The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

Thursday, January 28, 2016 — 1:15 to 4:15 p.m.

MODEL RESPONSE SET

Table of Contents

Question 25

25 The function, $t(x)$, is shown in the table below.

	x	t(x)	
2	–3	10	–2.5
2	–1	7.5	–2.5
2	1	5	–2.5
	3	2.5	
	5	0	

Determine whether $t(x)$ is linear or exponential. Explain your answer.

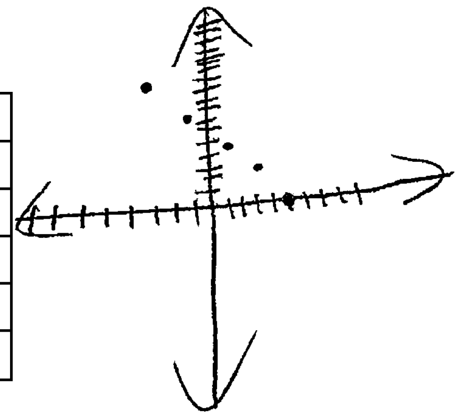
Linear because it has a constant rate of change.

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

Question 25

25 The function, $t(x)$, is shown in the table below.

x	t(x)
–3	10
–1	7.5
1	5
3	2.5
5	0



Determine whether $t(x)$ is linear or exponential. Explain your answer.

Linear because it goes in a straight line

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

Question 25

25 The function, $t(x)$, is shown in the table below.

x	t(x)
–3	10
–1	7.5
1	5
3	2.5
5	0

Determine whether $t(x)$ is linear or exponential. Explain your answer.

t(x) is linear because they have a pattern going on.

Score 1: The student stated linear, but gave an incomplete explanation.

Question 25

25 The function, $t(x)$, is shown in the table below.

x	t(x)
–3	10
–1	7.5
1	5
3	2.5
5	0

Determine whether $t(x)$ is linear or exponential. Explain your answer.

from my calculator I found

$y = -1.25x + 6.25$

and

$r = -1$

Score 1: The student did not state linear.

Question 25

25 The function, $t(x)$, is shown in the table below.

x	t(x)
–3	10
–1	7.5
1	5
3	2.5
5	0

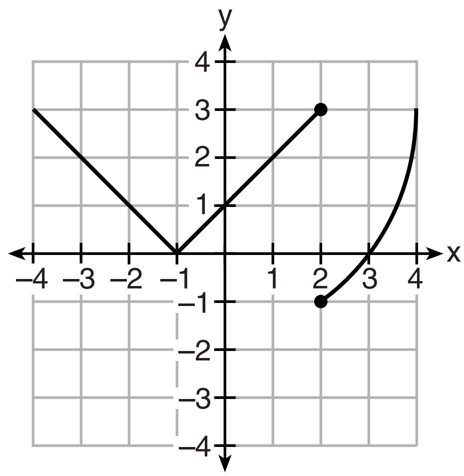
Determine whether $t(x)$ is linear or exponential. Explain your answer.

Exponential. There is no pattern.

Score 0: The student gave a completely incorrect response.

Question 26

26 Marcel claims that the graph below represents a function.



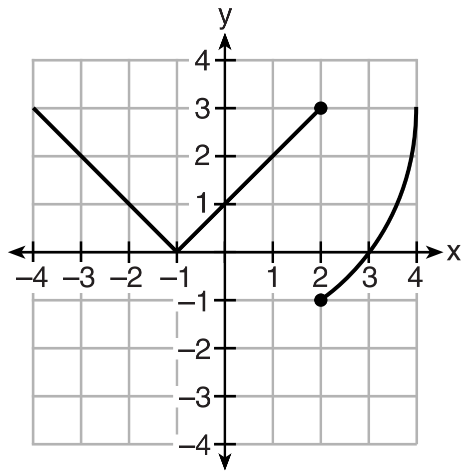
State whether Marcel is correct. Justify your answer.

No, Marcel is not correct because for it to be a functiona there can only be one y for every x value, but this is not the case.

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

Question 26

26 Marcel claims that the graph below represents a function.



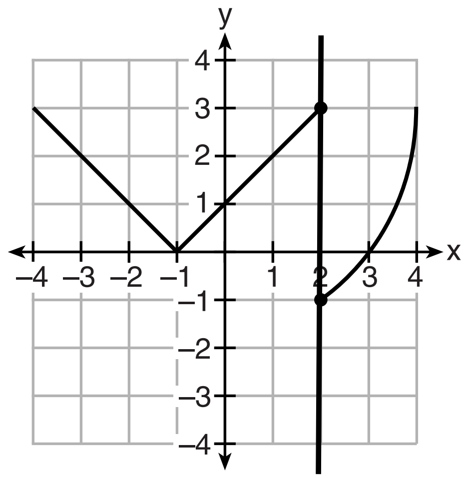
State whether Marcel is correct. Justify your answer.

No, It doesn't pass the vertical line test

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

Question 26

26 Marcel claims that the graph below represents a function.



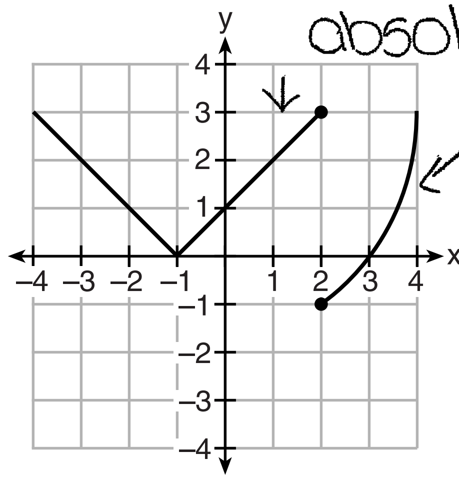
State whether Marcel is correct. Justify your answer.

No

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

Question 26

26 Marcel claims that the graph below represents a function.

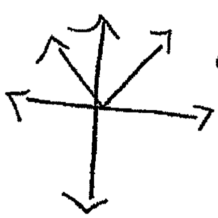


absolute function

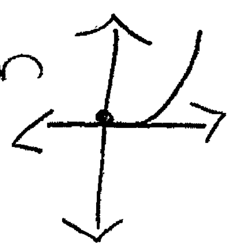
exponential function

State whether Marcel is correct. Justify your answer.

yes this represents a function. X value's don't repeat.



absolute function

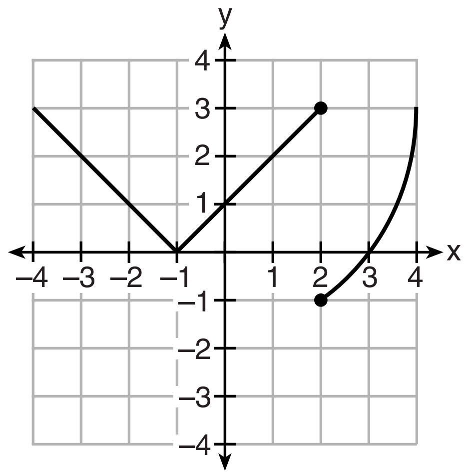


exponential function

Score 1: The student treated the original graph as two separate functions.

Question 26

26 Marcel claims that the graph below represents a function.



State whether Marcel is correct. Justify your answer.

Marcel is not correct, because one of them doesnt have a y-intercept. And the other one starts at (3,2) decends to (-1,0), then goes back up to (-4,3). so neither of these graphs are a function.

Score 0: The student gave an incorrect justification.

Question 27

27 Solve the equation for y.

$$(y - 3)^2 = 4y - 12$$

$y^2 - 6y + 9 = 4y - 12$

$y^2 - 6y + 9 = 4y - 12$
$\quad +12 \qquad +12$

$y^2 - 6y + 21 = 4y$
$\cancel{-4y} \qquad -4y$

$y^2 - 10y + 21 = 0$

$(y - 3)(y - 7) = 0$

$\{7, 3\}$

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

Question 27

27 Solve the equation for y.

$$(y - 3)^2 = 4y - 12$$

graphing calc

enter $y = (x-3)^2$

$y_2 = 4x - 12$

x	y_1	y_2
0	9	-12
1	4	-8
2	1	-4
3	0	0
4	1	4
5	4	8
6	9	12
7	16	16

$y = 3$

$y = 7$

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

Question 27

27 Solve the equation for y.

$$(y - 3)^2 = 4y - 12$$

$$(y-3)^2 = 4(y-3)$$

$$y-3 = 4$$

$$y = 7$$

Score 1: The student divided each side of the equation by $(y - 3)$, which resulted in finding only one solution.

Question 27

27 Solve the equation for y.

$$(y - 3)^2 = 4y - 12$$

$$y^2 - 9 = 4y - 12$$

$$y^2 - 4y + 3 = 0$$

$$(y-3)(y-1) = 0$$

$$y = 3 \qquad y = 1$$

Score 1: The student squared the binomial incorrectly.

Question 27

27 Solve the equation for y.

$$(y - 3)^2 = 4y - 12$$

$$y^2 - 6y + 9 = 4y - 12$$

$$\underline{-4y + 12} = \underline{-4y + 12}$$

$$y^2 - 10y + 21 = 0$$

$$(y-3)(y-7) = 0$$

Score 1: The student did not state the solution.

27 Solve the equation for y.

$$(y - 3)^2 = 4y - 12$$

$y^2 - 6y + 9 = 4y - 12$
$-4y \quad -4y$
$y^2 - 10y + 9 = -12$
$y^2 - 10y + 21 = 0$

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

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

27 Solve the equation for y.

$$(y - 3)^2 = 4y - 12$$

$(y-3)(y-3)=4y-12$

$y^2-3y-3y+9=4y-12$

$y^2-6y+9=4y-12$
$+6y \quad +6y$

$y^2+9=10y-12$
$-9 \quad -9$

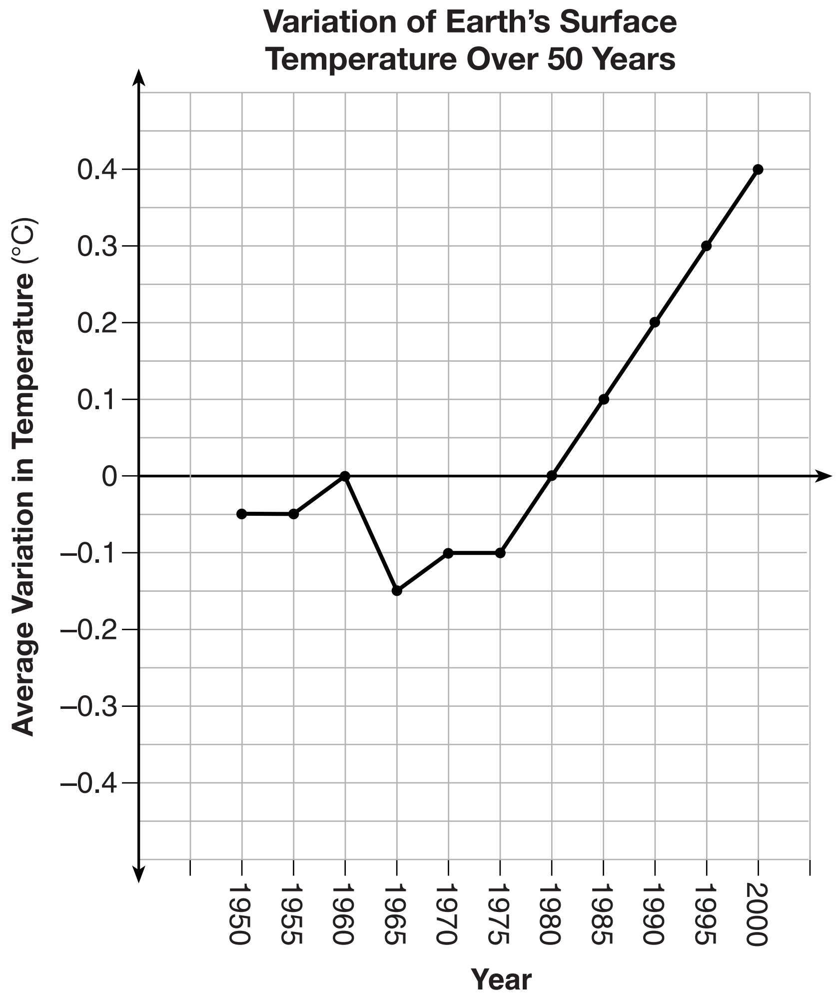
$\sqrt{y^2}=\sqrt{10y-21}$

$\boxed{\sqrt{y^2=-21}}$

Score 0: The student made multiple errors.

Question 28

28 The graph below shows the variation in the average temperature of Earth's surface from 1950–2000, according to one source.



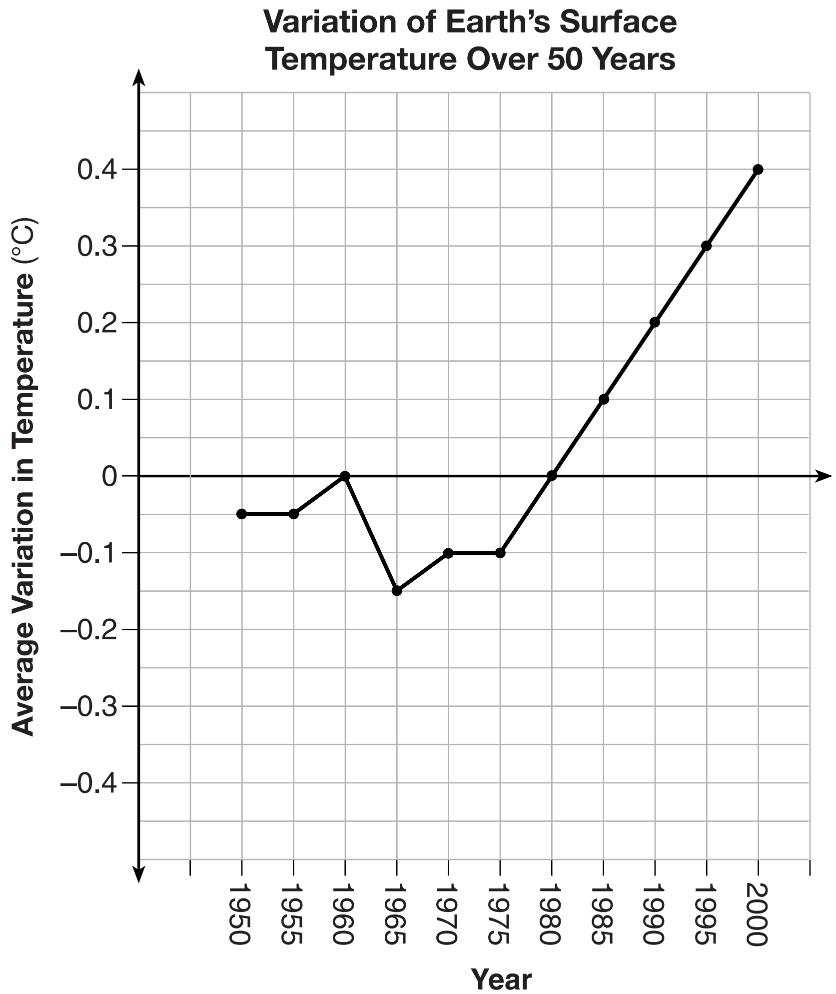
During which years did the temperature variation change the most per unit time? Explain how you determined your answer.

Between 1960 - 1965 becaube in the 5 year they decrease by 0.15 and the other are increcse or decrease by 0.1 or less.

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

Question 28

28 The graph below shows the variation in the average temperature of Earth's surface from 1950–2000, according to one source.



During which years did the temperature variation change the most per unit time? Explain how you determined your answer.

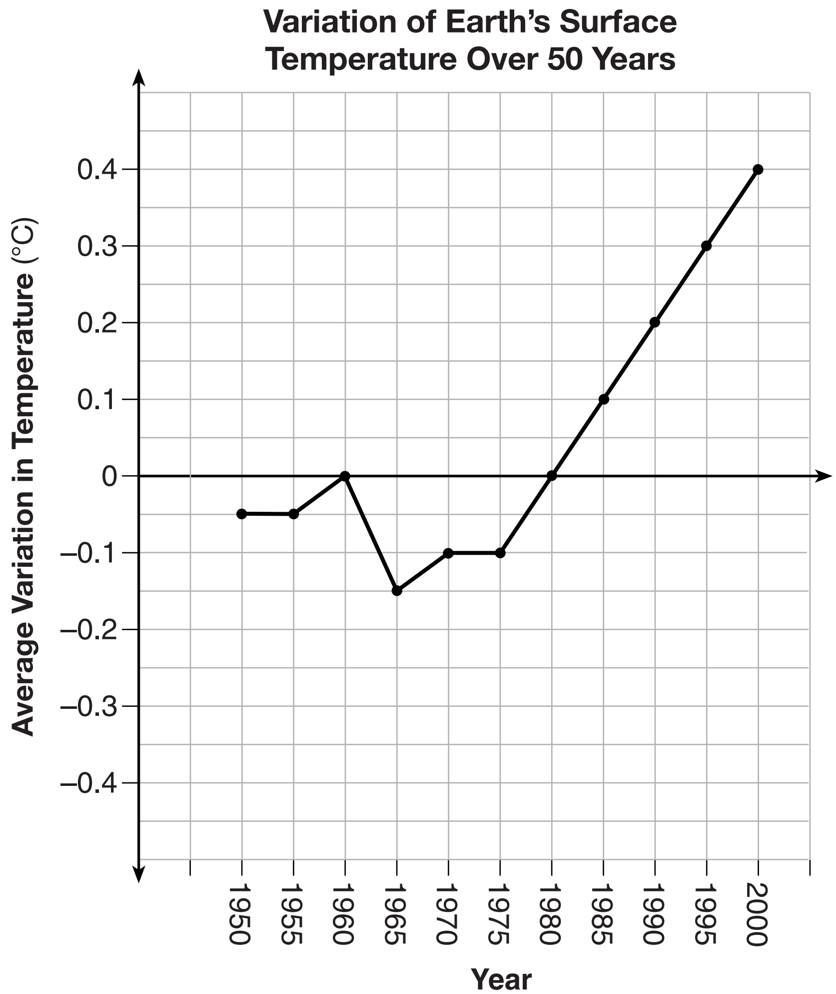
from 1960 to 1965

the graph has the steepest slope

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

Question 28

28 The graph below shows the variation in the average temperature of Earth's surface from 1950–2000, according to one source.



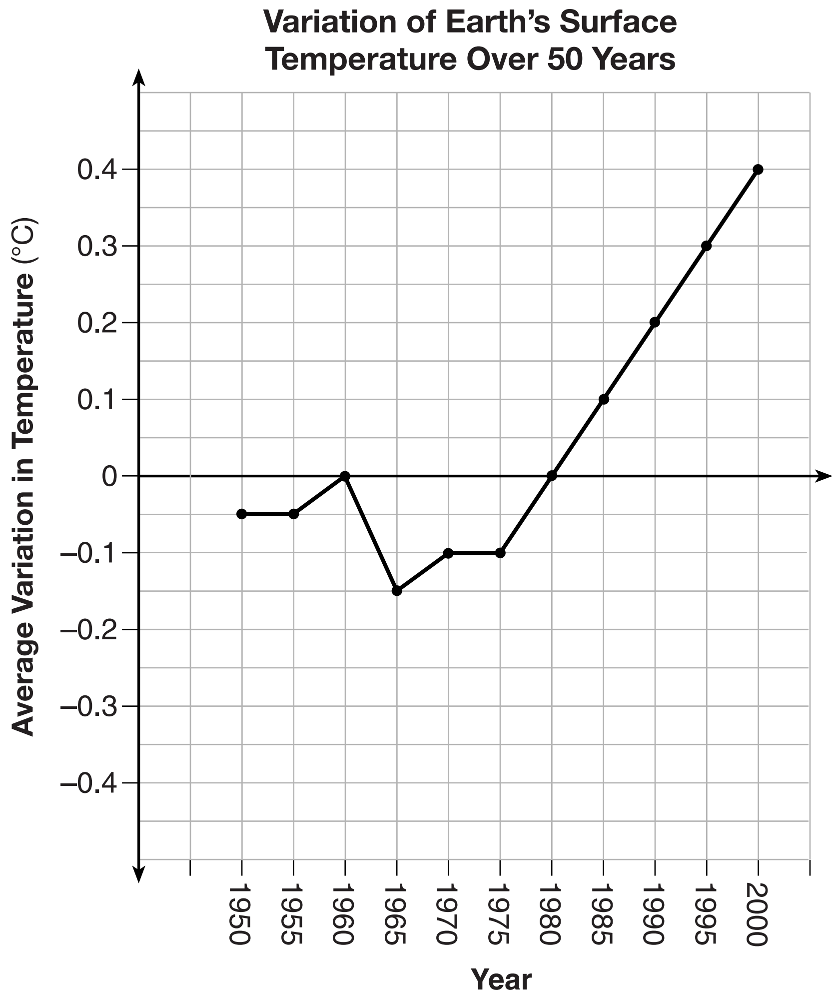
During which years did the temperature variation change the most per unit time? Explain how you determined your answer.

The tempurature changed the most from 1960 to 1965. I know this change is the biggest because the tempurature goes from 0°C to −.15°C.

Score 1: The student gave an explanation that is not completely correct. The rate of change of the interval was not compared to other intervals' rates of change.

Question 28

28 The graph below shows the variation in the average temperature of Earth's surface from 1950–2000, according to one source.



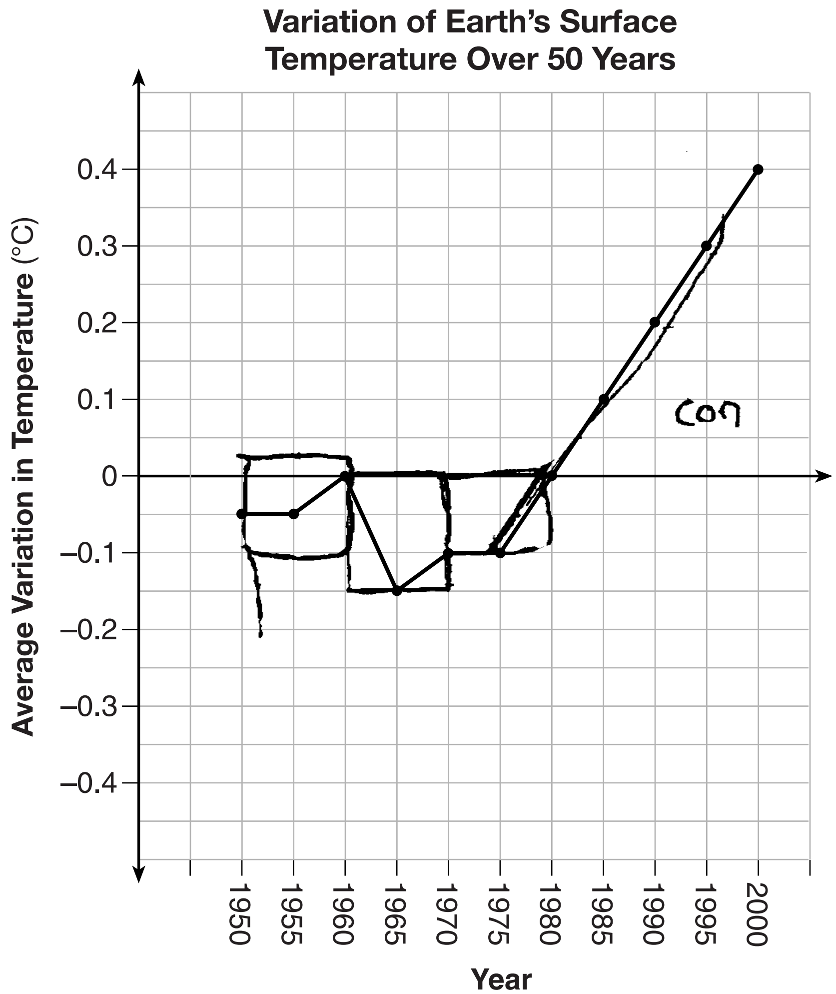
During which years did the temperature variation change the most per unit time? Explain how you determined your answer.

1960-1965, I determined my answer by using the slope of the line.

Score 1: The student did not indicate how the slope was used in comparison with other intervals.

Question 28

28 The graph below shows the variation in the average temperature of Earth's surface from 1950–2000, according to one source.



During which years did the temperature variation change the most per unit time? Explain how you determined your answer.

1960 → 1970

Changes the most in 10 years

x	y
1960	0
1966	-1.5

$\frac{\Delta y}{\Delta x}$ $\frac{1965-1960}{-1.5-0}$ $\frac{5}{-1.5} = -3\frac{1}{3}$

x	y
1965	-1.50
1970	-1.0

$\frac{\Delta y}{\Delta y}$ $\frac{1970-1965}{-1.0+1.5}$ $\frac{5}{.5} = 10$

Score 0: The student gave a completely incorrect response.

Question 29

29 The cost of belonging to a gym can be modeled by $C(m) = 50m + 79.50$, where $C(m)$ is the total cost for m months of membership.

State the meaning of the slope and y-intercept of this function with respect to the costs associated with the gym membership.

The slope means that is the amant you pay each month. The y intercept is how much you pay to start a membership

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

Question 29

29 The cost of belonging to a gym can be modeled by $C(m) = 50m + 79.50$, where $C(m)$ is the total cost for m months of membership.

State the meaning of the slope and y-intercept of this function with respect to the costs associated with the gym membership.

Slope = How much the prices kept on increasing

y-int = Is where the starting cost of the health club membership was.

Score 1: The student correctly stated the meaning of the y-intercept.

29 The cost of belonging to a gym can be modeled by $C(m) = 50m + 79.50$, where $C(m)$ is the total cost for m months of membership.

State the meaning of the slope and y-intercept of this function with respect to the costs associated with the gym membership.

The slope is the rate of change at which the function either increases or decreases depending on whether it is positive or negative. The slope is 50m which basically means $\frac{50}{1}$ so you go up your graph 50 and move to the right 1 spot.

The y-intercept is where you start your slope at, the y-intercept of this function is 79.50 so you would start there then start on your function.

Score 1: The student defined slope and y-intercept correctly, but not with respect to the cost of the gym membership.

Question 29

29 The cost of belonging to a gym can be modeled by $C(m) = 50m + 79.50$, where $C(m)$ is the total cost for m months of membership.

State the meaning of the slope and y-intercept of this function with respect to the costs associated with the gym membership.

Slope = 50

y-intercept = 79.50

Score 0: The student only stated the slope and the y-intercept.

30 A statistics class surveyed some students during one lunch period to obtain opinions about television programming preferences. The results of the survey are summarized in the table below.

Programming Preferences

	Comedy	Drama
Male	70	35
Female	48	42

Based on the sample, predict how many of the school's 351 males would prefer comedy. Justify your answer.

Let x = # males who prefer comedy

$$\frac{x}{351} = \frac{70}{105}$$

$$105x = 24570$$

$$\frac{105x}{105} = \frac{24570}{105}$$

$$\boxed{x = 234 \text{ males}}$$

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

Question 30

30 A statistics class surveyed some students during one lunch period to obtain opinions about television programming preferences. The results of the survey are summarized in the table below.

Programming Preferences

	Comedy	Drama
Male	70	35
~~**Female**~~	~~48~~	~~42~~

Based on the sample, predict how many of the school's 351 males would prefer comedy. Justify your answer.

$70 + 35 = 105$

$\frac{70}{105}$

Score 1: The student found the correct ratio.

Question 30

30 A statistics class surveyed some students during one lunch period to obtain opinions about television programming preferences. The results of the survey are summarized in the table below.

Programming Preferences

	Comedy	**Drama**
Male	70	35
Female	48	42

Based on the sample, predict how many of the school's 351 males would prefer comedy. Justify your answer.

$$\frac{70}{195} = \frac{x}{351}$$

$$x = 126$$

Score 1: The student used an incorrect proportion.

Question 30

30 A statistics class surveyed some students during one lunch period to obtain opinions about television programming preferences. The results of the survey are summarized in the table below.

Programming Preferences

	Comedy	Drama
Male	70	35
Female	48	42

Based on the sample, predict how many of the school's 351 males would prefer comedy. Justify your answer.

$\frac{70}{351}$

$351\overline{)70}$ $.1994 \times 100$

19.94% of males

Score 0: The student gave a completely incorrect response.

Question 31

31 Given that $a > b$, solve for x in terms of a and b:

$$b(x - 3) \geq ax + 7b$$

Work

$b(x-3) \geq ax + 7b$

$\downarrow$

$bx - 3\cancel{b} \geq ax + 7b$

$\quad +\cancel{3b} \qquad\quad +3b$

$bx \geq \cancel{ax} + 10b$

$-ax \quad\; -\cancel{ax}$

$\dfrac{x\cancel{(b-a)}}{\cancel{(b-a)}} \geq \dfrac{10b}{(b-a)}$

$x \leq \dfrac{10b}{b-a}$

Answer

$\boxed{x \leq \dfrac{10b}{b-a}}$

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

Question 31

31 Given that $a > b$, solve for x in terms of a and b:

$$b(x - 3) \geq ax + 7b$$

$$bx - 3b \geq ax + 7b$$
$$-7b \qquad -7b$$

$$bx - 10b \geq ax$$
$$-bx \qquad -bx$$

$$-10b \geq ax - bx$$

$$\frac{-10b}{a-b} \geq \frac{x(a-b)}{a-b}$$

$$\frac{-10b}{a-b} \geq x$$

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

Question 31

31 Given that $a > b$, solve for x in terms of a and b:

$$b(x - 3) \geq ax + 7b$$

$$bx - 3b \geq ax + 7b$$
$$+3b \qquad\qquad +3b$$

$$bx \geq ax + 10b$$
$$-ax \qquad -ax$$

$$\frac{bx - ax}{b-a} \geq \frac{10b}{b-a}$$

$$\boxed{x \geq \frac{10b}{b-a}}$$

Score 1: The student did not reverse the inequality symbol when dividing each side of the inequality by a negative number.

31 Given that $a > b$, solve for x in terms of a and b:

$$b(x - 3) \geq ax + 7b$$

$bx - 3b \geq ax + 7b$

$bx + ax \geq 3b + 7b$

$\dfrac{x(b+a)}{b+a} \geq \dfrac{10b}{b+a}$

$\boxed{x \geq \dfrac{10b}{b+a}}$

Score 1: The student made an error by writing $bx + ax$ instead of $bx - ax$.

Question 31

31 Given that $a > b$, solve for x in terms of a and b:

$$b(x - 3) \geq ax + 7b$$

$$\frac{bx - 3b}{b} \geq \frac{ax + 7b}{b21}$$

$$\frac{x - 3}{x} \geq \frac{\frac{a}{b}x + 7}{x}$$

$$x\left(\frac{-3}{x}\right) \geq \left(\frac{a}{b} + \frac{7}{x}\right)x$$

$$-3 \geq \frac{a}{b} + 7$$

$$-7 \quad -7$$

$$-10 \geq \frac{a}{b}$$

Score 0: The student gave a completely incorrect response.

Question 32

32 Jacob and Jessica are studying the spread of dandelions. Jacob discovers that the growth over t weeks can be defined by the function $f(t) = (8) \bullet 2^t$. Jessica finds that the growth function over t weeks is $g(t) = 2^{t+3}$.

Calculate the number of dandelions that Jacob and Jessica will each have after 5 weeks.

Jacob

$f(t) = (8) \cdot 2^t$

$f(t) = (8) \cdot 2^5$

$8 \cdot 32$

$\boxed{\text{Jacob: 256 plants}}$

Jessica

$g(t) = 2^{t+3}$

$g(t) = 2^{5+3}$

2^8

$\boxed{\text{Jessica: 256 plants}}$

Based on the growth from both functions, explain the relationship between $f(t)$ and $g(t)$.

They are both the same thing. No matter how many weeks you plug in for t, f(t) and g(t) are always going to be equal.

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

Question 32

32 Jacob and Jessica are studying the spread of dandelions. Jacob discovers that the growth over t weeks can be defined by the function $f(t) = (8) \cdot 2^t$. Jessica finds that the growth function over t weeks is $g(t) = 2^{t+3}$.

Calculate the number of dandelions that Jacob and Jessica will each have after 5 weeks.

$f(t) = (8) \cdot 2^5$

$= (8) \cdot 32$

$f(5) = 256.$

$g(t) = 2^{5+3}$

$= 2^8$

$g(5) = 256$

Both Jacob and Jessica Will have 256 dandelions

Based on the growth from both functions, explain the relationship between $f(t)$ and $g(t)$.

The relationship between f(t) and g(t) is positive because they Continue to increase Also at a certain point the number of dandelions are the same for both Jessica and Jacob

Score 1: The student gave an incomplete explanation.

Question 32

32 Jacob and Jessica are studying the spread of dandelions. Jacob discovers that the growth over t weeks can be defined by the function $f(t) = (8) \cdot 2^t$. Jessica finds that the growth function over t weeks is $g(t) = 2^{t+3}$.

Calculate the number of dandelions that Jacob and Jessica will each have after 5 weeks.

Jacob: There would be 256 dandelions in 5 weeks.

Jessica: There would be also 256 dandelions in 5 weeks.

Based on the growth from both functions, explain the relationship between $f(t)$ and $g(t)$.

The relationship between Jessica and Jacob is there will be 256 dandelions growing in both their field.

Score 1: The student gave an incorrect explanation.

Question 32

32 Jacob and Jessica are studying the spread of dandelions. Jacob discovers that the growth over t weeks can be defined by the function $f(t) = (8) \cdot 2^t$. Jessica finds that the growth function over t weeks is $g(t) = 2^{t+3}$.

Calculate the number of dandelions that Jacob and Jessica will each have after 5 weeks.

$f(t) = 8 \cdot 2^5$
$= 8 \times 32$
$= 256$
Jacob $= 256$

$g(t) = 2^5 + 2^3$
$= 32 + 8$
$= 40$
Jessica $= 40$

Based on the growth from both functions, explain the relationship between $f(t)$ and $g(t)$.

Jacob's grows faster

Score 1: The student gave an appropriate explanation based upon the error made in finding $g(t)$.

Question 32

32 Jacob and Jessica are studying the spread of dandelions. Jacob discovers that the growth over t weeks can be defined by the function $f(t) = (8) \bullet 2^t$. Jessica finds that the growth function over t weeks is $g(t) = 2^{t+3}$.

Calculate the number of dandelions that Jacob and Jessica will each have after 5 weeks.

Jacob: $f(t) = (8) \cdot 2^{(t)}$

$f(t) = (8) \cdot 2^{(5)}$

$= (8) \cdot 10$

$= 80$

Jessica: $g(t) = 2^{t+3}$

$g(t) = 2^{5+3}$

$= 2^8$

$= 256$

Based on the growth from both functions, explain the relationship between $f(t)$ and $g(t)$.

The relationship between f(t) and g(t) is that they both rise on a graph and f(t) determines the number of dandelions gradually. While g(t) determines the number of dandelions over longer periods.

Score 0: The student made an error in calculating $f(t)$ and gave an incorrect explanation.

Question 33

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

$a=-16 \quad b=64 \quad c=80$

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

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

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

$$t=2$$

It reaches its maximum height at 2 seconds.

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

t	d
0	80
1	128
2	144
3	128
4	80
5	0
6	-112

The height of the object decreases for $2<t<5$, because it reaches its maximum height at 2 seconds and decreases in height until it hits the ground at 5 seconds.

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

Question 33

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

x	y
0	80
1	128
2	144
3	128
4	80
5	0

At 2 seconds, it reaches it's peak at 144 ft

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

It decreases when $2 \leq x \leq 5$. It goes from 144 ft to 0 ft.

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

Question 33

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

at 2 seconds it acheives its maximum height

$d(t) = -16t^2 + 64t + 80$

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

$d(2) = 144$

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

The time interval in which the height decreases is between 2 and 5, I know this because according to the taible of this equation, the points go (1,128), (2,144), (3,128), (4,80), and (5,0), showing that that is when the ~~graph~~ object is going down.

Score 4: The student included a correct set of values for time and distance in their explanation for the second part. These values justify their answer in the first part.

Question 33

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

$y = -16x^2 + 64x + 80$

$d(0) = 80$

$d(1) = 128$

$d(2) = 144$

$d(3) = 128$

$\boxed{2 \text{ seconds}}$

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

$(2, 5)$

Score 3: The student did not explain how the interval was determined.

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

2 seconds

seconds x	y distance off ground
0	80
1	128
2	144
3	128
4	80
5	0

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

after 2 seconds because at 2 seconds the object is as high as it can go, so it's distance above the ground decreases, as the ball starts to fall.

Score 3: The student did not state the complete time interval.

Question 33

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

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

The maximum height is at 2 seconds

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

2 seconds is when it is at maximum height, so anything after that is decreasing,

Score 3: The student did not state the complete time interval.

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

$(2,144)$

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

To find the time it hits the ground you use $h(t)=0$ and solve.

$-16t^2+64t+80=0$

$-16(t^2-4t-5)=0$

$-16(t+1)(t-5)=0$

$\cancel{t+1=0}$ $\cancel{t=-1}$ $t-5=0$

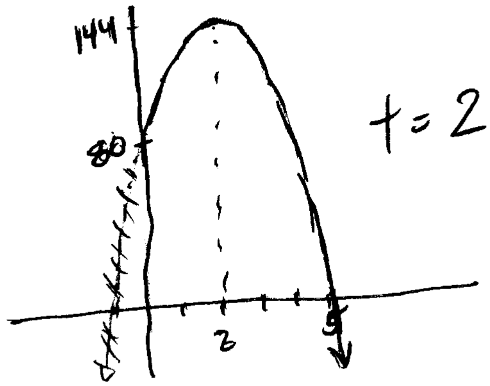
$t=5 \leftarrow$ time it hits ground

It's decreasing from from 2 to 5

Score 2: The student showed no work to find (2,144) and did not state a time.

Question 33

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.



$t = 2$

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

Score 2: The student determined and justified the time it took to reach the maximum height.

Question 33

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

The ball decreases between this time which is 2 seconds and 5 seconds

Score 1: The student wrote the correct interval in words.

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

It reaches maximum height at 144

X	Y
−1	0
0	80
1	128
2	144
3	128
4	80

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

Score 1: The student showed appropriate work to determine the time, but stated the maximun height.

Question 33

33 Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after t seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

(2, 144)

144 seconds

State the time interval, in seconds, during which the height of the object *decreases*. Explain your reasoning.

Score 0: The student gave an incorrect response.

Question 34

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

he could complete the square or
he could use the quadratic formula.

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

$$4x^2 + 16x + 9 = 0$$
$$4x^2 + 16x + 16 = -9 + 16$$
$$(2x+4)^2 = 7$$
$$2x + 4 = \pm\sqrt{7}$$
$$2x = -4 \pm \sqrt{7}$$
$$x = -2 \pm \frac{\sqrt{7}}{2}$$

$x = -2 + \frac{\sqrt{7}}{2}$ $\quad$ $x = -2 - \frac{\sqrt{7}}{2}$

$x = -.7$ $\quad$ $x = -3.3$

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

Question 34

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

$0 = 4x^2 + 16x + 9$

Fred could use the quadratic formula ($x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$) where you insert a, b, and c from from the quadratic function.
He could also use completing the square ($ax^2 + bx = c$): First find $(\frac{b}{2})^2$, add it to both sides and solve.

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

$0 = 4x^2 + 16x + 9$

$a = 4$
$b = 16$
$c = 9$

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

$\frac{-16 \pm \sqrt{256 - 144}}{8}$

$\frac{-16 + 10.6}{8}$

$-.7$

$\frac{-16 \pm 10.6}{8}$

$x = \{-3.3, -.7\}$

$\frac{-16 - 10.6}{8}$

-3.3

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

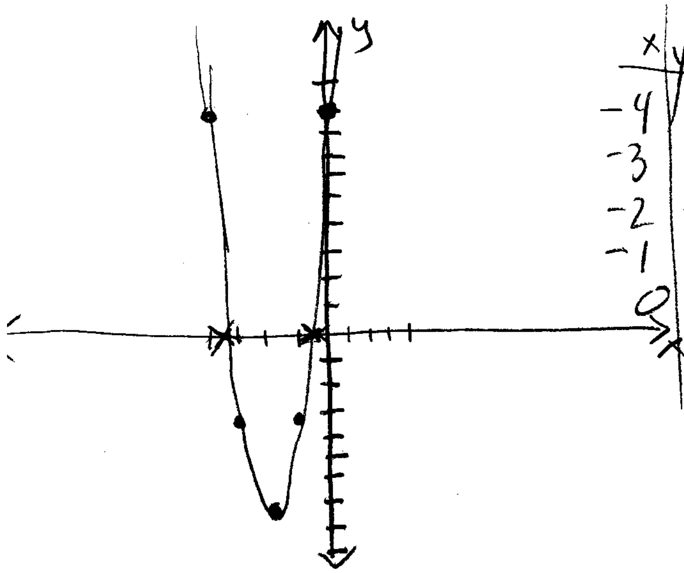
34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

algebraically or graphically

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

I graphed the parabola and used the $\boxed{\text{2nd}}$ $\boxed{\text{Trace}}$ Keys to CALC → zero where $f(x)=0$



x	y
−4	9
−3	−3
−2	−7
−1	−3
0	9

$x = -3.3$

$x = -.7$

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

Question 34

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

Fred could use the quadratic formula which is $\frac{-b \pm \sqrt{b^2-4ac}}{2a}$ or he could factor by grouping.

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

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

$a=4 \quad b=16 \quad c=9$

$$x = \frac{-16 \pm \sqrt{16^2-4(4)(9)}}{2(4)}$$

$$x = \frac{-16 \pm \sqrt{256-144}}{8}$$

$$x = \frac{-16 \pm \sqrt{112}}{8}$$

$$x = \frac{-16 \pm \sqrt{16}\sqrt{7}}{8}$$

$$x = \frac{-16 \pm 4\sqrt{7}}{8}$$

$$x = \frac{-16 + 4\sqrt{7}}{8} = -0.7$$

$$x = \frac{-16 - 4\sqrt{7}}{8} = -3.3$$

$$\boxed{\begin{array}{l} x = -0.7 \\ x = -3.3 \end{array}}$$

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

Question 34

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

Using quadratic equation or completing the square.

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

$4x^2+16x+9=0$

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

$\frac{-16 \pm\sqrt{16^2-4\cdot4\cdot9}}{2\cdot4}=x$

$\frac{-16 \pm\sqrt{256-8.9}}{8}=x$

$\frac{-16 \pm\sqrt{256-72}}{8}=x$

$\frac{-16 \pm\sqrt{184}}{8}=x$

$\frac{-16 \pm 13.6}{8}=x$

$\frac{-16+13.6}{8}=x$ | $\frac{-16-13.6}{8}=x$

$\frac{-2.4}{8}=x$ | $\frac{-29.6}{8}=x$

$-\frac{3}{10}=x$ | $-3\frac{7}{10}=x$

Score 3: The student made an error in calculating $4ac$, but found appropriate solutions to the nearest tenth.

Question 34

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

quadratic formula
complete the square

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

$$\frac{4x^2}{4} + \frac{16x}{4} + \frac{9}{4} = \frac{0}{4}$$

$$x^2 + 4x + \frac{9}{4} = 0$$

$$x^2 + 4x + 4 = -\frac{9}{4} + 4$$

$$(x + 2)^2 = -\frac{9}{4} + 4$$

$$(x + 2)^2 = 1.75$$

$$x + 2 = \sqrt{1.75}$$

$$x = -2 + \sqrt{1.75}$$

$$x = -.7$$

Score 3: The student only used the positive root of $\sqrt{1.75}$ when solving for x.

Question 34

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

① $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

② tricky trinomial: a·c then find the factors that equal b when you add them

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

$0 = 4x^2 + 16x + 9$

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

$\frac{-16 \pm \sqrt{16^2 - 4(4)(9)}}{2(4)}$

$\frac{-16 \pm \sqrt{112}}{8}$

$\frac{-16 + \sqrt{112}}{8}$ $\boxed{x \approx -0.68}$

$\frac{-16 - \sqrt{112}}{8}$ $\boxed{x \approx -3.32}$

Score 3: The student made a rounding error.

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

The two different methods Fred could use to solve the equation f(x)=0 is by completing the square, and using the quadratic formula.

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

$0 = 4x^2 + 16x + 9$
$-9 \qquad -9$

$64 + -9 = 4x^2 + 16x + 64$

$55 = 4x^2 + 16x + 64$

$55 = (2x+8)(2x+8)$

$55 = (2x+8)^2$

$\sqrt{55} = \sqrt{(2x+8)^2}$

$\sqrt{55} = (2x+8)$

$\sqrt{55} = 2x+8$

$7.4 = 2x + 8$
$-8 \qquad -8$

$2 \div -.6 = 2x \div 2$

$\boxed{-.3 = x}$

Score 2: The student made an error in completing the square and only used the positive root of $\sqrt{55}$.

Question 34

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

complete the square, $\boxed{\text{or}}$ use the quadratic formula

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

$$4x^2 + 16x + 9 = 0$$

$$20x^2 + 9 = 0$$
$$-9 \quad -9$$

$$\frac{20x^2}{20} = \frac{-9}{20}$$

$$x^2 = -.45$$

$$x = .45$$

Score 2: The student stated two methods.

Question 34

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

$$f(x) = 4x^2 + 16x + 9$$

$a = 4$
$b = 16$
$c = 9$

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

$$x = \frac{-16 \pm \sqrt{(16)^2 - 4(4)(9)}}{2(4)}$$

$$x = \frac{-16 \pm \sqrt{256 - 144}}{8}$$

$$x = \frac{-16 \pm \sqrt{112}}{8}$$

$$x = \frac{-16 \pm \sqrt{16}\sqrt{7}}{8}$$

$$x = \frac{-16 \pm 4\sqrt{7}}{8} \qquad x = -2 \pm \frac{1}{2}\sqrt{7}$$

Score 1: The student did not express the solution to the nearest tenth.

Question 34

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

Graph it

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

$$\frac{-16 \pm \sqrt{16^2 + 4 \cdot 4 \cdot 9}}{8}$$

$$\frac{-16 \pm \sqrt{400}}{8}$$

$$\frac{-16 \pm 20}{8}$$

$$\frac{-36}{8} \qquad \frac{4}{8}$$

Score 1: The student stated one method.

Question 34

34 Fred's teacher gave the class the quadratic function $f(x) = 4x^2 + 16x + 9$.

a) State two different methods Fred could use to solve the equation $f(x) = 0$.

b) Using one of the methods stated in part *a*, solve $f(x) = 0$ for x, to the *nearest tenth*.

$a = 4$
$b = 16$
$c = 9$

$$\frac{-16 \pm \sqrt{16^2 - 4 \times 4 \times 9}}{2}$$

$$= \frac{-16 \pm \sqrt{112}}{2} = \frac{-16 \pm 10.583}{2}$$

$$\frac{-16 + 10.58}{2} = \underline{\underline{-2.71}} \qquad \frac{-16 - 10.58}{2} = \underline{\underline{-14.65}}$$

Score 0: The student made an error in substituting into the quadratic formula and made a rounding error.

Question 35

35 Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, f(t)	\$2900	\$3080	\$2500	\$2380	\$2200	\$2700	\$3000	\$3620	\$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t. Round all values to the *nearest integer*.

$f(t) = -58t + 6182$

State the correlation coefficient, r, of the data to the *nearest hundredth.* Does r indicate a strong linear relationship between the variables? Explain your reasoning.

$-.94$ This shows a strong linear relationship because the number is very close to -1.

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

Question 35

35 Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, f(t)	$2900	$3080	$2500	$2380	$2200	$2700	$3000	$3620	$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t. Round all values to the *nearest integer*.

$f(t) = -58x + 6182$

State the correlation coefficient, r, of the data to the *nearest hundredth.* Does r indicate a strong linear relationship between the variables? Explain your reasoning.

$r = -.94$

yes it is close to -1

Score 3: The student did not write the regression equation in terms of t.

Question 35

35 Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, f(t)	$2900	$3080	$2500	$2380	$2200	$2700	$3000	$3620	$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t. Round all values to the *nearest integer*.

$f(t) = -58t + 6182$

State the correlation coefficient, r, of the data to the *nearest hundredth.* Does r indicate a strong linear relationship between the variables? Explain your reasoning.

$r = -0.94$

r indicates a strong negative correlation between the variables.

Score 3: The student gave no explanation.

Question 35

35 Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, f(t)	\$2900	\$3080	\$2500	\$2380	\$2200	\$2700	\$3000	\$3620	\$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t. Round all values to the *nearest integer*.

$y=ax+b$ $f(t)=-58x+6182$

$y=-58x+6182$

State the correlation coefficient, r, of the data to the *nearest hundredth.* Does r indicate a strong linear relationship between the variables? Explain your reasoning.

$r=-0.94$ r does indicate a weak linear relationship between the variables because r is not close to 1 wich means it is not a strong relationship.

Score 2: The student did not write the regression equation in terms of t, but wrote the correct r value.

Question 35

35 Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, f(t)	\$2900	\$3080	\$2500	\$2380	\$2200	\$2700	\$3000	\$3620	\$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t. Round all values to the *nearest integer*.

$f(t) = -58x + 6182$

State the correlation coefficient, r, of the data to the *nearest hundredth.* Does r indicate a strong linear relationship between the variables? Explain your reasoning.

.94 the relationship is very strong between the variables because the correlation coefficient is close to one.

Score 2: The student did not write the regression equation in terms of t, and wrote an incorrect correlation coefficient, but wrote an appropriate explanation.

Question 35

35 Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, f(t)	\$2900	\$3080	\$2500	\$2380	\$2200	\$2700	\$3000	\$3620	\$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t. Round all values to the *nearest integer*.

$f(t) = 6182.2 + (-58.2639)t$

State the correlation coefficient, r, of the data to the *nearest hundredth.* Does r indicate a strong linear relationship between the variables? Explain your reasoning.

-58.26; No, Given it is a negative coeffcent

Score 1: The student rounded the regression equation incorrectly, and no further correct work is shown.

Question 35

35 Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, f(t)	$2900	$3080	$2500	$2380	$2200	$2700	$3000	$3620	$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t. Round all values to the *nearest integer*.

State the correlation coefficient, r, of the data to the *nearest hundredth.* Does r indicate a strong linear relationship between the variables? Explain your reasoning.

-0.94, strong linear relationship because it's above 0.70 and close to -1.

Score 1: The student wrote a correct correlation coefficient, but wrote an incorrect explanation.

Question 35

35 Erica, the manager at Stellarbeans, collected data on the daily high temperature and revenue from coffee sales. Data from nine days this past fall are shown in the table below.

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7	Day 8	Day 9
High Temperature, t	54	50	62	67	70	58	52	46	48
Coffee Sales, f(t)	$2900	$3080	$2500	$2380	$2200	$2700	$3000	$3620	$3720

State the linear regression function, $f(t)$, that estimates the day's coffee sales with a high temperature of t. Round all values to the *nearest integer*.

$$x \approx -58\frac{19}{72}x + 6182.199074$$

State the correlation coefficient, r, of the data to the *nearest hundredth.* Does r indicate a strong linear relationship between the variables? Explain your reasoning.

no it does not because
it dont come out =

Score 0: The student made multiple errors.

Question 36

36 A contractor has 48 meters of fencing that he is going to use as the perimeter of a rectangular garden. The length of one side of the garden is represented by x, and the area of the garden is 108 square meters.

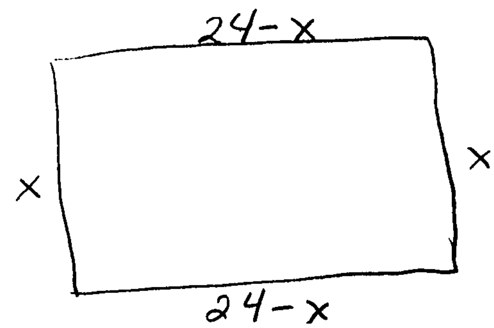
Determine, algebraically, the dimensions of the garden in meters.

$p = 48$

$A = 108$

$w = x$

$l = \frac{48-2x}{2} = 24-x$



$A = lw$

$108 = x(24-x)$

$108 = 24x - x^2$

$x^2 - 24x + 108 = 0$

$(x-6)(x-18) = 0$

$x = 6$ or $x = 18$

The dimensions are 6 and 18

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

Question 36

36 A contractor has 48 meters of fencing that he is going to use as the perimeter of a rectangular garden. The length of one side of the garden is represented by x, and the area of the garden is 108 square meters.

Determine, algebraically, the dimensions of the garden in meters.

$\frac{48}{2} = 24$

x = length

$24 - x$ = width

$(24-x)x = 108$

$24x - x^2 = 108$

$\cdot -1$

$-24x + x^2 = -108$

$x^2 - 24x + 144 = -108 + 144$

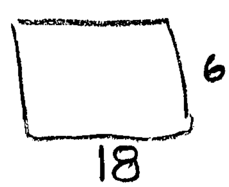
$(x-12)^2 = 36$

$x - 12 = \pm\sqrt{36}$

$x = 12 \pm \sqrt{36}$

$x = 12 + \sqrt{36}$ $\quad$ $x = 12 - \sqrt{36}$

$24 - x = 12 - \sqrt{36}$ $\quad$ $24 - x = 12 + \sqrt{36}$



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

Question 36

36 A contractor has 48 meters of fencing that he is going to use as the perimeter of a rectangular garden. The length of one side of the garden is represented by x, and the area of the garden is 108 square meters.

Determine, algebraically, the dimensions of the garden in meters.

x

y $\boxed{A=108}$ P=48

$2x+2y=48$
$-2x \qquad -2x$

$\frac{2}{2}y = \frac{-2x}{2} + \frac{48}{2}$

$y=-x+24$

P $\quad 2x+2y=48$

A $\quad (x)(y)=108$

$(x)(-x+24)=108$

$-x^2+24x=108$

$-x^2+24x-108=0$

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

a = −1
b = 24
c = −108

$x=\frac{-24\pm\sqrt{(24)^2-4(-1)(-108)}}{2(-1)}$

$x=\frac{-24\pm\sqrt{576-432}}{-2}$

$x=\frac{-24\pm\sqrt{144}}{-2} = x=\frac{-24\pm 12}{-2}$

$x=\frac{-24+12}{-2}$

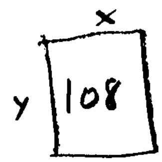
$x=\frac{-12}{-2}=6$

Score 3: The student found only one dimension.

Question 36

36 A contractor has 48 meters of fencing that he is going to use as the perimeter of a rectangular garden. The length of one side of the garden is represented by x, and the area of the garden is 108 square meters.

Determine, algebraically, the dimensions of the garden in meters.



$P = 48$

$$2x + 2y = 48$$

$$\frac{x\cancel{y}}{x} = \frac{108}{x}$$

$$y = \frac{108}{x}$$

$$2x + 2\left(\frac{108}{x}\right) = 48$$

$$(x)\ 2x + \frac{216}{\cancel{x}} = 48\ (x)$$

$$2x^2 + 216 = 48x$$

$$\frac{2x^2}{2} - \frac{48x}{2} + \frac{216}{2} = 0$$

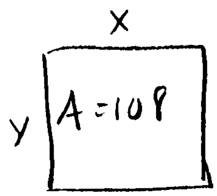
$$x^2 - 24x + 108 = 0$$

Score 2: The student wrote a correct quadratic equation in standard form.

Question 36

36 A contractor has 48 meters of fencing that he is going to use as the perimeter of a rectangular garden. The length of one side of the garden is represented by x, and the area of the garden is 108 square meters.

Determine, algebraically, the dimensions of the garden in meters.



P = 48

Perimeter $x + y = 48$

Area: $\frac{xy}{x} = \frac{108}{x}$

$y = \frac{108}{x}$

$(x)\left(x + \frac{108}{x}\right) = 48\,(x)$

$x^2 + 108 = 48x$

$x^2 - 48x + 108 = 0$

$a = 1$
$b = -48$
$c = 108$

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

$x = \frac{-(-48) \pm \sqrt{(-48)^2 - 4(1)(108)}}{2(1)}$

$x = \frac{48 \pm \sqrt{2304 - 432}}{2}$

$x = \frac{48 \pm \sqrt{1872}}{2}$

$x = 45.63330765$

$x = 2.366692347$

Score 2: The student made a conceptual error when expressing the perimeter.

36 A contractor has 48 meters of fencing that he is going to use as the perimeter of a rectangular garden. The length of one side of the garden is represented by x, and the area of the garden is 108 square meters.

Determine, algebraically, the dimensions of the garden in meters.

$xy = 108$

$y = \frac{108}{x}$

$2y = \frac{216}{x}$

$2x + 2y = 48$

$2x + \frac{216}{x} = 48$

$2x^2 + 216 = 48x$

$x^2 + 216 = 24x$

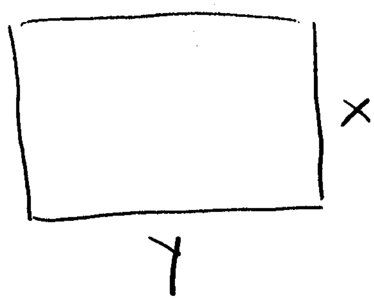
$x^2 - 24x + 216 = 0$

Score 1: The student wrote a correct system of equations, but did not write a correct quadratic equation in standard form.

Question 36

36 A contractor has 48 meters of fencing that he is going to use as the perimeter of a rectangular garden. The length of one side of the garden is represented by x, and the area of the garden is 108 square meters.

Determine, algebraically, the dimensions of the garden in meters.



$$xy = 108$$
$$x + y = 48$$

$$x + \frac{108}{x} = 48$$

$$x^2 + 108 = 48x$$

$$x^2 - 48x + 108 = 0$$

Score 1: The student made a conceptual error when expressing the perimeter, but wrote an appropriate quadratic equation in standard form.

Question 36

36 A contractor has 48 meters of fencing that he is going to use as the perimeter of a rectangular garden. The length of one side of the garden is represented by x, and the area of the garden is 108 square meters.

Determine, algebraically, the dimensions of the garden in meters.

$6 \cdot 8 = 48$

$\frac{108}{6} = 18$

$\cancel{\frac{108}{8} = 13.5}$

6 and 18
w l

Score 0: The student has a correct response based on an incorrect procedure.

Question 37

37 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost \$12.50 and child tickets cost \$6.25. The cinema's goal is to sell at least \$1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$$x + y \leq 200$$
$$12.5x + 6.25y \geq 1500$$

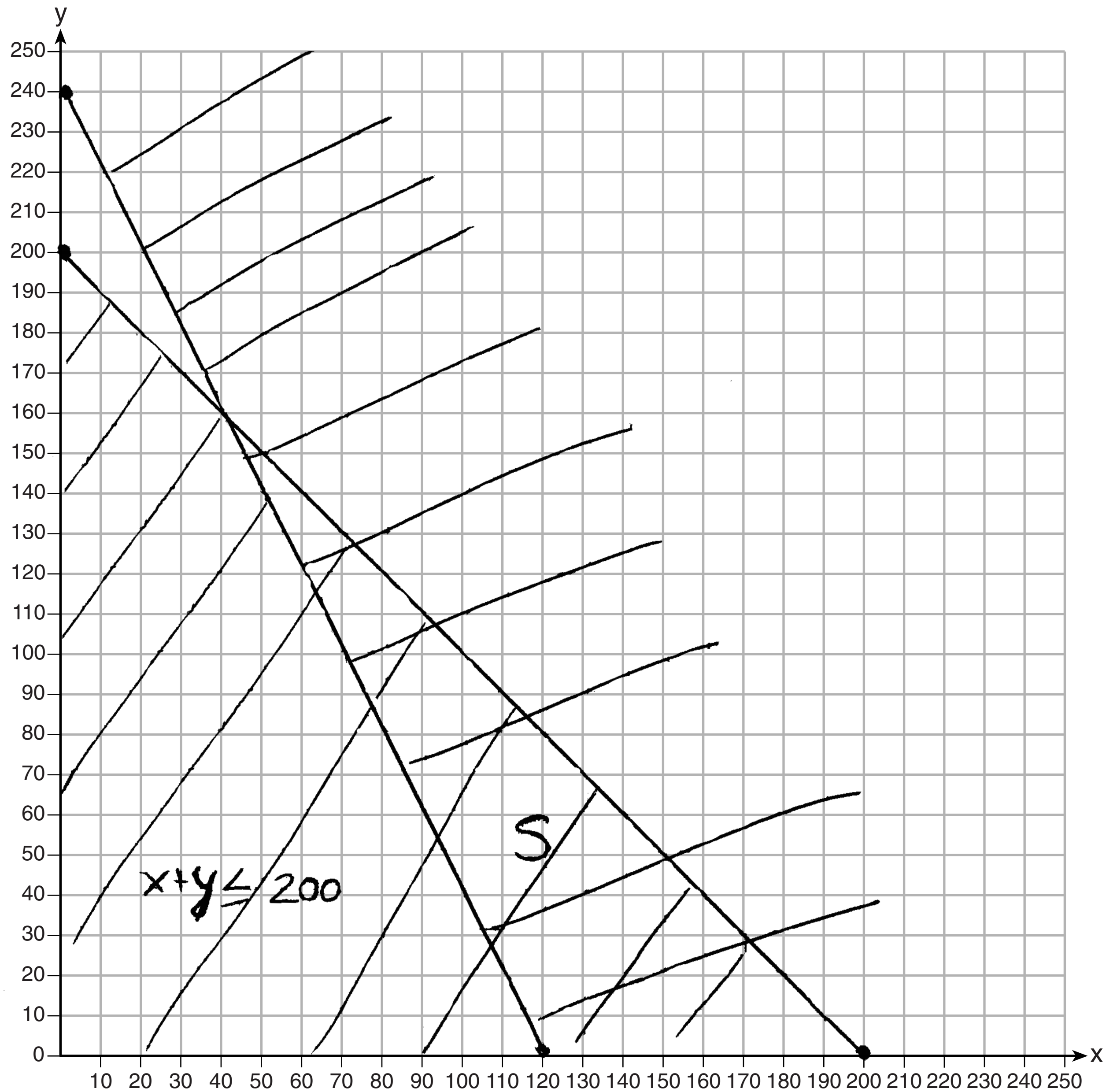
Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an S.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

No, she is incorrect. The reason she isn't right is that, both of the coordinates aren't from the solution area.

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

Question 37



y
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50
40
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0
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250
S
x+y ≤ 200

Question 37

37 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost \$12.50 and child tickets cost \$6.25. The cinema's goal is to sell at least \$1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$x+y \leq 200$

$12.5x + 6.25y \geq 1500$

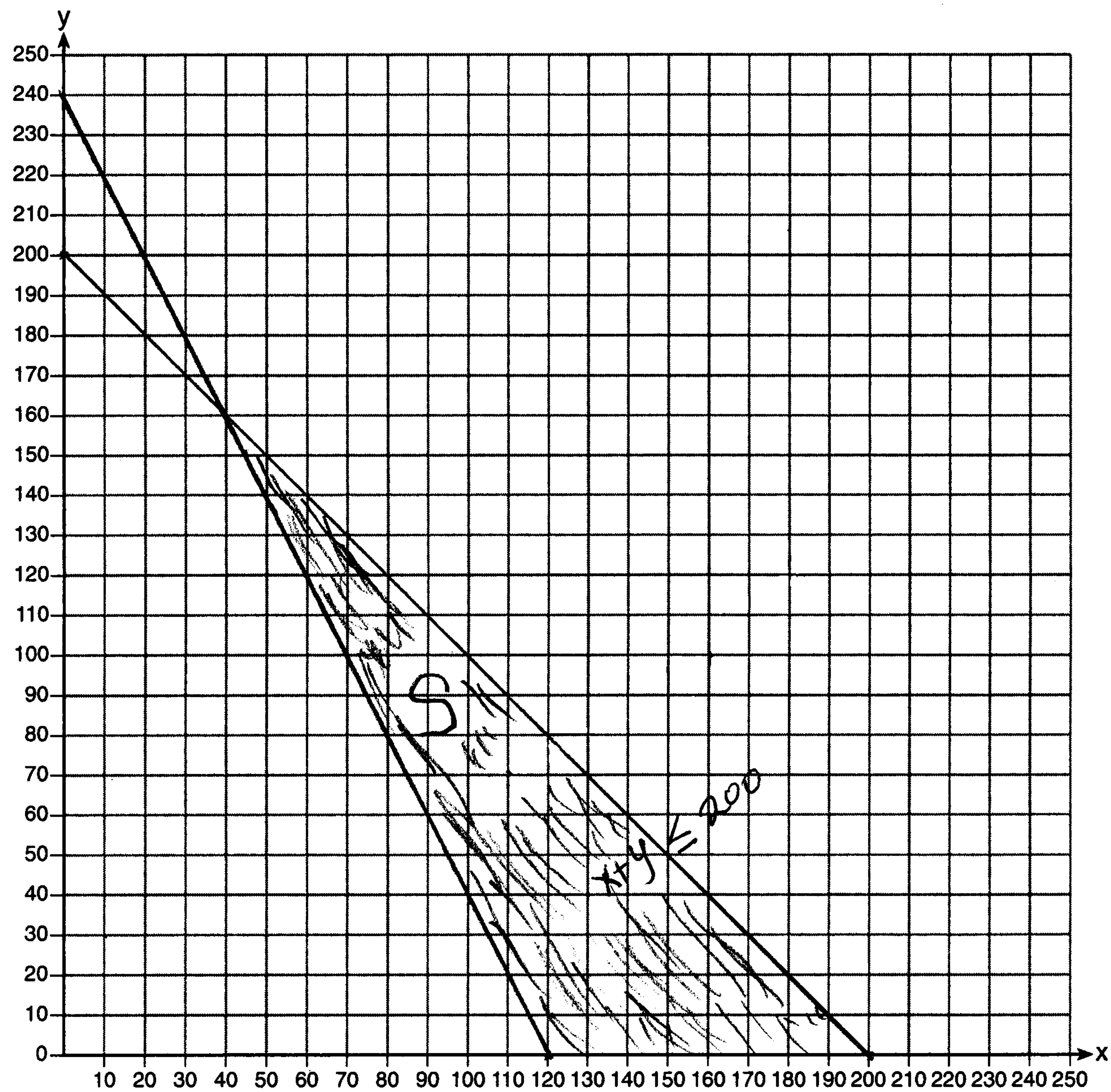
Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an S.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

She's wrong because the point is not in S on the graph.

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

Question 37



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10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250
S
x+y ≤ 200

37 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost \$12.50 and child tickets cost \$6.25. The cinema's goal is to sell at least \$1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$\boxed{\begin{array}{l} x = \text{adult} \\ y = \text{child} \end{array}}$

$x + y \leq 200$

$12.50x + 6.25y \geq 1500$

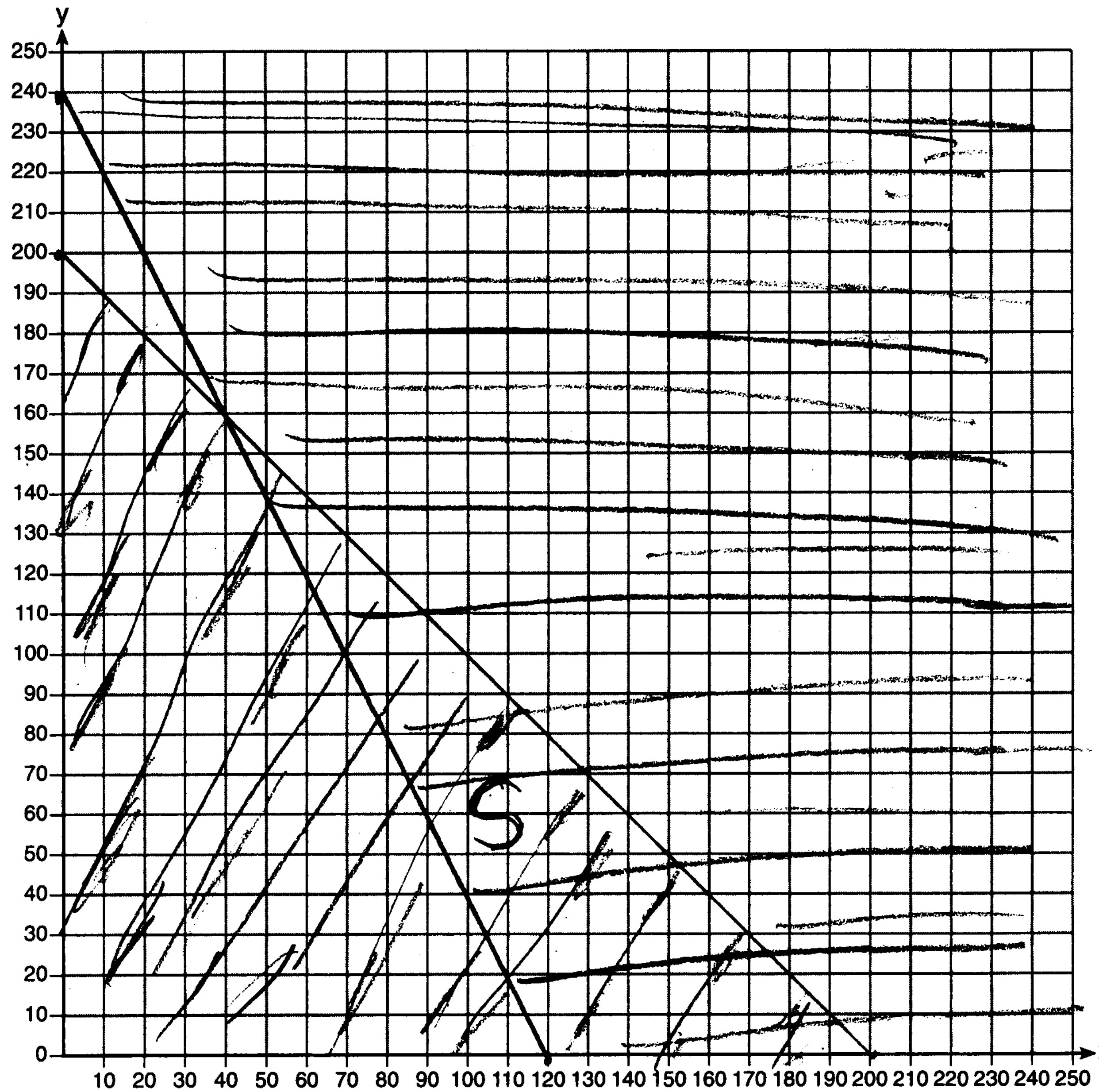
Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an S.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

She is ncorrect because according to the graph 80 child and 30 adult does not appear in the solution set

Score 5: The student did not label either inequality on the graph.

Question 37



Question 37

37 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost \$12.50 and child tickets cost \$6.25. The cinema's goal is to sell at least \$1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$$x + y \leq 200$$
$$12.50x + 6.25y \geq 1500$$

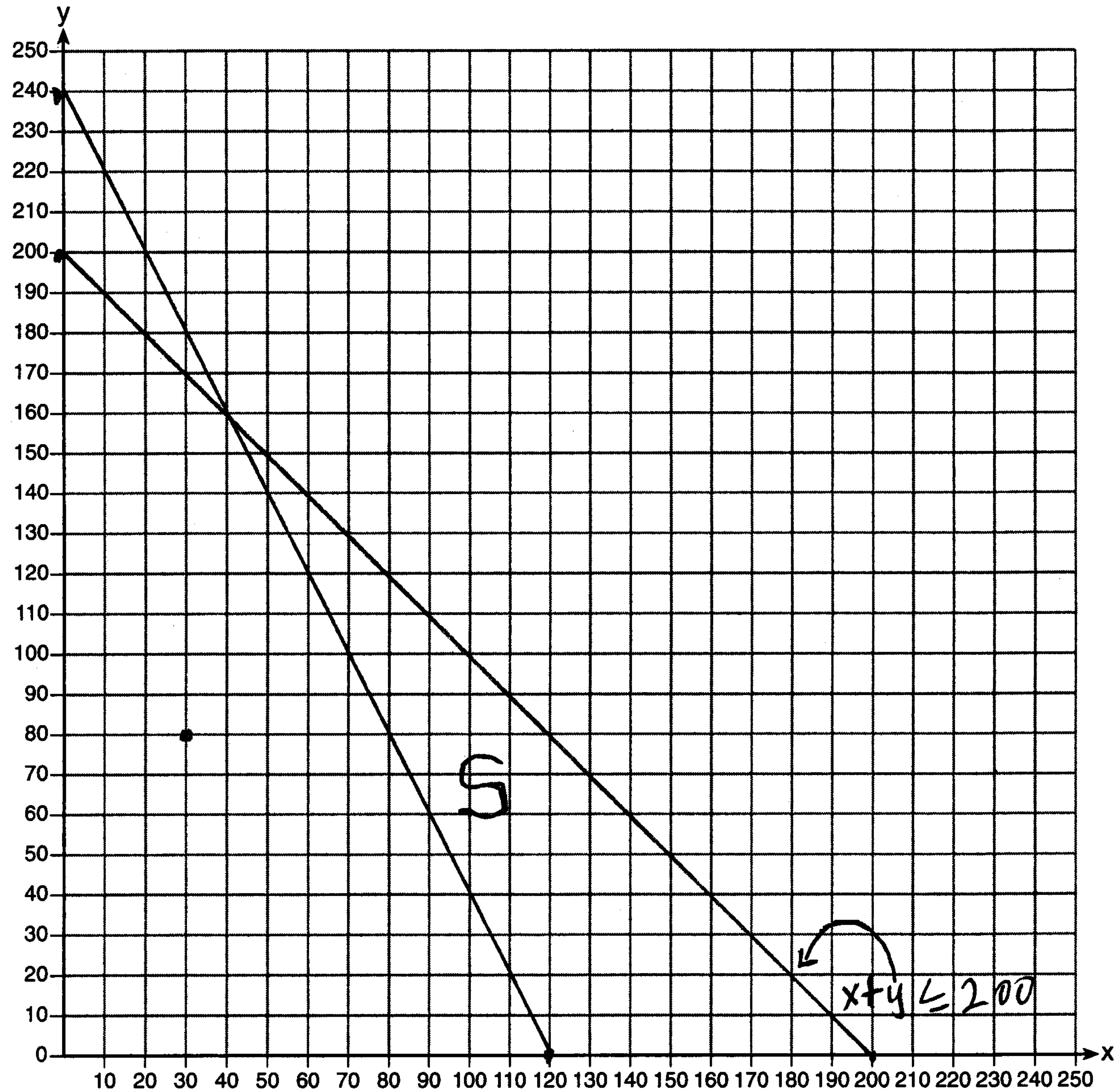
Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an S.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

No, She is incorrect because the point does not lie in S.

Score 5: The student did not shade the solution to the system of inequalities.

Question 37



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40
30
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10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250
x
S
x+y ≤ 200

Question 37

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Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$$x + y = 200$$

$$12.50x + 6.25y = 1500$$

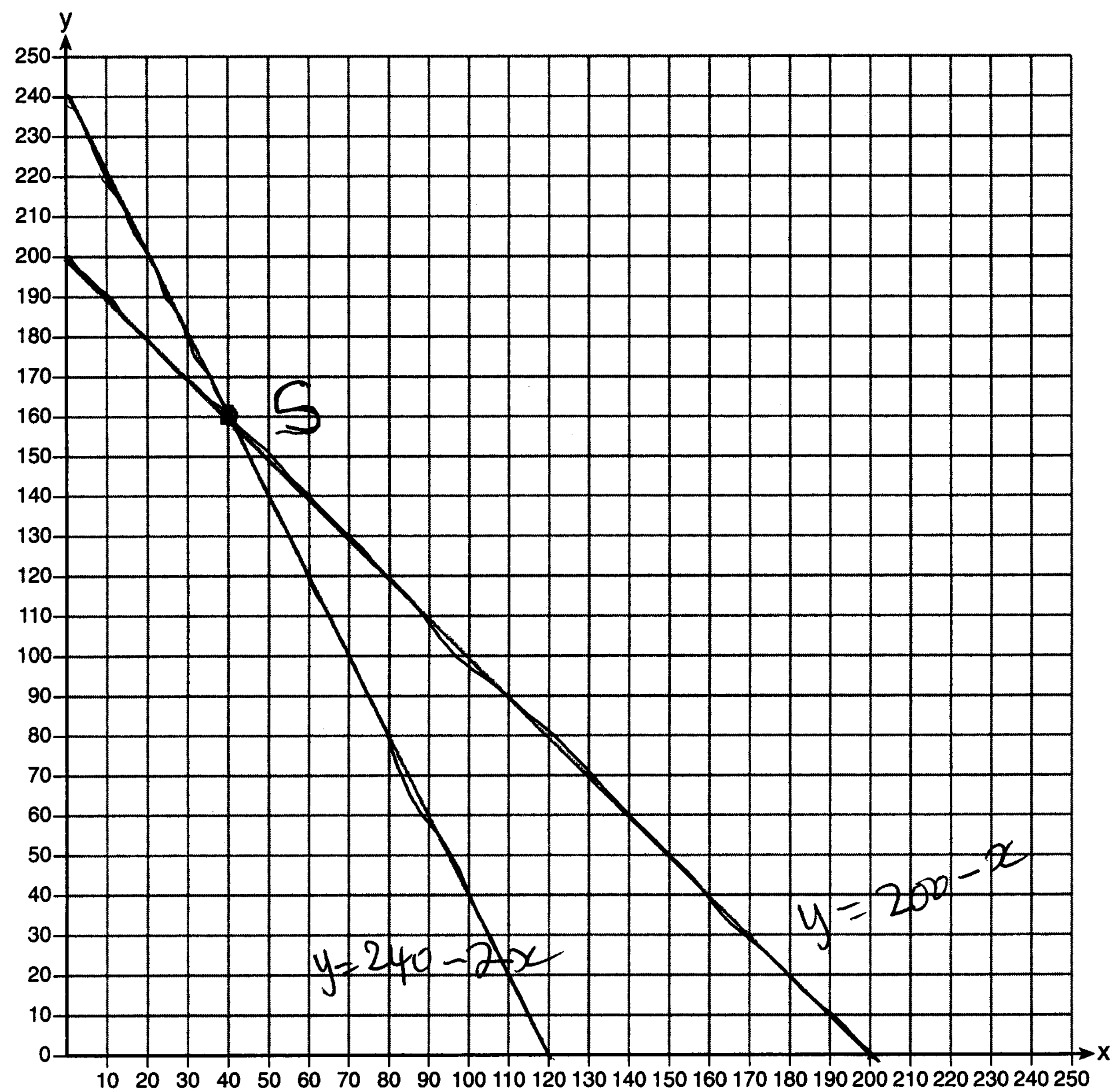
Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an S.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

No. They have to sell 40 adult and 160 child

Score 4: The student made a conceptual error by writing equations instead of inequalities.

Question 37



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30
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10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250
S
y=240-2x
y=200-x

37 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost \$12.50 and child tickets cost \$6.25. The cinema's goal is to sell at least \$1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$$12.50x + 6.25y \geq 1{,}500$$

$$x + y \leq 200$$

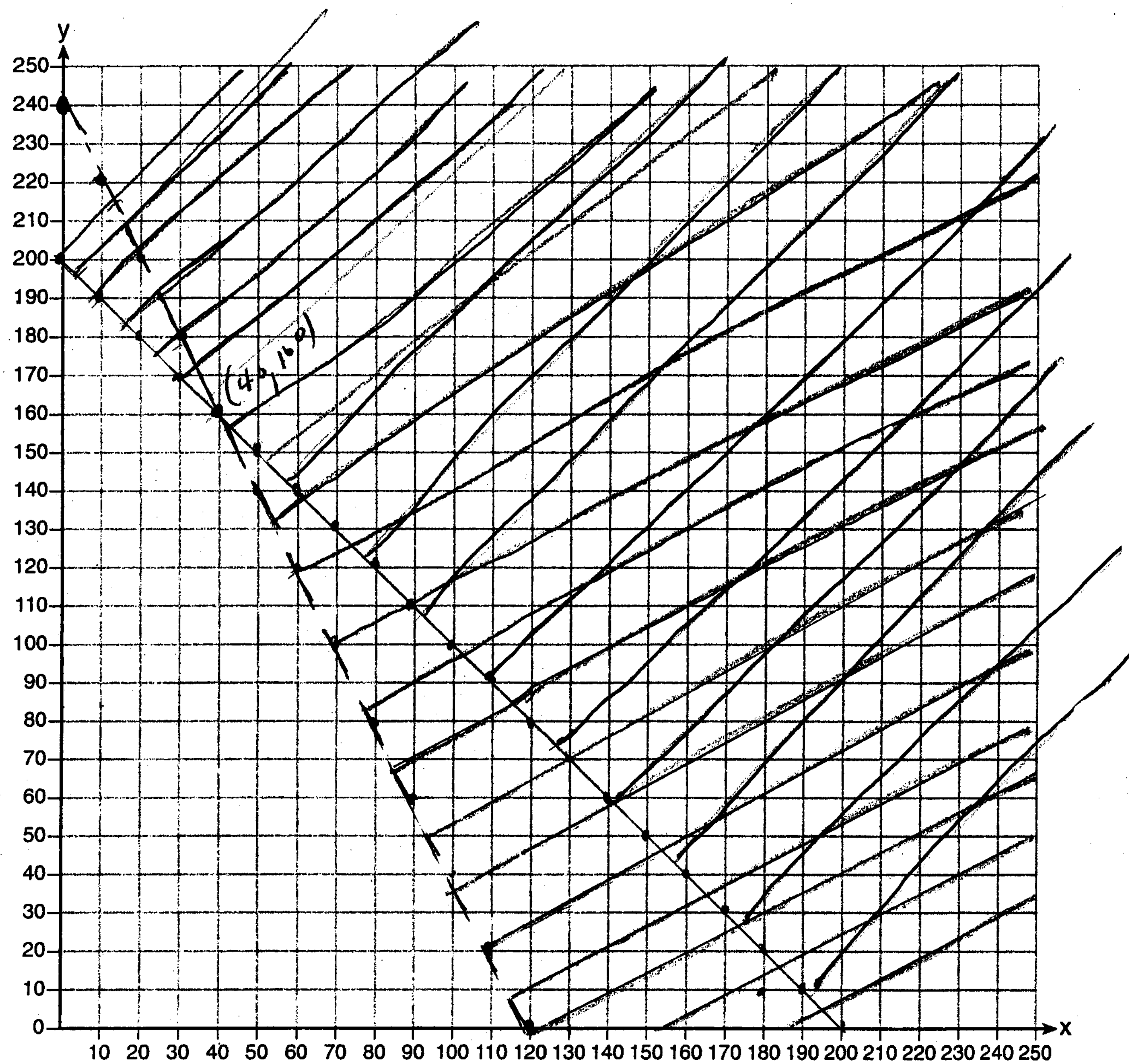
Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an *S*.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

no, the coordinate (30,80) is not in the solution set.

Score 4: The student made multiple graphing and labeling errors.

Question 37



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60
50
40
30
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0
10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250
x
(40, 160)

Question 37

37 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost \$12.50 and child tickets cost \$6.25. The cinema's goal is to sell at least \$1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$12.50x + 6.25y \geq 1500$

Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an S.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

$6.25y + 12.50x$ $\quad y = 80;\ x = 30$

$(6.25)80 + (12.50)30$

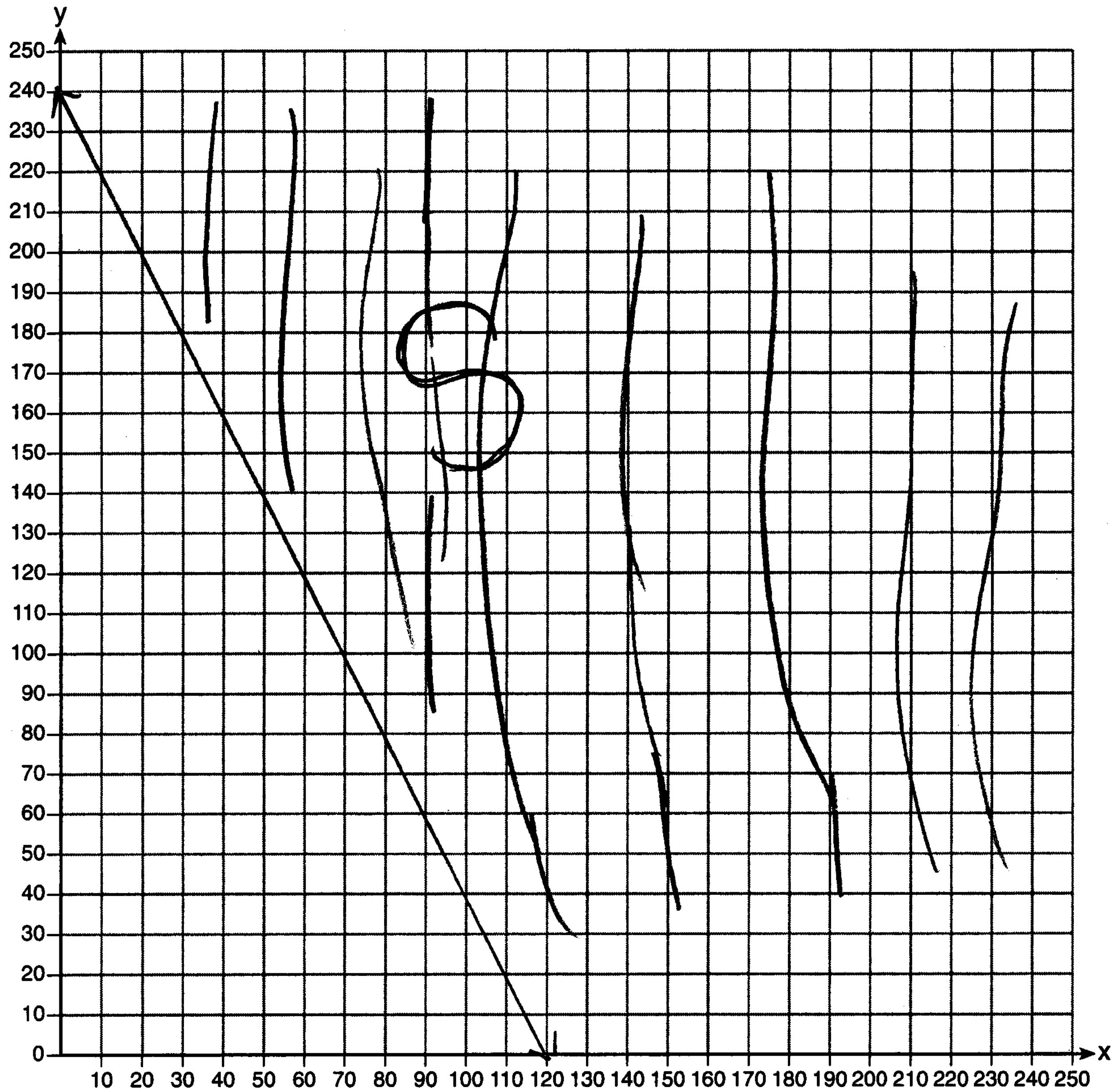
$500 + 375$

\$875

No because their goal is \$1500 and they are \$625 short.

Score 3: The student wrote and graphed one inequality correctly, but the explanation was not based on the graph.

Question 37



y
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10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250

Question 37

37 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost \$12.50 and child tickets cost \$6.25. The cinema's goal is to sell at least \$1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$12.5x + 6.25y \geq 1500 \quad x + y \leq 200$

$$\boxed{\begin{cases} x + y \leq 200 \\ 12.5x + 6.25y \geq 1500 \end{cases}}$$

~~1200~~ 1500 12.5

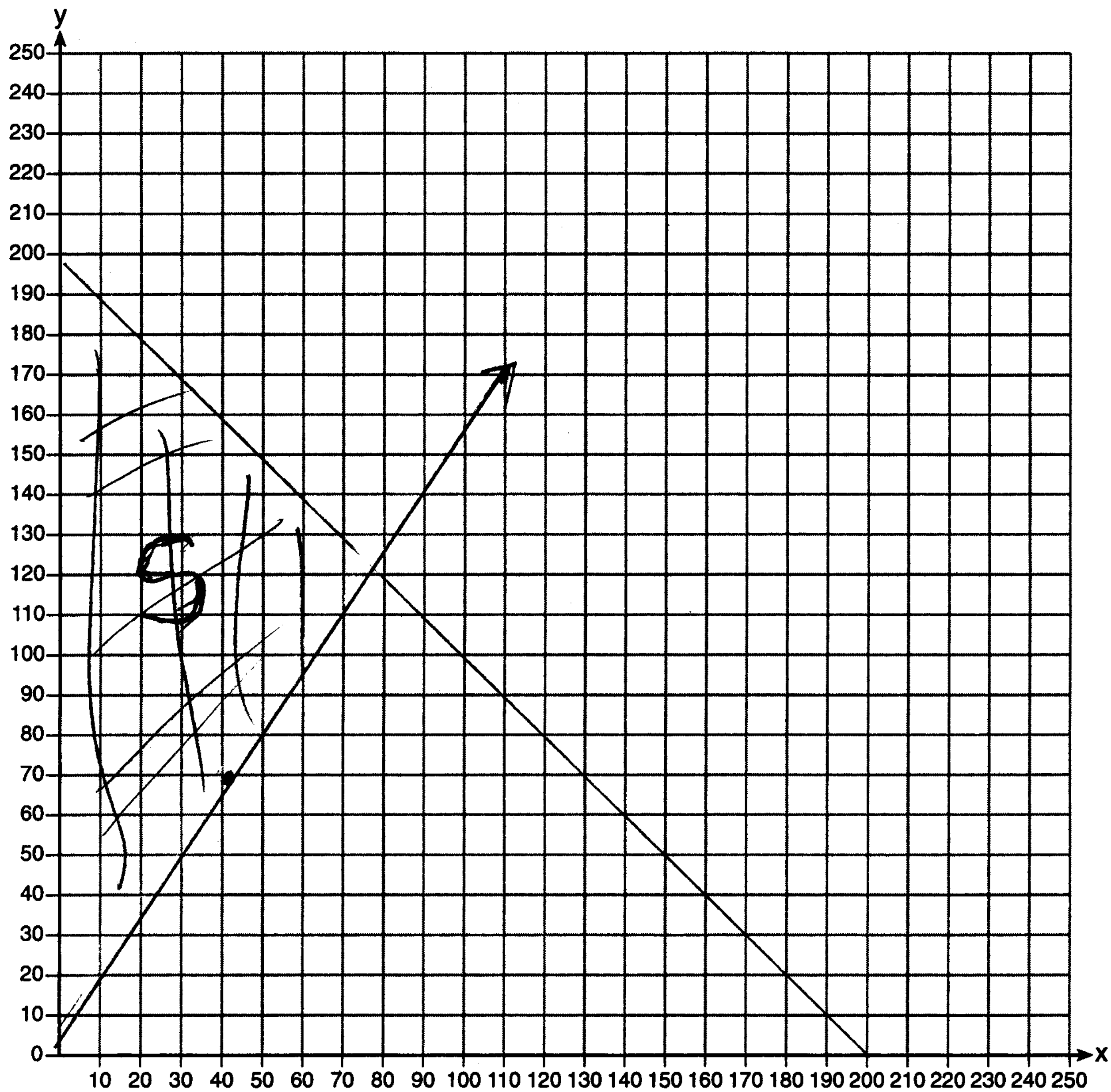
Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an *S*.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

no because it is not in the solution set

Score 2: The student wrote a correct system of inequalities, but made multiple graphing or labeling errors, and wrote an incorrect explanation based on the graph.

Question 37



$y = -x + 200$

$12.5x + 6.5y = 1500$

$12.5x - 1500 = 6.25x$

$x + y \leq 200$

$x - 200$

$\frac{-y}{-1} \geq \frac{x - 200}{-1}$

$y \leq -x + 200$

Question 37

37 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost $12.50 and child tickets cost $6.25. The cinema's goal is to sell at least $1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$$12.50x + 6.25y \geq 1500$$

Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an S.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

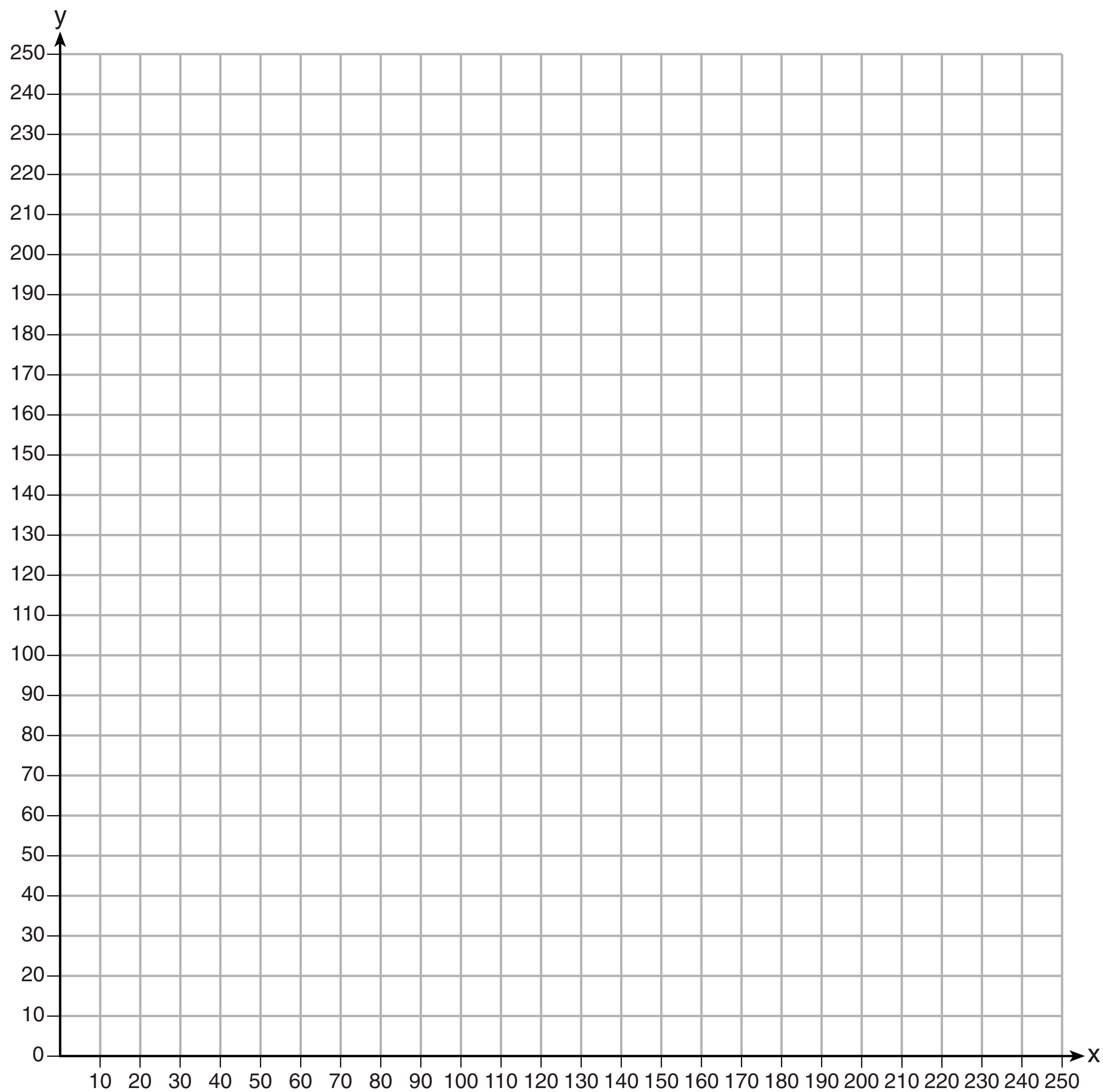
$$12.50(30) + 6.25(80)$$

$$875$$

No She is incorrect

Score 1: The student wrote one inequality correctly, but no explanation was written.

Question 37



$$12.50x + 6.25y \geq 200$$
$$-12.50x \qquad -12.50x$$

$$\frac{6.25y}{6.25} \geq \frac{-12.50x + 200}{6.25}$$

$$y \geq -2x + 240$$

Question 37

37 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost \$12.50 and child tickets cost \$6.25. The cinema's goal is to sell at least \$1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$(12.50 * x) + (6.25 * y) = 1500$

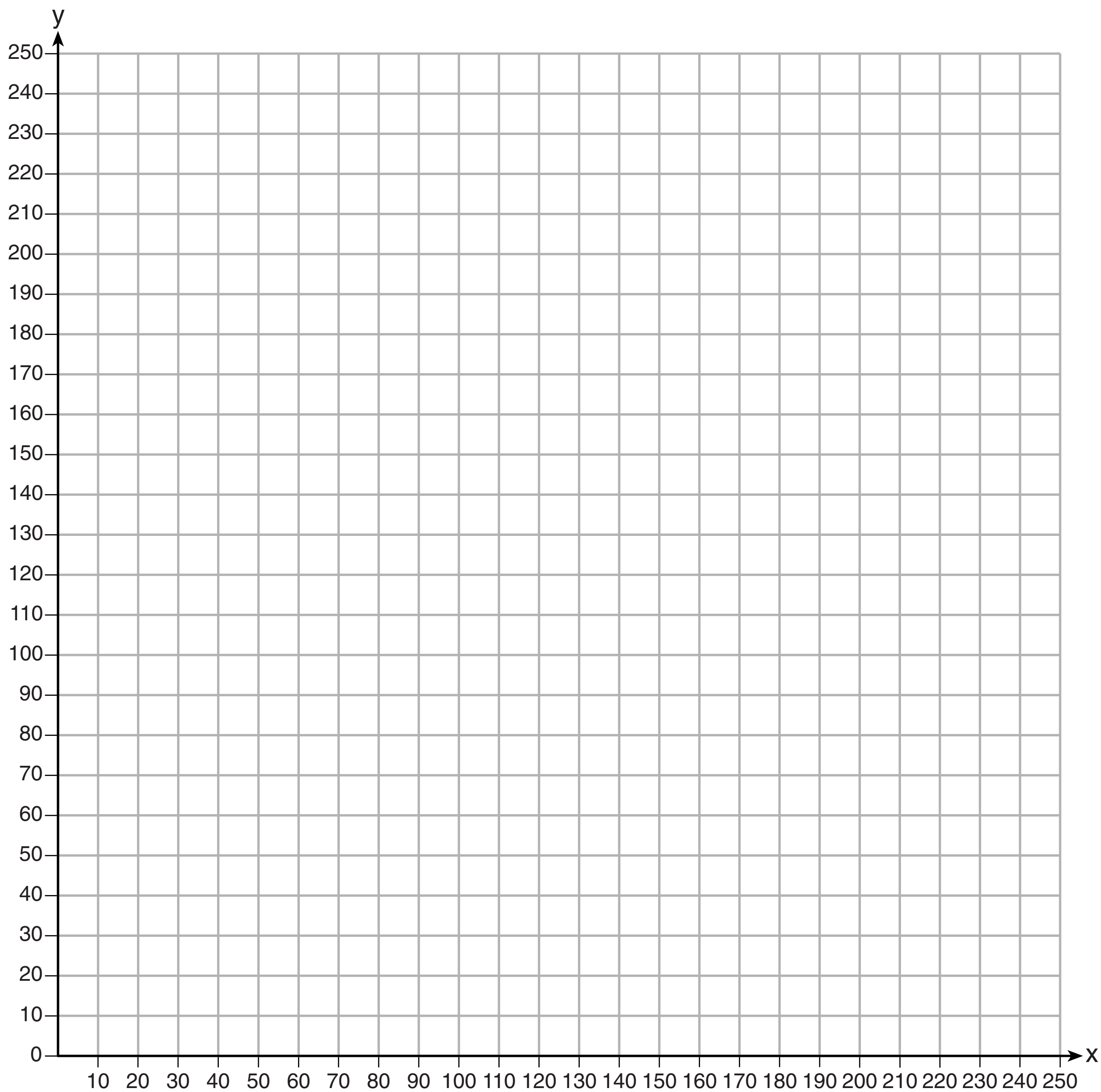
Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an S.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

no She is incorrect
because that would only
add up to ~~8~~875

Score 1: The student gave an explanation not based on the graph.

Question 37



y
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170
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200
210
220
230
240
250

Question 37

37 The Reel Good Cinema is conducting a mathematical study. In its theater, there are 200 seats. Adult tickets cost \$12.50 and child tickets cost \$6.25. The cinema's goal is to sell at least \$1500 worth of tickets for the theater.

Write a system of linear inequalities that can be used to find the possible combinations of adult tickets, x, and child tickets, y, that would satisfy the cinema's goal.

$1500 \geq \$6.25y + 12.50x$

$y > \$12.50x + \$6.25$

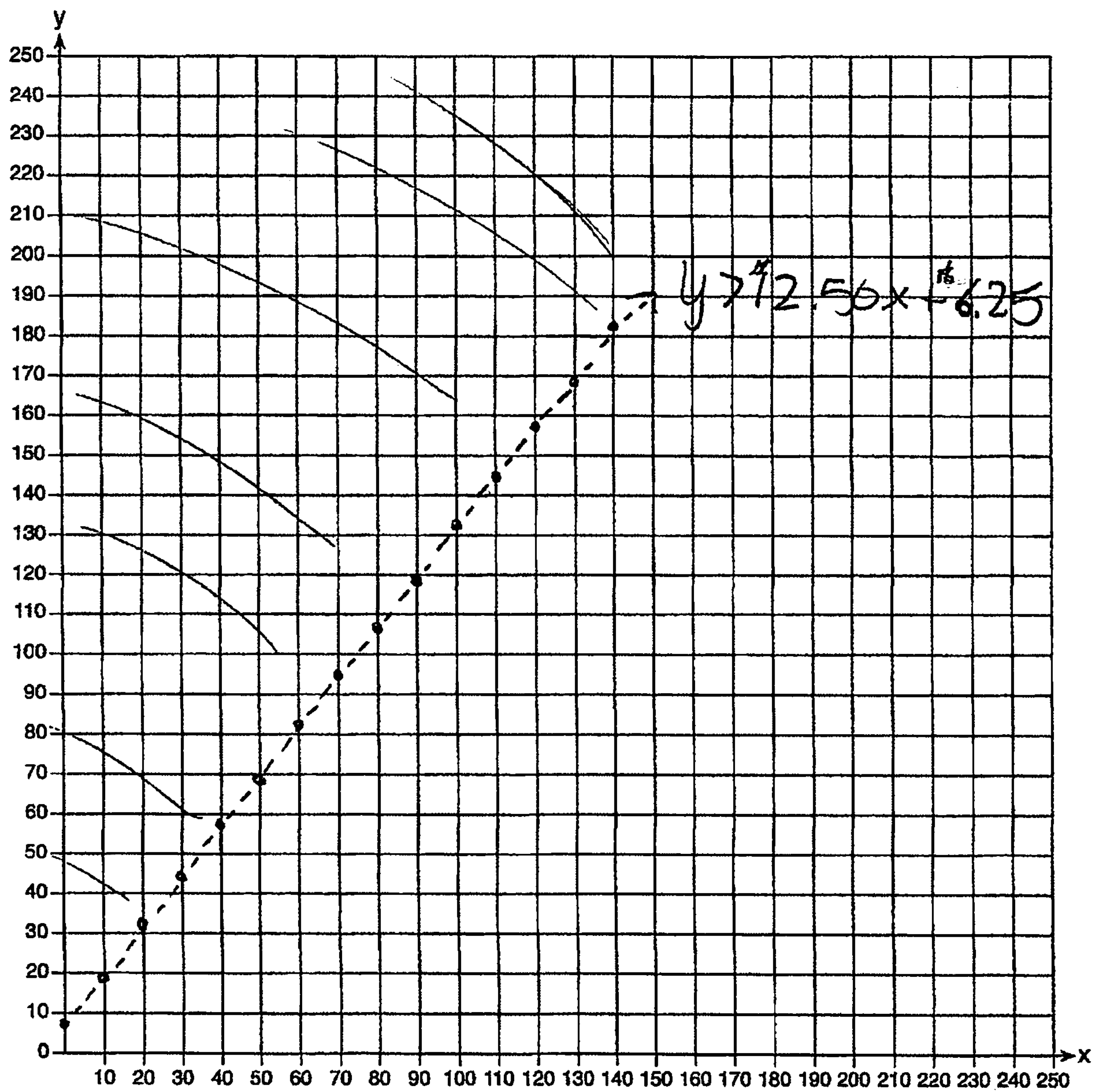
Graph the solution to this system of inequalities on the set of axes on the next page. Label the solution with an S.

Marta claims that selling 30 adult tickets and 80 child tickets will result in meeting the cinema's goal. Explain whether she is correct or incorrect, based on the graph drawn.

Marta's claim is correct.

Score 0: The student did not state or graph either inequality correctly and no explanation was given.

Question 37



y
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10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250
y > 12.50x + 6.25