequality $y + 4 < -2(x - 4)$ on the set of axes below.



$y+4 < -2(x-4)$

$y+4 < -2x+8$

$\underline{\;-4 \qquad\quad -4\;}$

$y < -2x+4$

Score 0: The student made two graphing errors by drawing a solid line and not shading.

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

$$x^2 = x$$

$$x^2 - x = 0$$

$$x(x-1) = 0$$

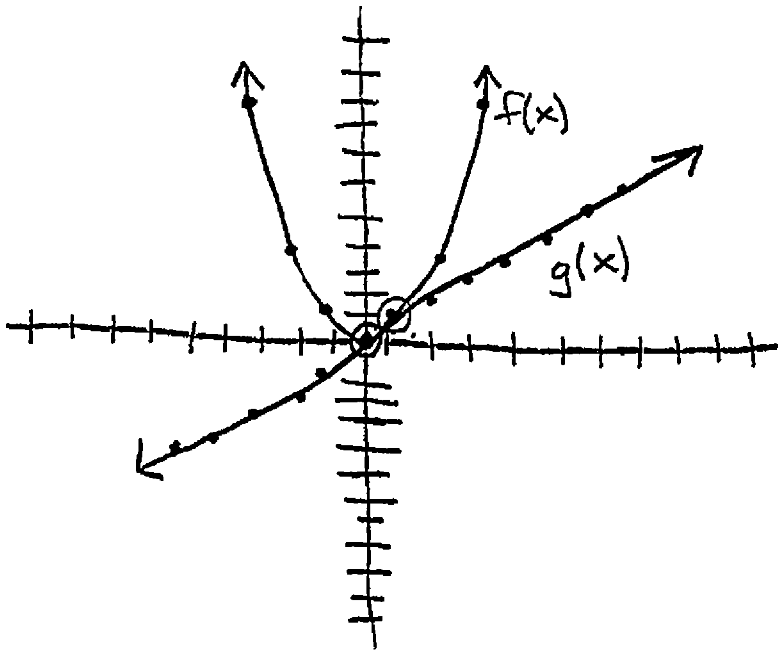
$$x = 0 \quad x = 1$$

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

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

$y = x^2 \qquad y = x$



The values of x are 0 and 1.

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

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

$f(x) = x^2$

x	y
-2	4
-1	1
0	0
1	1

$g(x) = x$

x	y
-2	-2
-1	-1
0	0
1	1

$x = 0$ $\quad$ $x = 1$

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

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

x	y
0	0
1	1
2	4
3	9

x	y
0	0
1	1
2	2
3	3

(0, 0) (1, 1)

Score 1: The student wrote the solutions to $f(x) = g(x)$ as coordinates.

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

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

$$\boxed{x = 1}$$

Score 1: The student found one correct solution.

Question 31

31 If $f(x) = x^2$ and $g(x) = x$, determine the value(s) of x that satisfy the equation $f(x) = g(x)$.

I graphed it & got this as a table.

X	y1	y2
-4	16	-4
-3	9	-3
-2	4	-2
-1	1	-1
0	0	0
1	1	1
2	4	2

Score 0: The student showed appropriate work, but did not state either solution.

Question 32

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

it will go to the right by however many (a) equals

$h(x) = |x| - a$

will go down based on however many (a) equals.

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

Question 32

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

Right a

$h(x) = |x| - a$

down a

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

Question 32

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

moved down a units

$h(x) = |x| - a$

moved right a units

Score 1: The student reversed the horizontal and vertical shifts.

Question 32

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

The function moves left a units.

$h(x) = |x| - a$

The function moves down a units.

Score 1: The student only stated one shift correctly.

Question 32

32 Describe the effect that each transformation below has on the function $f(x) = |x|$, where $a > 0$.

$g(x) = |x - a|$

The function would be translated down a units.

$h(x) = |x| - a$

The function would be translated to the left a units.

Score 0: The student wrote two incorrect responses.

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

$r(x) = x^2 + 3x - 18$

18
1×18
2×9
3×6

$(x+6)(x-3) = 0$

$x \cancel{+6} = 0 \quad x \cancel{-3} = 0$

$\cancel{-6} \quad -6 \quad \cancel{+3} \quad +3$

$\boxed{x = -6} \quad \boxed{x = 3}$

Explain what the zeros represent on the graph of $r(x)$.

The zeros represent that when the graph crosses the x axis, "x" is (-6) and (3).

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

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

$$r(x) = x^2 + 3x - 18$$

$$0 = x^2 + 3x - 18$$

$$0 = x^2 + 6x - 3x - 18$$

$$0 = x(x+6) - 3(x+6)$$

$$0 = (x-3)(x+6)$$

$$x = 3 \quad \text{or} \quad x = -6$$

Explain what the zeros represent on the graph of $r(x)$.

The zeros represent the x intercepts.

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

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

$0 = x^2 + 3x - 18$

-18	3
-3	6

$0 = (x^2 - 3x) + (6x - 18)$

$0 = x(x-3) + 6(x-3)$

$0 = (x-3)(x+6)$

$x - 3 = 0$	$x + 6 = 0$
$+3 \; +3$	$-6 \; -6$
$x = 3$	$x = -6$

Explain what the zeros represent on the graph of $r(x)$.

The zeros represent the points at which the parabola crosses the x axis

Score 3: The student wrote an incomplete explanation by referencing points and not the x-values at which the parabola crosses the x-axis.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

$a=1 \quad b=3 \quad c=-18$

$x^2+3x-18$

$x=\frac{-(3)\pm\sqrt{3^2-4(1)(-18)}}{2}$

$x=\frac{-3\pm\sqrt{81}}{2}$

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

$\boxed{x=3} \qquad \boxed{x=-6}$

Explain what the zeros represent on the graph of $r(x)$.

points where the parabola crosses the x axis.

Score 2: The student used a method other than factoring to find the zeros of $r(x)$ and wrote an incomplete explanation.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

3, -6

Explain what the zeros represent on the graph of $r(x)$.

When the line crosses the X-axis

Score 2: The student showed no work to find the zeros and wrote an incomplete explanation.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

$x^2 + 3x - 18 = 0$ $3 \times 6 = 18$

$(x + 3)(x + 6) = 0$

$x + 3 = 0$	$x + 6 = 0$
$-3 = 0$	$-6 = 0$
$\boxed{x = -3}$	$\boxed{x = -6}$

Explain what the zeros represent on the graph of $r(x)$.

Zeros represent the point of intersection between the equation in the graph.

Score 1: The student made a factoring error and wrote an incorrect explanation.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

$x^2 + 3x - 18$

$$\begin{array}{c|c} 18 & 3 \\ \hline -3 \cdot 6 & \end{array}$$

$x^2 - 3x + 6x - 18$

$x(x-3) + 6(x-3)$

$(x+6)(x-3) = 0$

Explain what the zeros represent on the graph of $r(x)$.

-3

Score 1: The student wrote a correctly factored equation.

Question 33

33 The function $r(x)$ is defined by the expression $x^2 + 3x - 18$. Use factoring to determine the zeros of $r(x)$.

$x^2 + 3x - 18$
$a = 1$
$b = 3$
$c = -18$

-18
-3 +6
3

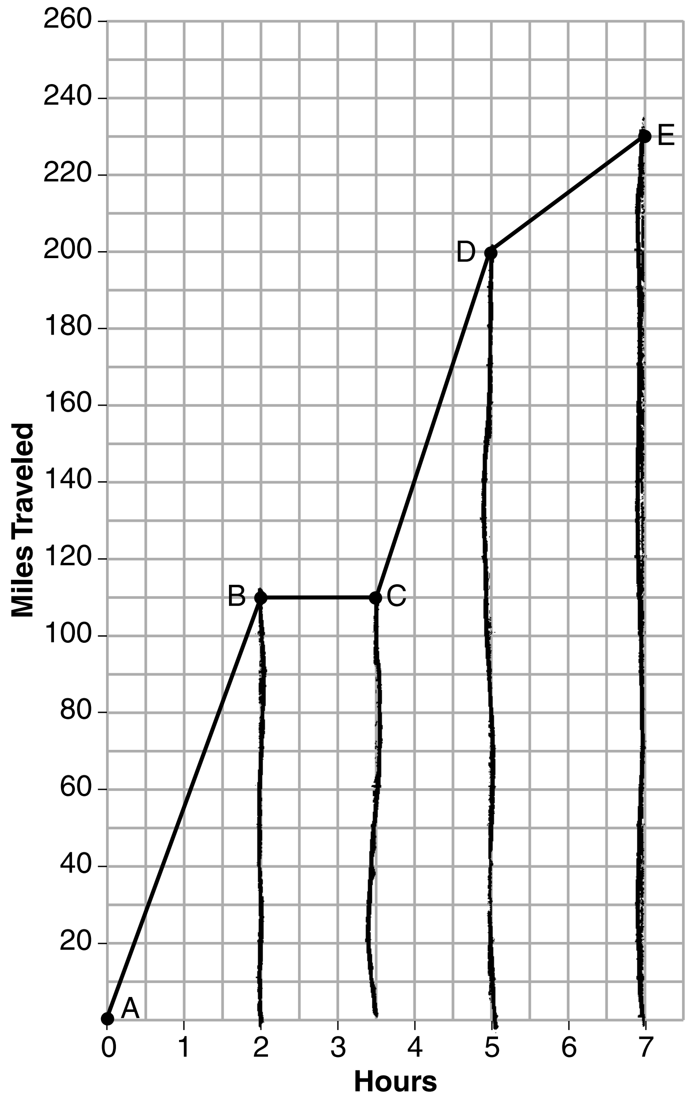
$r(x) = (0, 3)(0, -6)$

Explain what the zeros represent on the graph of $r(x)$.

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

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

AB: $\frac{110}{2} = 55$ CD: $\frac{90}{1.5} = 60$

BC: 0 DE: $\frac{30}{2} = 15$

From D to E. 15 miles per hour is an appropriate speed for city driving.

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between B and C.

Craig stopped at a text area on the highway to check his messages.

Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

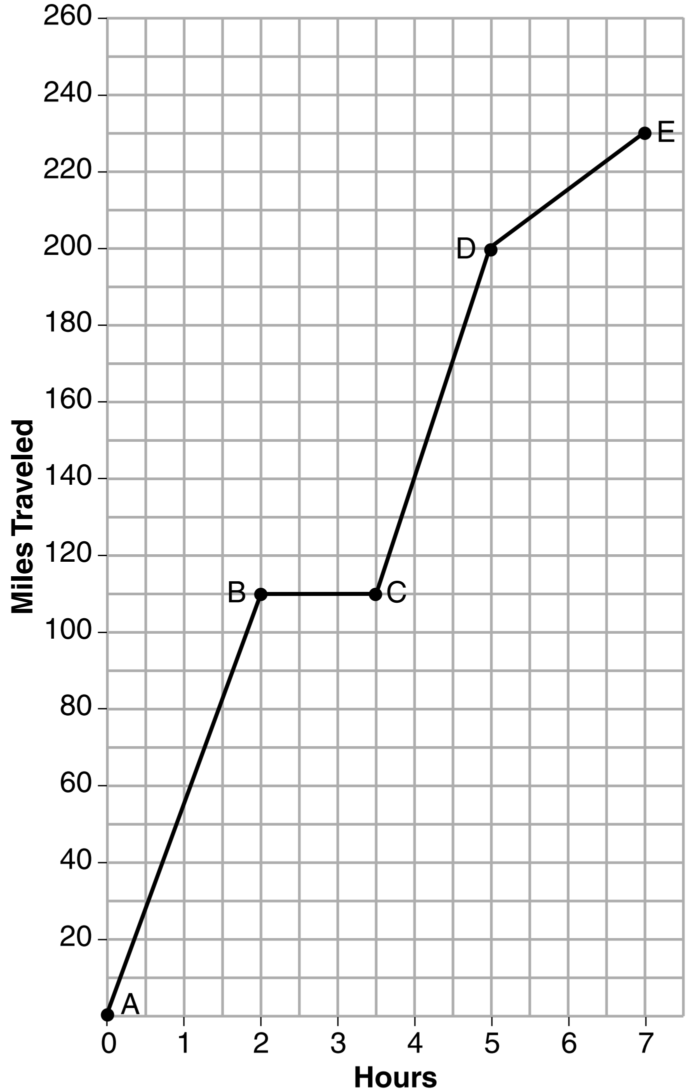
$$\frac{230}{7} = 32.85714286$$

32.9 miles per hour

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

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

D to E it is slower but

not stopped

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

he took a nap

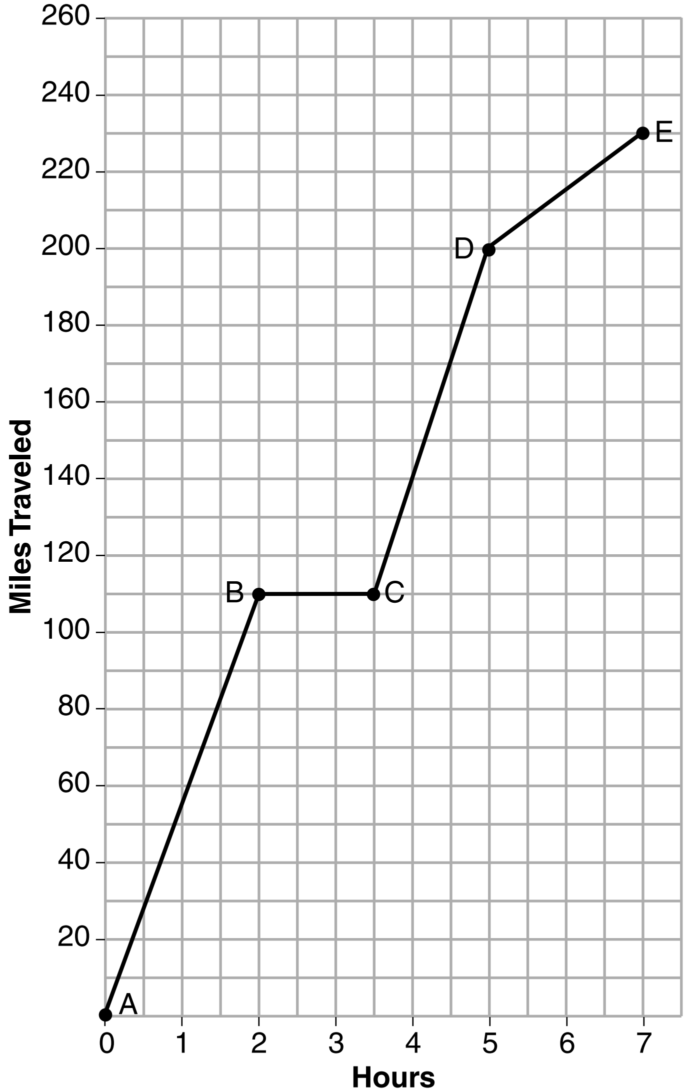
Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

32.4 mph

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

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



~~A-B~~
~~B-C~~
~~C-D~~
D-E

Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

D - E because that is the flattest slope without it being completely flat

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between B and C.

He stopped to eat something

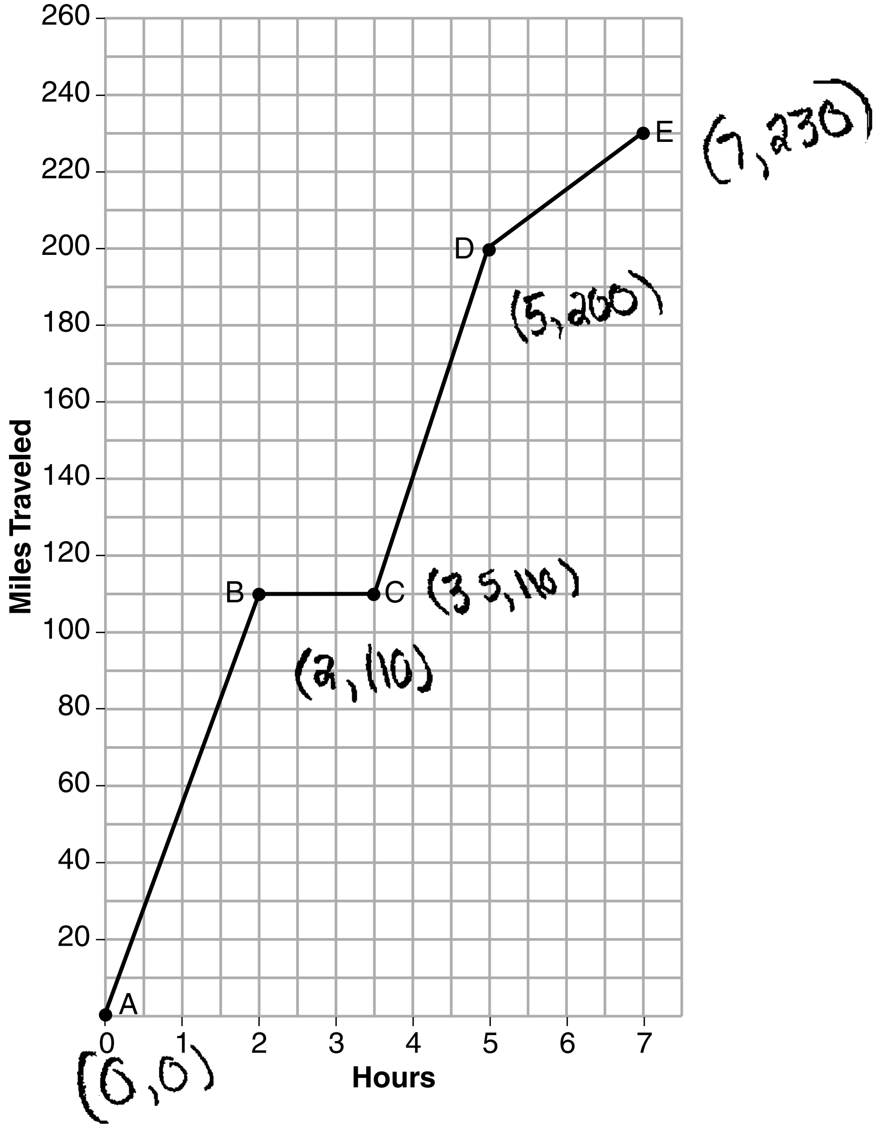
Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

$$\frac{110\text{m}}{2\text{hours}} = \boxed{100 \text{ mph}}$$

$$\cancel{\frac{150\text{m}}{4\text{hours}}} =$$

Score 3: The student calculated the average speed incorrectly.

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

From hours 5 to 7 because craig would be stuck it traffic and the rate of change for hours 5 to 7. is slower than hours 0 to 2 and $3\frac{1}{2}$ to 5.

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

Between interval B and C

craig could have gotten a

flat tire and had to stop

Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

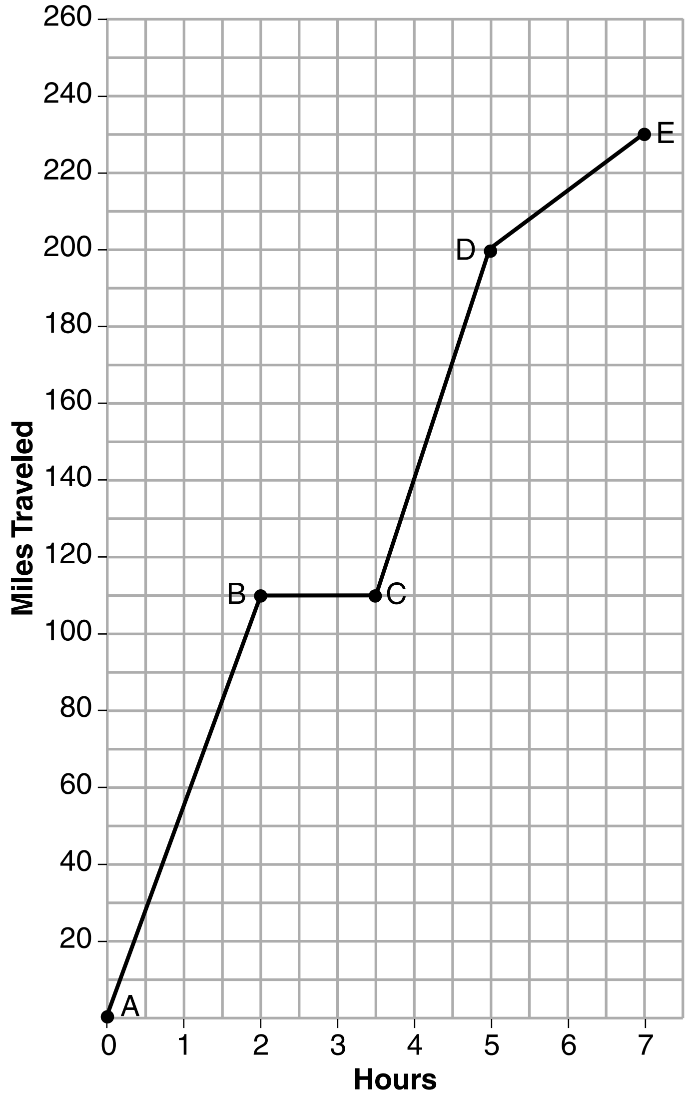
$$\text{r.o.c} = \frac{y-y}{x-x}$$

$$0-2 = \frac{110-0}{2-0} = \frac{110}{2} = 55\text{mph}$$

Score 3: The student made an error in calculating the average speed of the entire trip.

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

Between D and E because there may have been traffic.

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

He may have stoppetsomewhere to stay there or take a break from driving

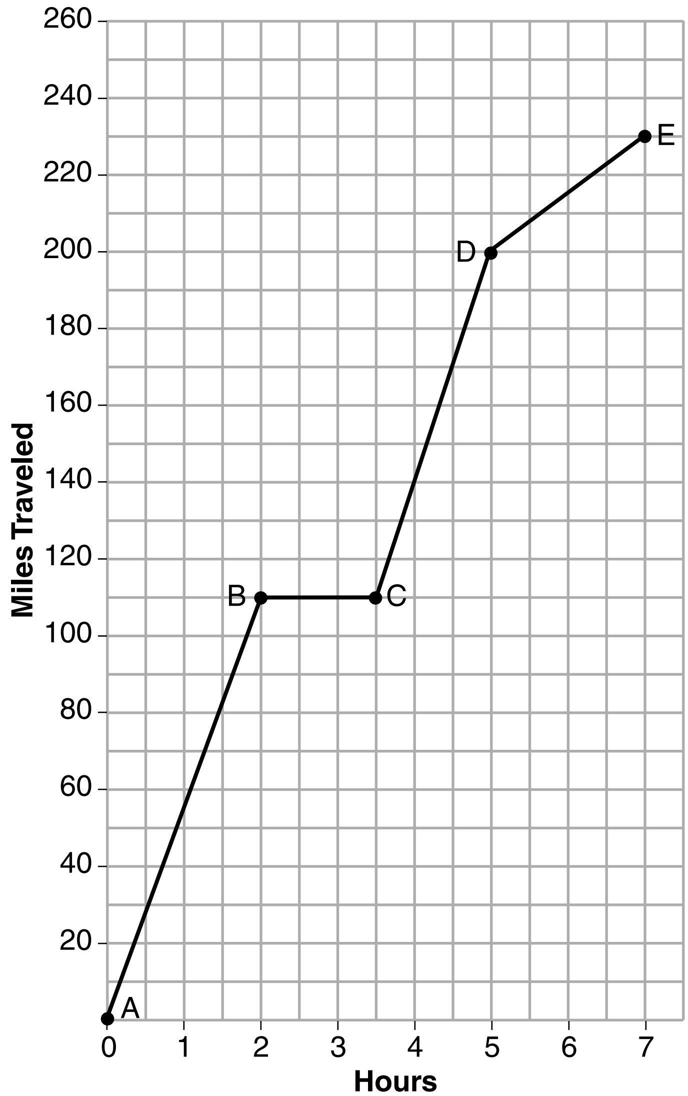
Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

32.8 miles per hour

$\frac{230 \text{ miles}}{7 \text{ hours}}$ //

Score 2: The student wrote a correct interval, but with an incomplete explanation, and made a rounding error.

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

B to C because the car was stopped for the whole interval.

Question 34 is continued on the next page.

Question 34

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

? IDK

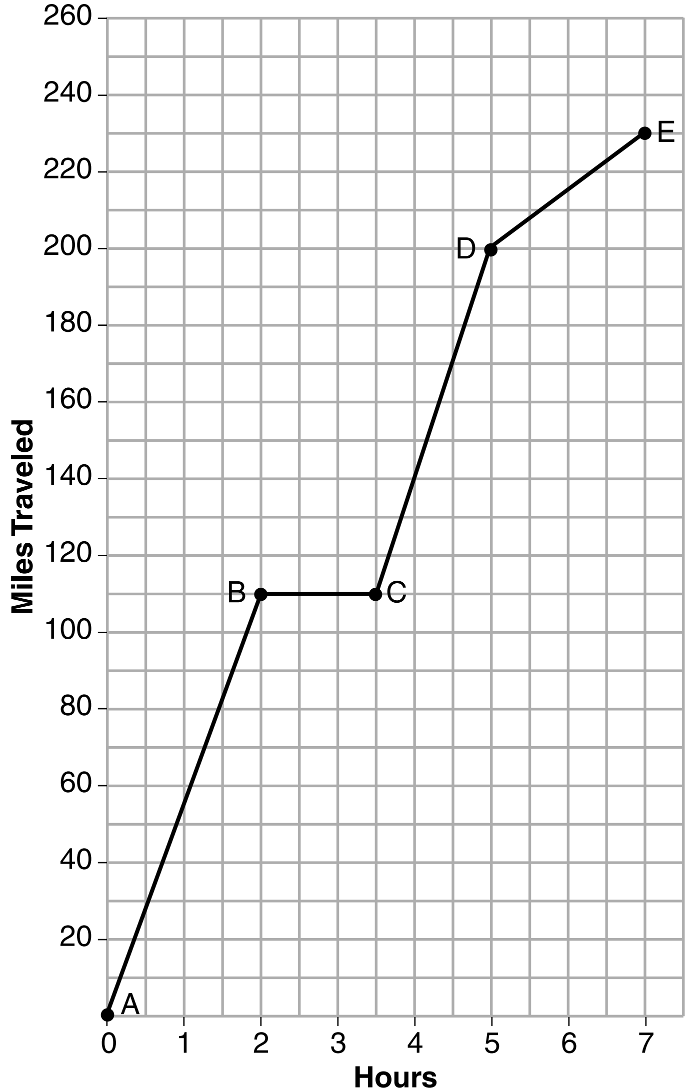
Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

$$\frac{230}{7} = 32.9$$

Score 1: The student calculated the average speed correctly.

Question 34

34 The graph below models Craig's trip to visit his friend in another state. In the course of his travels, he encountered both highway and city driving.



Based on the graph, during which interval did Craig most likely drive in the city? Explain your reasoning.

A to B because he was driving up a really steep hill.

Question 34 is continued on the next page.

Question 34 continued.

Explain what might have happened in the interval between *B* and *C*.

he was driving really slow

Determine Craig's average speed, to the *nearest tenth of a mile per hour*, for his entire trip.

$$\frac{\text{total miles}}{\text{hours driven}} \quad \frac{230}{5.5} = 41.8$$

Score 0: The student wrote a completely incorrect response.

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

$$2x^2+3x+10=4x+32$$
$$-4x-32 \quad -4x-32$$
$$2x^2-1x-22=0$$

$$\frac{1 \pm \sqrt{1+176}}{4}$$

$$\boxed{x=3.6,-3.1}$$

Explain why you chose the method used to solve this quadratic equation.

I used this method (the quadratic formula) since the equation $2x^2-1x-22=0$ could not be factored by grouping.

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

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

$2x^2 + 3x + 10 = 2(2x+16)$

$2x^2 + 3x + 10 = 4x + 16$

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

$(2x+3)(x-2) = 0$

$2x + 3 = 0 \quad x - 2 = 0$

$2x = -3 \quad x - 2 = 0$

$x = -1.5 \quad x = 2.0$

Explain why you chose the method used to solve this quadratic equation.

I chose this method because it factors easily.

Score 3: The student did not distribute 2 to both $2x$ and 16.

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

$2x^2+3x+10 = 2(2x+16)$

$2x^2+3x+10 = 4x+32$

$-4x \quad -4x-32$

$2x^2-x+10 = 32$

$-32 \quad -32$

$2x^2-x-22=0$

-44

$x = \dfrac{-(-1)\pm\sqrt{(-1)^2-4(2)(-22)}}{2(2)}$

$x = \dfrac{1\pm\sqrt{177}}{4}$

$x = \dfrac{1\pm3\sqrt{59}}{4}$

$x = 1/4 \pm 3/4\sqrt{59}$

$x = 1/4+3/4\sqrt{59}$ | $x = 1/4-3/4\sqrt{59}$

$x = 1\sqrt{59}$ | $x = -1/2\sqrt{59}$

$x = \sqrt{59}$

$x = -3.8$

$x = 7.7$

Explain why you chose the method used to solve this quadratic equation.

I used quadratic formula because completing the square did not work because factors of -44 do not add up to -1.

Score 2: The student made a correct substitution into the quadratic formula and wrote a correct explanation.

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

$2x^2+3x+10=2(2x+16)$

$2x^2+3x+10 = 4x+32$

$2x^2+3x+10-4x-32=0$

$2x^2-x-22=0$

$a=2,\ b=-1,\ c=-22$

$\Delta=(-1)^2-4\times2\times(-22)$

$=1+176$

$=177$

$x=\dfrac{1\pm\sqrt{177}}{4}$

$x_1=\dfrac{1+\sqrt{177}}{4}\approx3.57$

$x_2=\dfrac{1-\sqrt{177}}{4}\approx-3.07$

Explain why you chose the method used to solve this quadratic equation.

Score 2: The student made a rounding error and did not write an explanation.

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

$2x^2+3x+10=2(2x+16)$

$2x^2+3x+10=4x+32$

$-4x \quad -32 \quad -4x \quad -32$

$2x^2-1x-22=0$

1, 44
2, 22
4, 11

$\boxed{x=-3 \quad x=3.6}$

Explain why you chose the method used to solve this quadratic equation.

I chose to find x by putting the quadratic equation in the calculator since doing it manually got me nowhere

Score 1: The student wrote an appropriate explanation, but a method other than algebraic was used, and only one correct solution was stated.

Question 35

35 Given:

$$g(x) = 2x^2 + 3x + 10$$
$$k(x) = 2x + 16$$

Solve the equation $g(x) = 2k(x)$ algebraically for x, to the *nearest tenth*.

$g(x) = 2k(x)$

$2x^2 + 3x + 10 = 2x + 2x + 16 + 16$

$2x^2 + 3x + 10 = 4x + 32$

$-10 \qquad -10$

$2x^2 + 3x = 4x + 22$

$-3x \qquad -3x$

$\sqrt{2x^2} = x + 22$

$2x = x + 4.7$

Explain why you chose the method used to solve this quadratic equation.

I used substitution to solve because the question gave me the equastions to work with so I substituded g(x) and k(x) into g(x) = 2k(x)

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

36 Michael has $10 in his savings account. Option 1 will add $100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

option 1 $f(x) = 10 + 100x$

option 2 $g(x) = 10(2)^x$

Michael wants to have at least $700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

opt 1

$f(x) = 10 + 100 \cdot 7$

$= 10 + 700$

$= 710$

opt 2

$g(x) = 10 \cdot 2^7$

$= 10 \cdot 128$

$= 1280$

He will reach his goal with either option.

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

Question 36

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

$$① : f(x) = 100x + 10$$

$$② : f(x) = 10(2)^x$$

Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

Both, Option 1 will suply \$710 to Michael but Option 2 will suply \$1280 so both will give him enough money to buy the Bike.

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

Question 36

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

option 1 $f(x) = 100x + 10$

option 2 $f(x) = 10(1.02)^x$

Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

$y = 100(7) + 10$ Option 1

$y = 710$

$y = 10(1.02)^7$ Option 2

$y = 11.5$

Score 3: The student wrote an incorrect function for option 2, but gave an appropriate determination and justification.

Question 36

36 Michael has \$10 in his savings account. Option 1 will add \$100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

#1 $100x + 10 \geq 700$

#2 $10(2)^x \geq 700$

Michael wants to have at least \$700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

7 Weeks

$100(7) + 10 \geq 700$ ✓

$710 \geq 700$

Both

$10(2)^7 \geq 700$ ✓

$1280 \geq 700$

Score 3: The student did not write two correct functions, but wrote two appropriate inequalities that they used to justify their answer.

36 Michael has $10 in his savings account. Option 1 will add $100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

option 1: $f(700) = 100(7)+10$

option 2: $f(700) = 10(2^7)$

Michael wants to have at least $700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

Both options will enable Michael to reach his goal, because after 7 weeks with Option 1 michael will have $710, and $1280 after Option 2

Score 2: The student made a correct determination, but did not write either function using proper notation.

36 Michael has $10 in his savings account. Option 1 will add $100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

Option 1: $m = 10 + 100w$

Option 2: $m = 10 \cdot 2x^2$

Michael wants to have at least $700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

both will get michael $700 after 7 weeks but option 2 will give him lots more than 700

Score 1: The student stated both options will work.

36 Michael has $10 in his savings account. Option 1 will add $100 to his account each week. Option 2 will double the amount in his account at the end of each week.

Write a function in terms of x to model each option of saving.

$100x + 10$

$10x^2$

Michael wants to have at least $700 in his account at the end of 7 weeks to buy a mountain bike. Determine which option(s) will enable him to reach his goal. Justify your answer.

$100(7) + 10 \geq 700$

$700 \geq 700$

$10(7)^2 \geq 700$

$490 \geq 700$

Score 0: The student wrote only one appropriate expression.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where *x* represents the number of years since 2010.

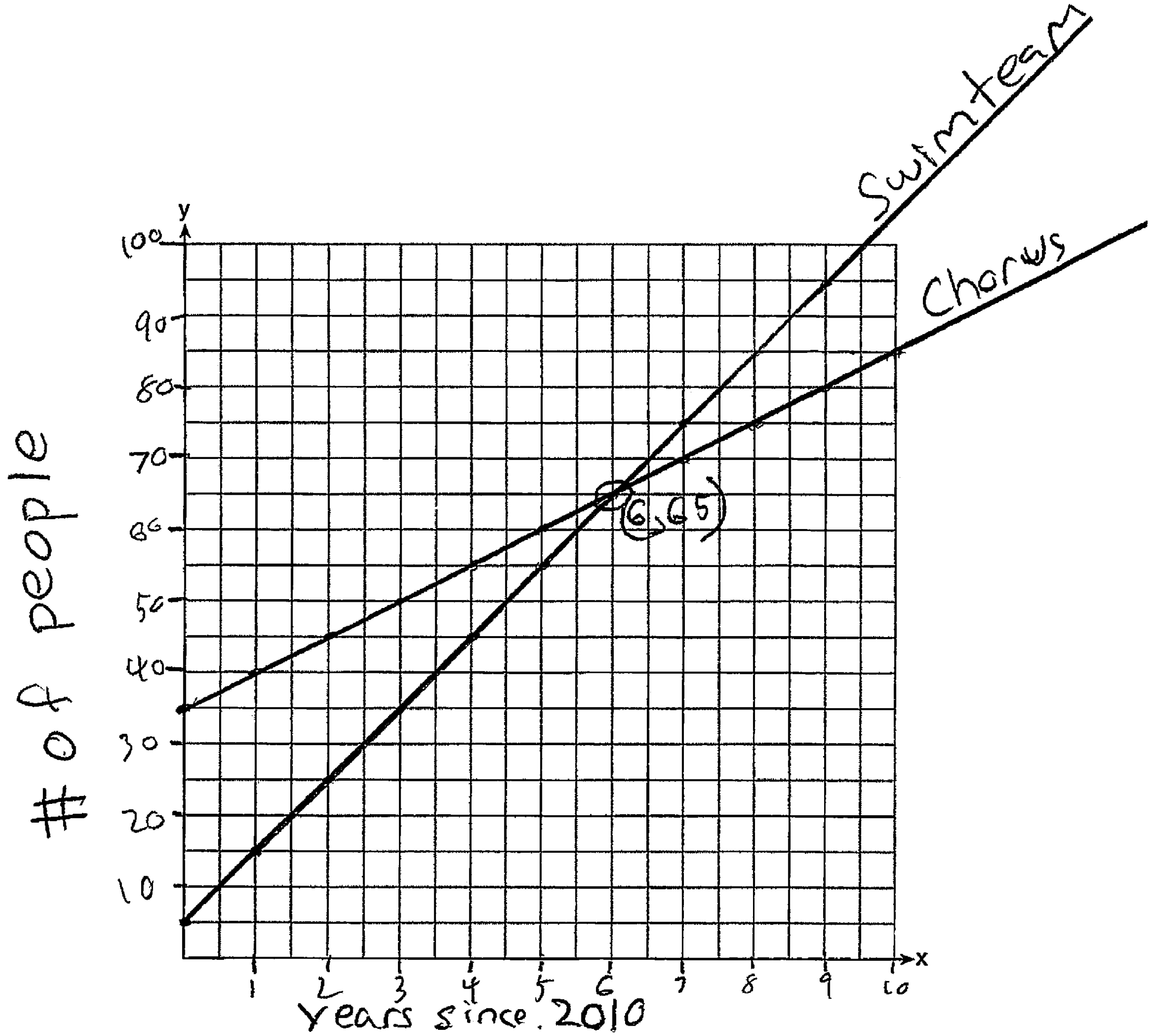
$y = 10x + 5$

$y = 5x + 35$

Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

The coordinant (6, 65) displays that 6 years after 2010, both the swim team and the chorus had 65 members, and in the next year, the number of people on the swim team will surpass the chorus,

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

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

2

S: $5+10x=y$

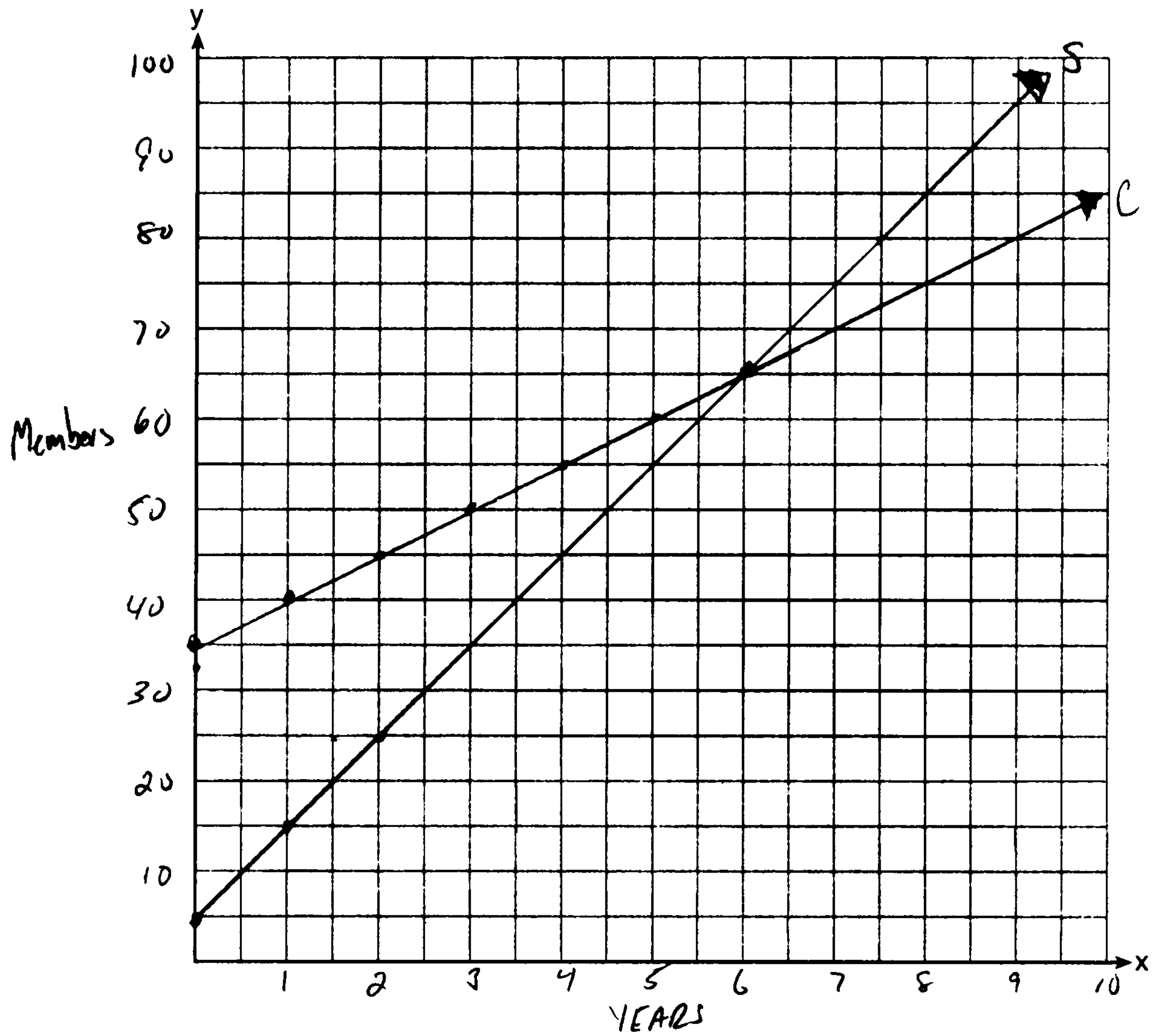
c: $35+5x=y$

Question 37 is continued on the next page.

Question 37

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

The intersection point means both clubs had the same number of students at the same time

Score 5: The student wrote an incomplete explanation.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

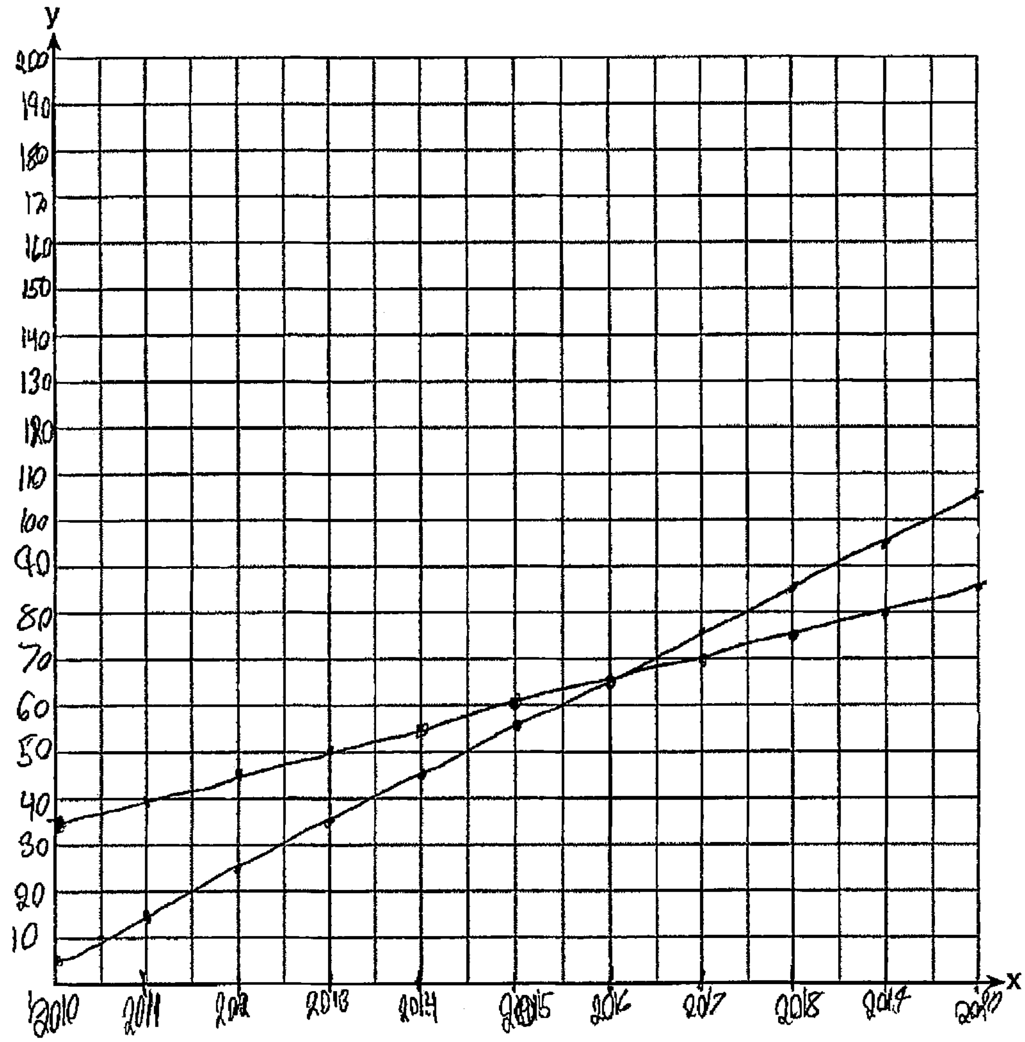
Write a system of equations to model this situation, where x represents the number of years since 2010.

$$y = 5x + 35$$
$$y = 10x + 5$$

Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

at the Point of intersection They have the Same amount of Students

Score 4: The student wrote a correct system of equations. Both lines are graphed correctly, but neither one is labeled. An incomplete explanation was written.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

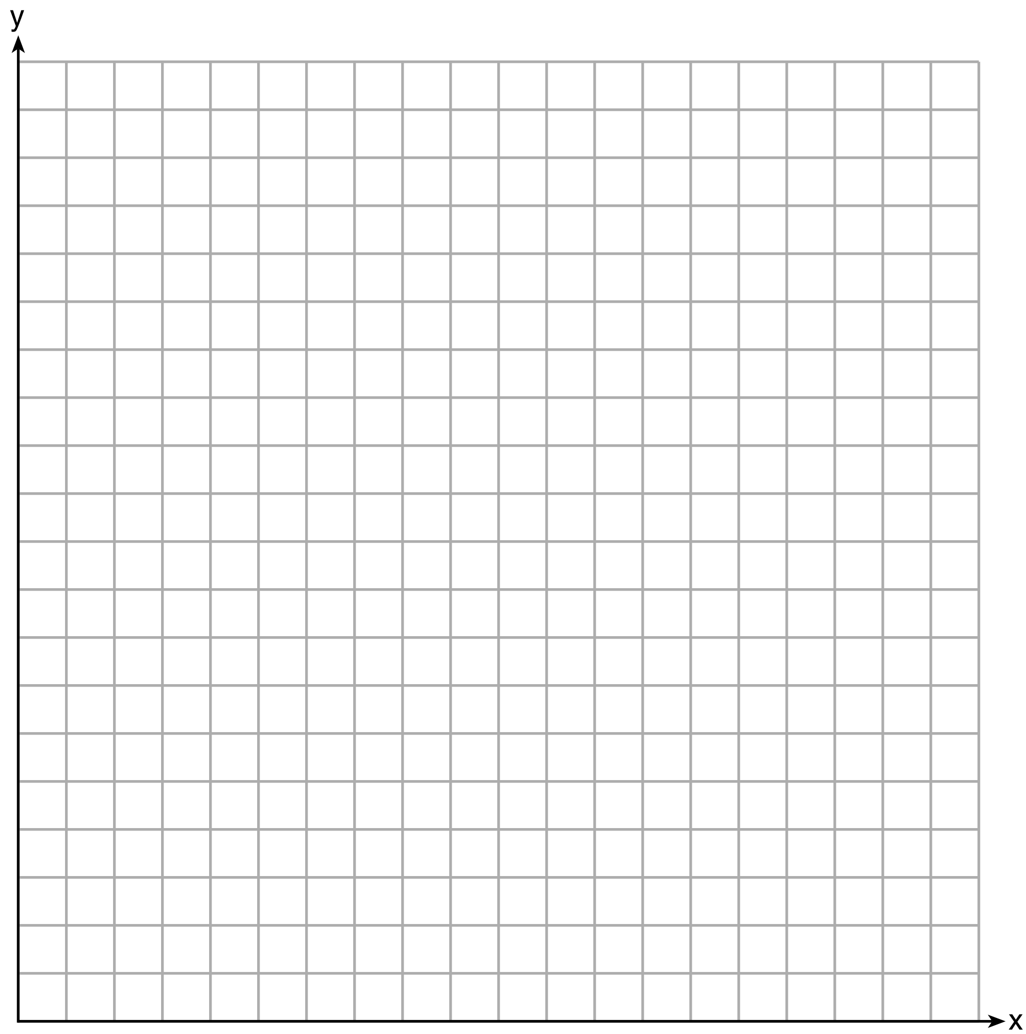
swim $y = 10x + 5$

Chorus $y = 5x + 35$

Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

x is the number of years after 2010 in which the number of students in each activity is the same (y)

Score 4: The student wrote a correct system of equations and explained both coordinates in the context of the problem.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

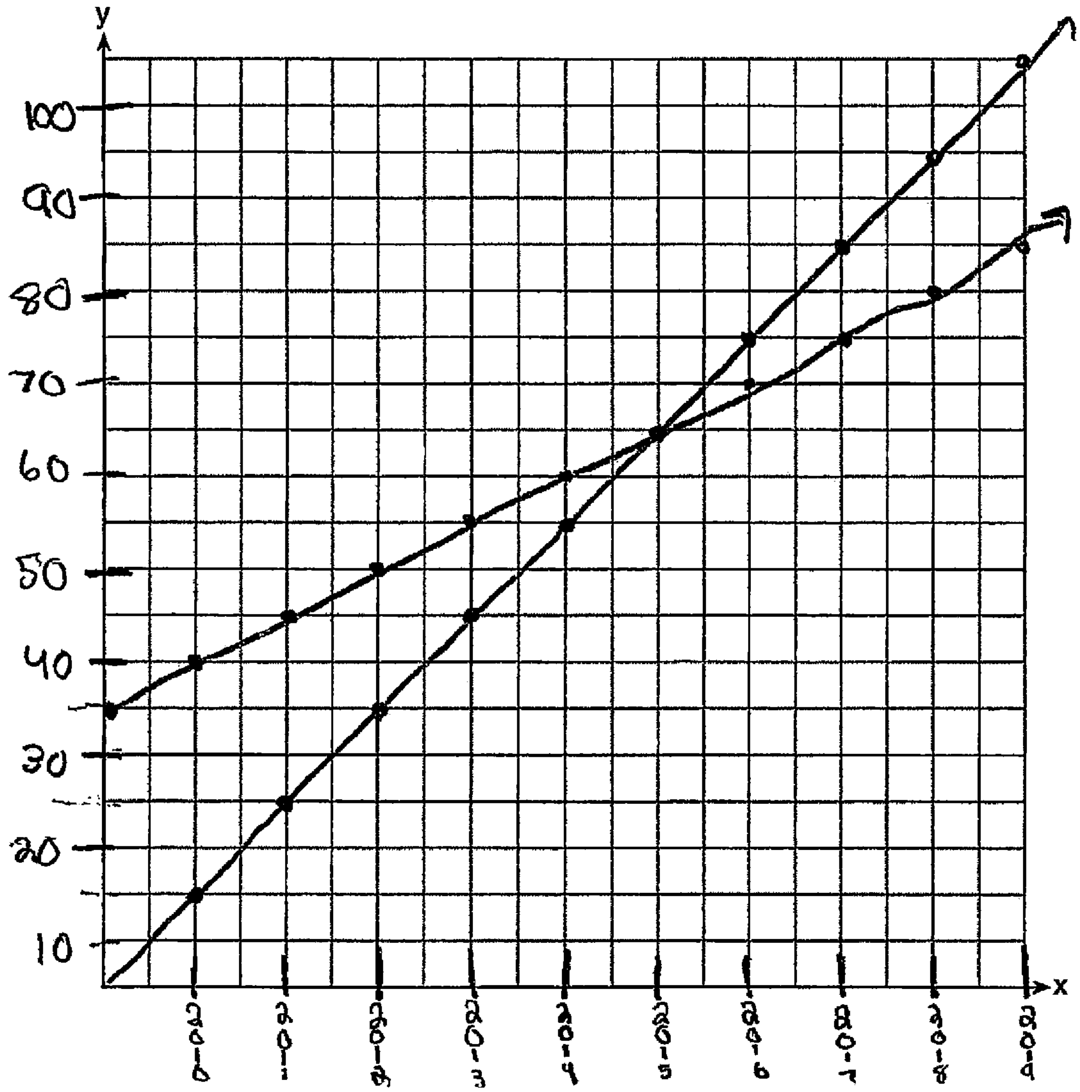
$y = 5 + 10x$ $\quad$ $y = 35 + 5x$

Question 37 is continued on the next page.

Question 37

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

The point of intersection means that this year both teams have the same number of players on the team

Score 3: The student wrote a correct system of equations, but did not graph them correctly. An incomplete explanation was written.

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where *x* represents the number of years since 2010.

$x(5+10)$

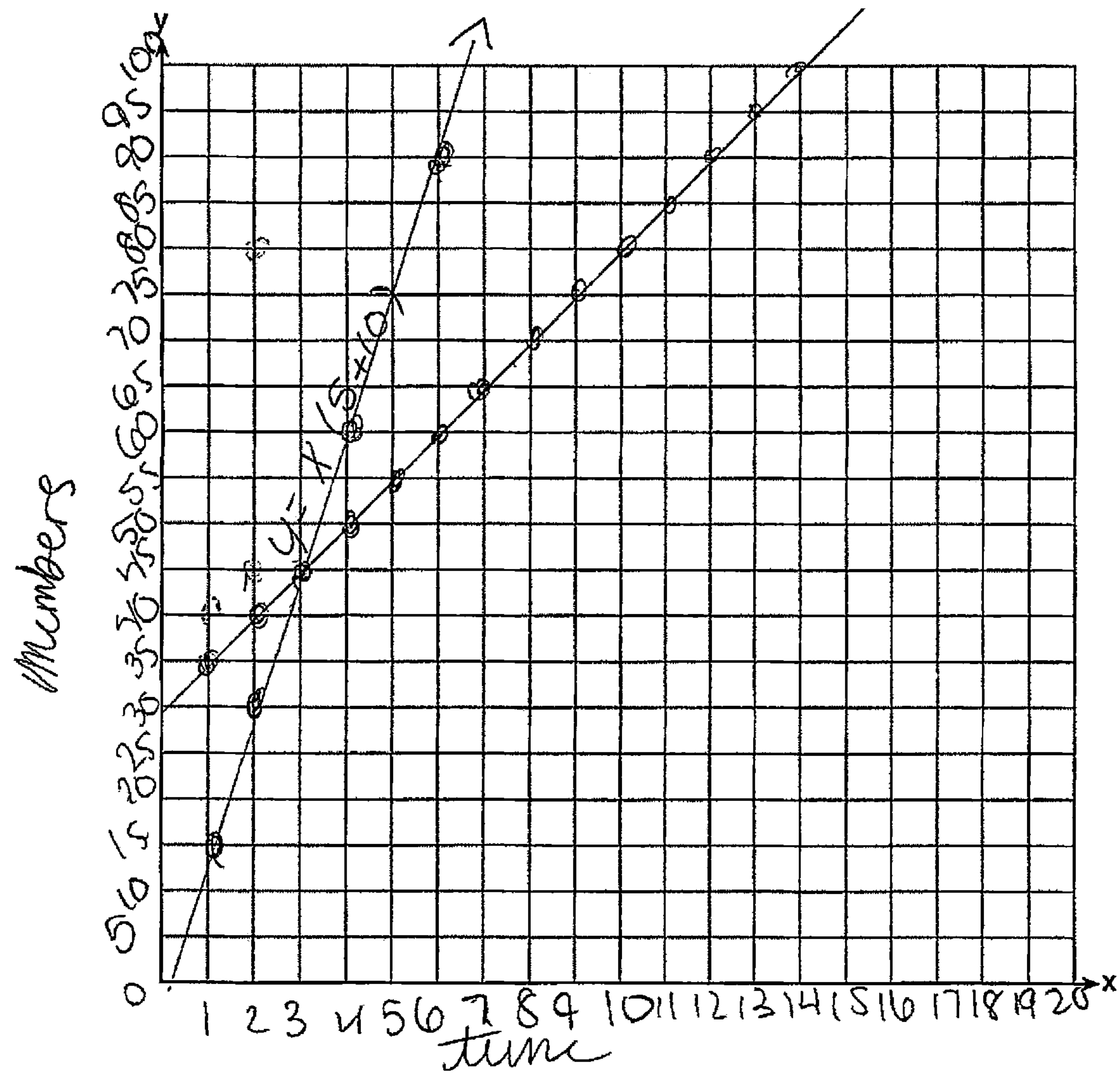
$x(35+5)$

Question 37 is continued on the next page.

Question 37

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

this means that in 3 years they will both have 45 members then after the swim team will have more

Score 2: The student wrote an appropriate explanation based on their graph.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

let x =represent the # of years.

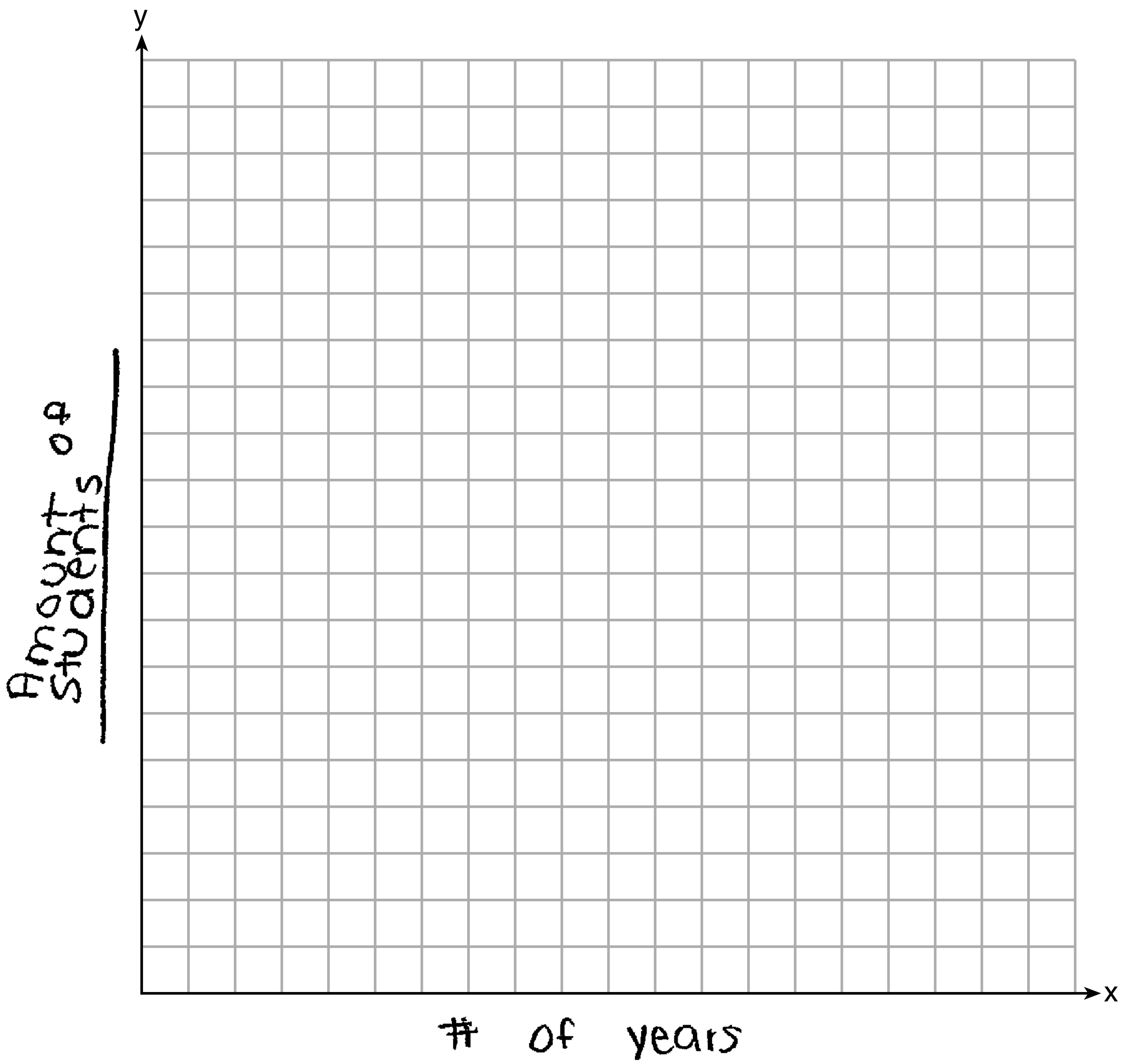
Swim @2010 2010 - Chorus

$5 + (10x) = 35 + 5x$

Question 37 is continued on the next page.

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

Each coordinate represent a
the ~~a stuc~~
the # of students after X how many years.

Score 1: The student wrote two appropriate expressions.

Question 37

37 Central High School had five members on their swim team in 2010. Over the next several years, the team increased by an average of 10 members per year. The same school had 35 members in their chorus in 2010. The chorus saw an increase of 5 members per year.

Write a system of equations to model this situation, where x represents the number of years since 2010.

$$35 + 5(x) > 35$$

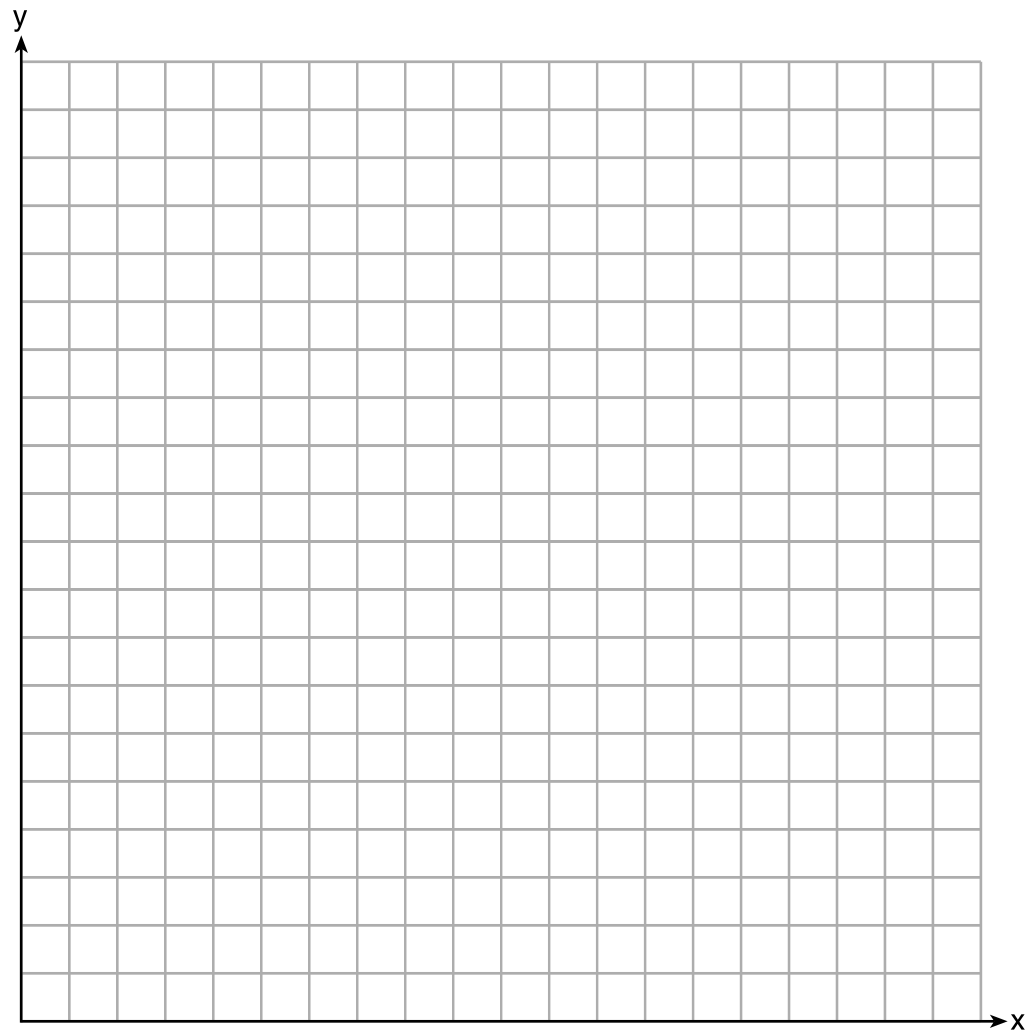
$$5 + 10(x) > 5$$

Question 37 is continued on the next page.

Question 37

Question 37 continued.

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



Explain in detail what each coordinate of the point of intersection of these equations means in the context of this problem.

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