The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

Wednesday, June 17, 2015 — 1:15 to 4:15 p.m., only

Student Name:_____

School Name: _____

The possession or use of any communications device is strictly prohibited when taking this examination. If you have or use any communications device, no matter how briefly, your examination will be invalidated and no score will be calculated for you.

Print your name and the name of your school on the lines above.

A separate answer sheet for Part I has been provided to you. Follow the instructions from the proctor for completing the student information on your answer sheet.

This examination has four parts, with a total of 37 questions. You must answer all questions in this examination. Record your answers to the Part I multiple-choice questions on the separate answer sheet. Write your answers to the questions in Parts II, III, and IV directly in this booklet. All work should be written in pen, except graphs and drawings, which should be done in pencil. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale.

The formulas that you may need to answer some questions in this examination are found at the end of the examination. This sheet is perforated so you may remove it from this booklet.

Scrap paper is not permitted for any part of this examination, but you may use the blank spaces in this booklet as scrap paper. A perforated sheet of scrap graph paper is provided at the end of this booklet for any question for which graphing may be helpful but is not required. You may remove this sheet from this booklet. Any work done on this sheet of scrap graph paper will *not* be scored.

When you have completed the examination, you must sign the statement printed at the end of the answer sheet, indicating that you had no unlawful knowledge of the questions or answers prior to the examination and that you have neither given nor received assistance in answering any of the questions during the examination. Your answer sheet cannot be accepted if you fail to sign this declaration.

Notice…

A graphing calculator and a straightedge (ruler) must be available for you to use while taking this examination.

**DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.**

Part I

Answer all 24 questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For each statement or question, choose the word or expression that, of those given, best completes the statement or answers the question. Record your answers on your separate answer sheet. [48]

Use this space for computations.

1 The cost of airing a commercial on television is modeled by the function $C(n) = 110n + 900$, where n is the number of times the commercial is aired. Based on this model, which statement is true?

(1) The commercial costs $0 to produce and $110 per airing up to $900.

(2) The commercial costs $110 to produce and $900 each time it is aired.

(3) The commercial costs $900 to produce and $110 each time it is aired.

(4) The commercial costs $1010 to produce and can air an unlimited number of times.

2 The graph below represents a jogger's speed during her 20-minute jog around her neighborhood.
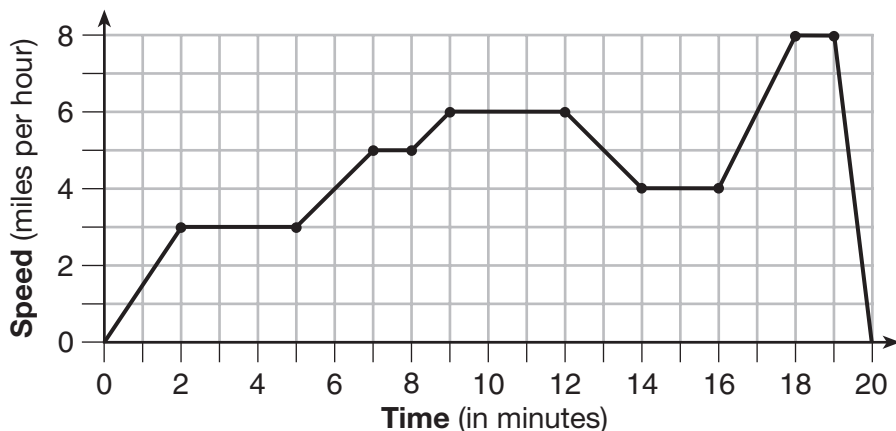
Which statement best describes what the jogger was doing during the 9–12 minute interval of her jog?

(1) She was standing still.

(2) She was increasing her speed.

(3) She was decreasing her speed.

(4) She was jogging at a constant rate.

3 If the area of a rectangle is expressed as $x^4 - 9y^2$, then the product of the length and the width of the rectangle could be expressed as

(1) $(x - 3y)(x + 3y)$

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

(2) $(x^2 - 3y)(x^2 + 3y)$

(4) $(x^4 + y)(x - 9y)$

4 Which table represents a function?

x	2	4	2	4
f(x)	3	5	7	9

(1)

x	3	5	7	9
f(x)	2	4	2	4

(3)

x	0	−1	0	1
f(x)	0	1	−1	0

(2)

x	0	1	−1	0
f(x)	0	−1	0	1

(4)

5 Which inequality is represented in the graph below?

(1) $y \geq -3x + 4$

(3) $y \geq -4x - 3$

(2) $y \leq -3x + 4$

(4) $y \leq -4x - 3$

6 Mo's farm stand sold a total of 165 pounds of apples and peaches. She sold apples for \$1.75 per pound and peaches for \$2.50 per pound. If she made \$337.50, how many pounds of peaches did she sell?

(1) 11   (3) 65

(2) 18   (4) 100

7 Morgan can start wrestling at age 5 in Division 1. He remains in that division until his next odd birthday when he is required to move up to the next division level. Which graph correctly represents this information?

Use this space for computations.

(1)

(3)

(2)

(4)

Algebra I (Common Core) – June '15   [4]

8 Which statement is *not* always true?

(1) The sum of two rational numbers is rational.

(2) The product of two irrational numbers is rational.

(3) The sum of a rational number and an irrational number is irrational.

(4) The product of a nonzero rational number and an irrational number is irrational.

9 The graph of the function $f(x) = \sqrt{x + 4}$ is shown below.
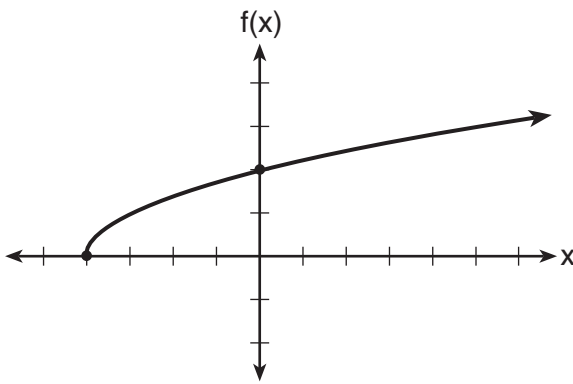
The domain of the function is

(1) $\{x | x > 0\}$ (3) $\{x | x > -4\}$

(2) $\{x | x \geq 0\}$ (4) $\{x | x \geq -4\}$

10 What are the zeros of the function $f(x) = x^2 - 13x - 30$?

(1) -10 and 3 (3) -15 and 2

(2) 10 and -3 (4) 15 and -2

11 Joey enlarged a 3-inch by 5-inch photograph on a copy machine. He enlarged it four times. The table below shows the area of the photograph after each enlargement.

Enlargement	0	1	2	3	4
Area (square inches)	15	18.8	23.4	29.3	36.6

What is the average rate of change of the area from the original photograph to the fourth enlargement, to the *nearest tenth*?

(1) 4.3   (3) 5.4

(2) 4.5   (4) 6.0

12 Which equation(s) represent the graph below?

$$\text{I} \quad y = (x + 2)(x^2 - 4x - 12)$$

$$\text{II} \quad y = (x - 3)(x^2 + x - 2)$$

$$\text{III} \quad y = (x - 1)(x^2 - 5x - 6)$$

(1) I, only   (3) I and II

(2) II, only   (4) II and III

13 A laboratory technician studied the population growth of a colony of bacteria. He recorded the number of bacteria every other day, as shown in the partial table below.

t (time, in days)	0	2	4
f(t) (bacteria)	25	15,625	9,765,625

Which function would accurately model the technician's data?

(1) $f(t) = 25^t$ (3) $f(t) = 25t$

(2) $f(t) = 25^{t+1}$ (4) $f(t) = 25(t + 1)$

14 Which quadratic function has the largest maximum?

$h(x) = (3 - x)(2 + x)$ $k(x) = -5x^2 - 12x + 4$

     (1)   (3)

x	f(x)
−1	−3
0	5
1	9
2	9
3	5
4	−3

    (2)

g(x)
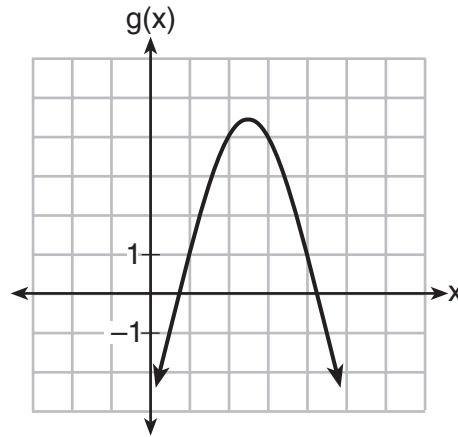
    (4)

15 If $f(x) = 3^x$ and $g(x) = 2x + 5$, at which value of x is $f(x) < g(x)$?

(1) −1   (3) −3

(2) 2   (4) 4

16 Beverly did a study this past spring using data she collected from a cafeteria. She recorded data weekly for ice cream sales and soda sales. Beverly found the line of best fit and the correlation coefficient, as shown in the diagram below.

Beverly's Cafeteria Study
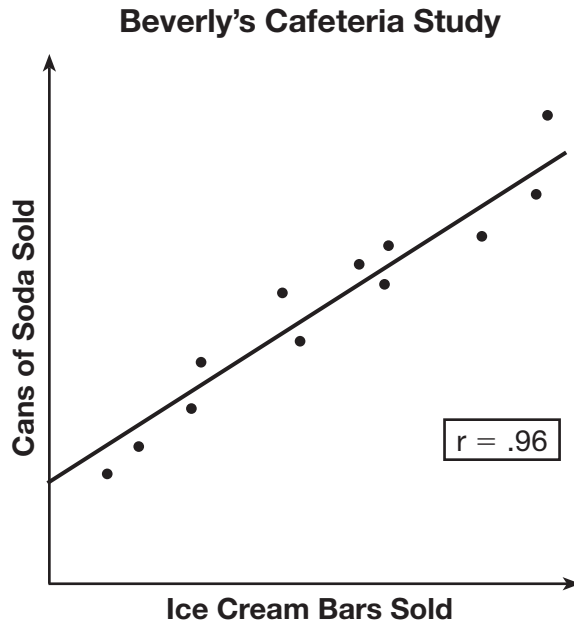
Given this information, which statement(s) can correctly be concluded?

I.   Eating more ice cream causes a person to become thirsty.
II. Drinking more soda causes a person to become hungry.
III. There is a strong correlation between ice cream sales and soda sales.

(1) I, only   (3) I and III

(2) III, only   (4) II and III

17 The function $V(t) = 1350(1.017)^t$ represents the value $V(t)$, in dollars, of a comic book t years after its purchase. The yearly rate of appreciation of the comic book is

(1) 17%   (3) 1.017%

(2) 1.7%   (4) 0.017%

18 When directed to solve a quadratic equation by completing the square, Sam arrived at the equation $\left(x - \frac{5}{2}\right)^2 = \frac{13}{4}$. Which equation could have been the original equation given to Sam?

(1) $x^2 + 5x + 7 = 0$ (3) $x^2 - 5x + 7 = 0$

(2) $x^2 + 5x + 3 = 0$ (4) $x^2 - 5x + 3 = 0$

19 The distance a free falling object has traveled can be modeled by the equation $d = \frac{1}{2}at^2$, where a is acceleration due to gravity and t is the amount of time the object has fallen. What is t in terms of a and d?

(1) $t = \sqrt{\dfrac{da}{2}}$ (3) $t = \left(\dfrac{da}{d}\right)^2$

(2) $t = \sqrt{\dfrac{2d}{a}}$ (4) $t = \left(\dfrac{2d}{a}\right)^2$

20 The table below shows the annual salaries for the 24 members of a professional sports team in terms of millions of dollars.

0.5	0.5	0.6	0.7	0.75	0.8
1.0	1.0	1.1	1.25	1.3	1.4
1.4	1.8	2.5	3.7	3.8	4
4.2	4.6	5.1	6	6.3	7.2

The team signs an additional player to a contract worth 10 million dollars per year. Which statement about the median and mean is true?

(1) Both will increase.

(2) Only the median will increase.

(3) Only the mean will increase.

(4) Neither will change.

21 A student is asked to solve the equation $4(3x - 1)^2 - 17 = 83$. The student's solution to the problem starts as
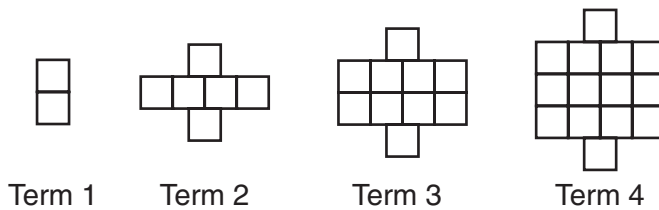
$$4(3x - 1)^2 = 100$$
$$(3x - 1)^2 = 25$$

A correct next step in the solution of the problem is

(1) $3x - 1 = \pm 5$ (3) $9x^2 - 1 = 25$

(2) $3x - 1 = \pm 25$ (4) $9x^2 - 6x + 1 = 5$

22 A pattern of blocks is shown below.

Term 1   Term 2   Term 3   Term 4

If the pattern of blocks continues, which formula(s) could be used to determine the number of blocks in the nth term?

I	II	III
$a_n = n + 4$	$a_1 = 2$ $a_n = a_{n-1} + 4$	$a_n = 4n - 2$

(1) I and II   (3) II and III

(2) I and III   (4) III, only

23 What are the solutions to the equation $x^2 - 8x = 24$?

(1) $x = 4 \pm 2\sqrt{10}$ (3) $x = 4 \pm 2\sqrt{2}$

(2) $x = -4 \pm 2\sqrt{10}$ (4) $x = -4 \pm 2\sqrt{2}$

24 Natasha is planning a school celebration and wants to have live music and food for everyone who attends. She has found a band that will charge her $750 and a caterer who will provide snacks and drinks for $2.25 per person. If her goal is to keep the average cost per person between $2.75 and $3.25, how many people, p, must attend?

(1) $225 < p < 325$ (3) $500 < p < 1000$

(2) $325 < p < 750$ (4) $750 < p < 1500$

Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

25 Graph the function $y = |x - 3|$ on the set of axes below.
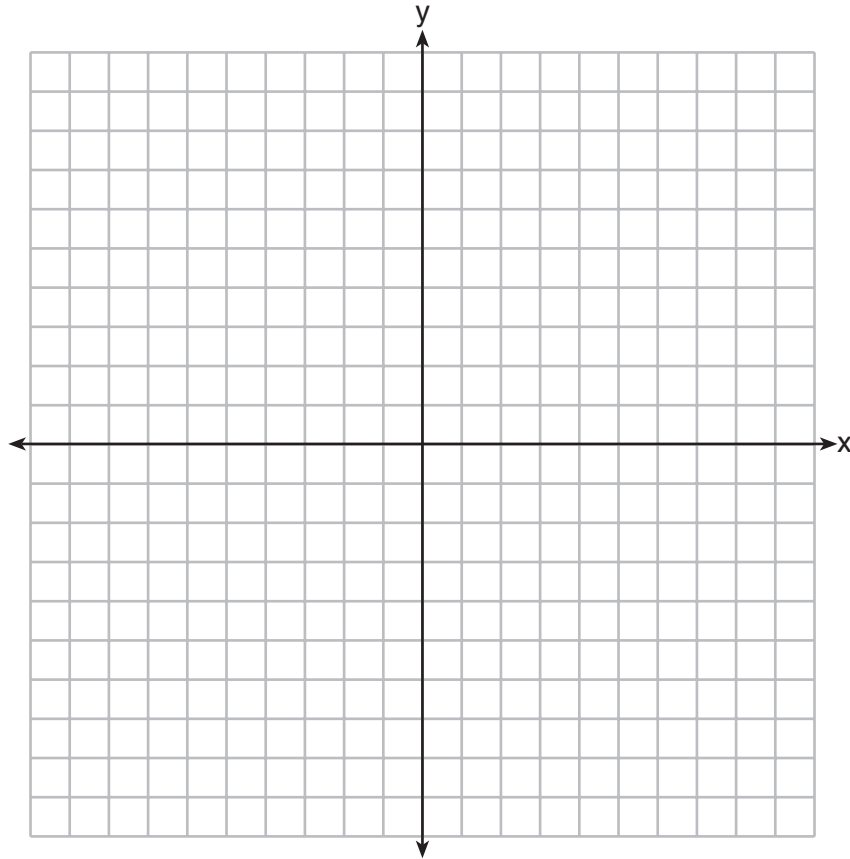
Explain how the graph of $y = |x - 3|$ has changed from the related graph $y = |x|$.

26 Alex is selling tickets to a school play. An adult ticket costs $6.50 and a student ticket costs $4.00. Alex sells x adult tickets and 12 student tickets. Write a function, $f(x)$, to represent how much money Alex collected from selling tickets.

27 John and Sarah are each saving money for a car. The total amount of money John will save is given by the function $f(x) = 60 + 5x$. The total amount of money Sarah will save is given by the function $g(x) = x^2 + 46$. After how many weeks, x, will they have the same amount of money saved? Explain how you arrived at your answer.

28 If the difference $(3x^2 - 2x + 5) - (x^2 + 3x - 2)$ is multiplied by $\frac{1}{2}x^2$, what is the result, written in standard form?

29 Dylan invested $600 in a savings account at a 1.6% annual interest rate. He made no deposits or withdrawals on the account for 2 years. The interest was compounded annually. Find, to the *nearest cent*, the balance in the account after 2 years.

30 Determine the smallest integer that makes $-3x + 7 - 5x < 15$ true.

31 The residual plots from two different sets of bivariate data are graphed below.
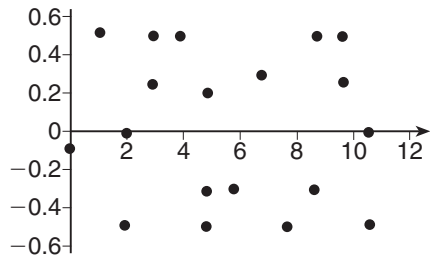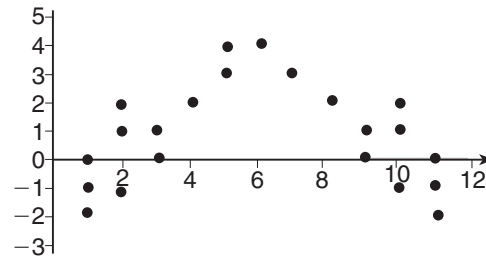
Graph A   **Graph B**

Explain, using evidence from graph *A* and graph *B*, which graph indicates that the model for the data is a good fit.

32 A landscaper is creating a rectangular flower bed such that the width is half of the length. The area of the flower bed is 34 square feet. Write and solve an equation to determine the width of the flower bed, to the *nearest tenth of a foot*.

Answer all 4 questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. For all questions in this part, a correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

33 Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

34 The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \leq x \leq 40 \\ 15(x - 40) + 400, & x > 40 \end{cases}$$

Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours.

Determine the number of hours an employee must work in order to earn $445. Explain how you arrived at this answer.

35 An on-line electronics store must sell at least $2500 worth of printers and computers per day. Each printer costs $50 and each computer costs $500. The store can ship a maximum of 15 items per day.

On the set of axes below, graph a system of inequalities that models these constraints.

Number of Computers

Number of Printers
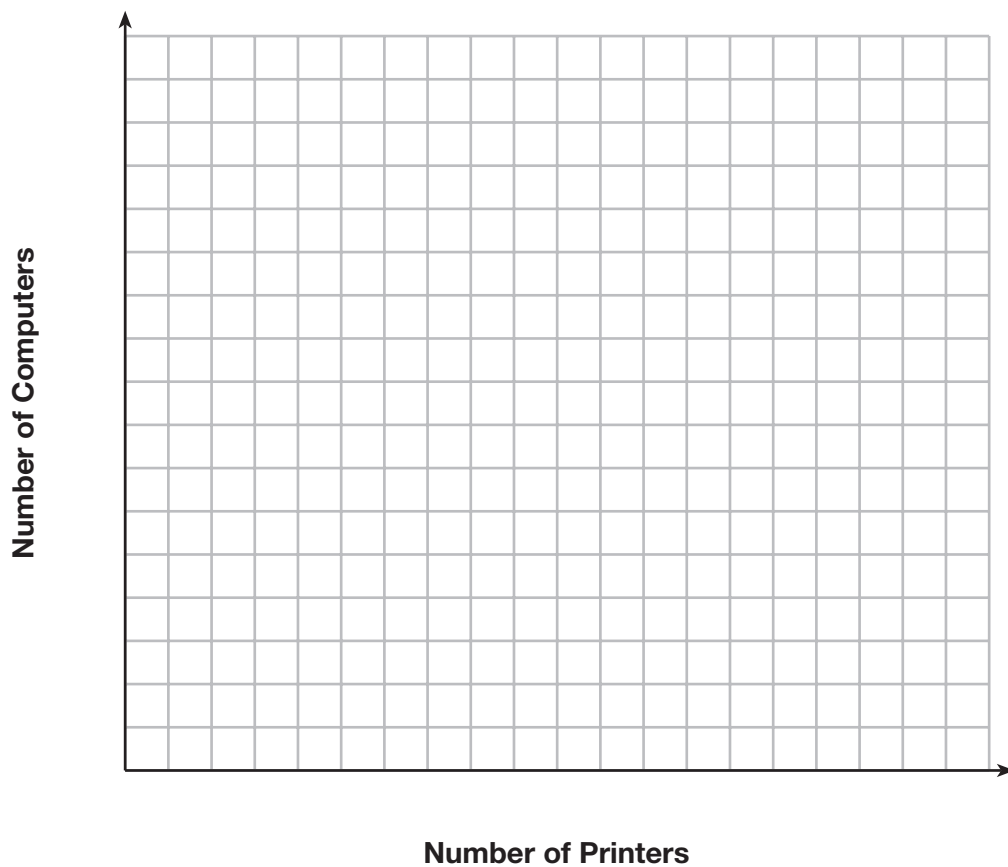
Determine a combination of printers and computers that would allow the electronics store to meet all of the constraints. Explain how you obtained your answer.

36 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data.

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the *nearest download*.

Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

Answer the question in this part. A correct answer will receive 6 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily drawn to scale. A correct numerical answer with no work shown will receive only 1 credit. All answers should be written in pen, except for graphs and drawings, which should be written in pencil.   [6]

37 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

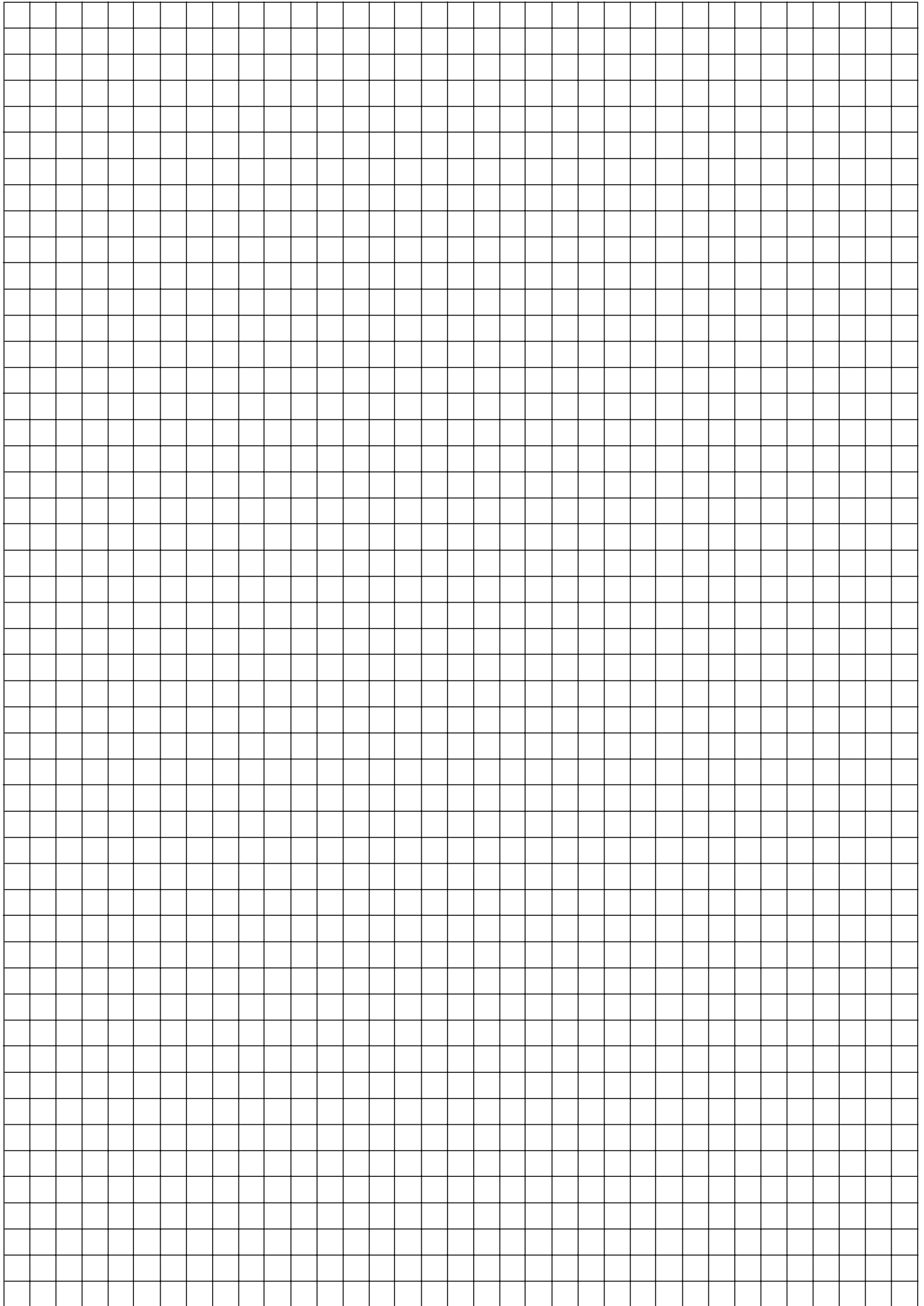On the set of axes below, graph the function $y = h(x)$ over the interval $0 \le x \le 150$.
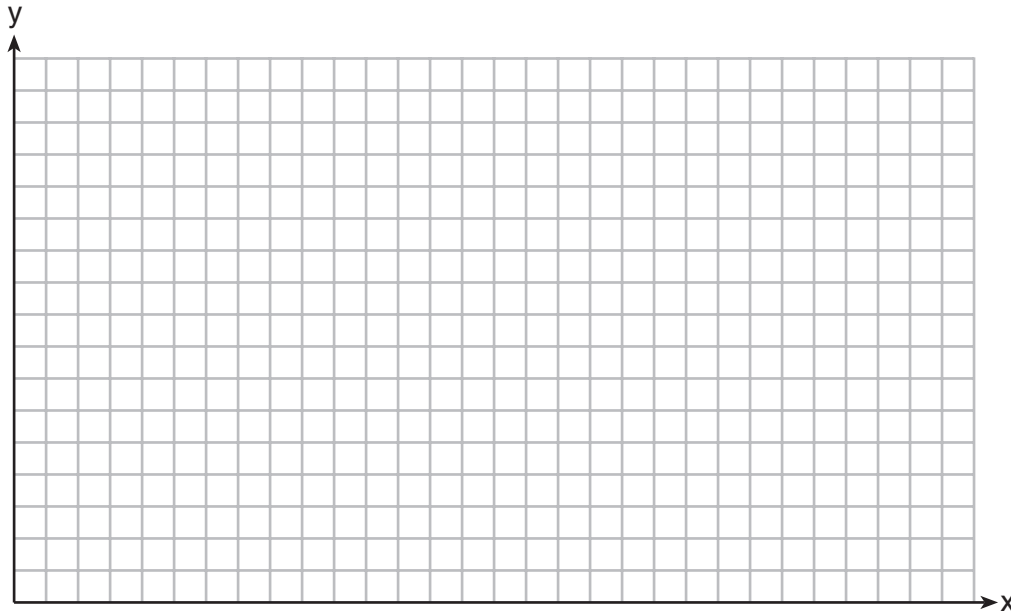
Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

High School Math Reference Sheet

1 inch = 2.54 centimeters   1 kilometer = 0.62 mile   1 cup = 8 fluid ounces
1 meter = 39.37 inches   1 pound = 16 ounces   1 pint = 2 cups
1 mile = 5280 feet   1 pound = 0.454 kilogram   1 quart = 2 pints
1 mile = 1760 yards   1 kilogram = 2.2 pounds   1 gallon = 4 quarts
1 mile = 1.609 kilometers   1 ton = 2000 pounds   1 gallon = 3.785 liters
   1 liter = 0.264 gallon
   1 liter = 1000 cubic centimeters

Triangle	$A = \frac{1}{2}bh$	Pythagorean Theorem	$a^2 + b^2 = c^2$
Parallelogram	$A = bh$	Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Circle	$A = \pi r^2$	Arithmetic Sequence	$a_n = a_1 + (n - 1)d$
Circle	$C = \pi d$ or $C = 2\pi r$	Geometric Sequence	$a_n = a_1 r^{n-1}$
General Prisms	$V = Bh$	Geometric Series	$S_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$
Cylinder	$V = \pi r^2 h$	Radians	1 radian $= \frac{180}{\pi}$ degrees
Sphere	$V = \frac{4}{3}\pi r^3$	Degrees	1 degree $= \frac{\pi}{180}$ radians
Cone	$V = \frac{1}{3}\pi r^2 h$	Exponential Growth/Decay	$A = A_0 e^{k(t - t_0)} + B_0$
Pyramid	$V = \frac{1}{3}Bh$		

Tear Here

Tear Here

Tear Here

ALGEBRA I (COMMON CORE)

FOR TEACHERS ONLY

ALGEBRA I (Common Core)

Wednesday, June 17, 2015 — 1:15 to 4:15 p.m., only

SCORING KEY AND RATING GUIDE

Mechanics of Rating

The following procedures are to be followed for scoring student answer papers for the Regents Examination in Algebra I (Common Core). More detailed information about scoring is provided in the publication *Information Booklet for Scoring The Regents Examination in Algebra I (Common Core)*.

Do *not* attempt to correct the student's work by making insertions or changes of any kind. In scoring the constructed-response questions, use check marks to indicate student errors. Unless otherwise specified, mathematically correct variations in the answers will be allowed. Units need not be given when the wording of the questions allows such omissions.

Each student's answer paper is to be scored by a minimum of three mathematics teachers. No one teacher is to score more than approximately one-third of the constructed-response questions on a student's paper. Teachers may not score their own students' answer papers. On the student's separate answer sheet, for each question, record the number of credits earned and the teacher's assigned rater/scorer letter.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Raters should record the student's scores for all questions and the total raw score on the student's separate answer sheet. Then the student's total raw score should be converted to a scale score by using the conversion chart that will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ by Wednesday, June 17, 2015. Because scale scores corresponding to raw scores in the conversion chart may change from one administration to another, it is crucial that, for each administration, the conversion chart provided for that administration be used to determine the student's final score. The student's scale score should be entered in the box provided on the student's separate answer sheet. The scale score is the student's final examination score.

If the student's responses for the multiple-choice questions are being hand scored prior to being scanned, the scorer must be careful not to make any marks on the answer sheet except to record the scores in the designated score boxes. Marks elsewhere on the answer sheet will interfere with the accuracy of the scanning.

Part I

Allow a total of 48 credits, 2 credits for each of the following.

(1) 3	(9) 4	(17) . . . . . 2 . . . . .
(2) 4	(10) 4	(18) . . . . . 4 . . . . .
(3) 2	(11) 3	(19) . . . . . 2 . . . . .
(4) 3	(12) 2	(20) . . . . . 3 . . . . .
(5) 1	(13) 2	(21) . . . . . 1 . . . . .
(6) 3	(14) 3	(22) . . . . . 3 . . . . .
(7) 1	(15) 1	(23) . . . . . 1 . . . . .
(8) 2	(16) 2	(24) . . . . . 4 . . . . .

Updated information regarding the rating of this examination may be posted on the New York State Education Department's web site during the rating period. Check this web site at: http://www.p12.nysed.gov/assessment/ and select the link "Scoring Information" for any recently posted information regarding this examination. This site should be checked before the rating process for this examination begins and several times throughout the Regents Examination period.

The Department is providing supplemental scoring guidance, the "Model Response Set," for the Regents Examination in Algebra I (Common Core). This guidance is recommended to be part of the scorer training. Schools are encouraged to incorporate the Model Response Sets into the scorer training or to use them as additional information during scoring. While not reflective of all scenarios, the model responses selected for the Model Response Set illustrate how less common student responses to constructed-response questions may be scored. The Model Response Set will be available on the Department's web site at http://www.nysedregents.org/algebraone/.

General Rules for Applying Mathematics Rubrics

I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examination in Algebra I (Common Core) are designed to provide a systematic, consistent method for awarding credit. The rubrics are not to be considered all-inclusive; it is impossible to anticipate all the different methods that students might use to solve a given problem. Each response must be rated carefully using the teacher's professional judgment and knowledge of mathematics; all calculations must be checked. The specific rubrics for each question must be applied consistently to all responses. In cases that are not specifically addressed in the rubrics, raters must follow the general rating guidelines in the publication *Information Booklet for Scoring the Regents Examination in Algebra I (Common Core)*, use their own professional judgment, confer with other mathematics teachers, and/or contact the State Education Department for guidance. During each Regents Examination administration period, rating questions may be referred directly to the Education Department. The contact numbers are sent to all schools before each administration period.

II. Full-Credit Responses

A full-credit response provides a complete and correct answer to all parts of the question. Sufficient work is shown to enable the rater to determine how the student arrived at the correct answer.

When the rubric for the full-credit response includes one or more examples of an acceptable method for solving the question (usually introduced by the phrase "such as"), it does not mean that there are no additional acceptable methods of arriving at the correct answer. Unless otherwise specified, mathematically correct alternative solutions should be awarded credit. The only exceptions are those questions that specify the type of solution that must be used; e.g., an algebraic solution or a graphic solution. A correct solution using a method other than the one specified is awarded half the credit of a correct solution using the specified method.

III. Appropriate Work

Full-Credit Responses: The directions in the examination booklet for all the constructed-response questions state: "Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc." The student has the responsibility of providing the correct answer *and* showing how that answer was obtained. The student must "construct" the response; the teacher should not have to search through a group of seemingly random calculations scribbled on the student paper to ascertain what method the student may have used.

Responses With Errors: Rubrics that state "Appropriate work is shown, but…" are intended to be used with solutions that show an essentially complete response to the question but contain certain types of errors, whether computational, rounding, graphing, or conceptual. If the response is incomplete; i.e., an equation is written but not solved or an equation is solved but not all of the parts of the question are answered, appropriate work has *not* been shown. Other rubrics address incomplete responses.

IV. Multiple Errors

Computational Errors, Graphing Errors, and Rounding Errors: Each of these types of errors results in a 1-credit deduction. Any combination of two of these types of errors results in a 2-credit deduction. No more than 2 credits should be deducted for such mechanical errors in a 4-credit question and no more than 3 credits should be deducted in 6-credit question. The teacher must carefully review the student's work to determine what errors were made and what type of errors they were.

Conceptual Errors: A conceptual error involves a more serious lack of knowledge or procedure. Examples of conceptual errors include using the incorrect formula for the area of a figure, choosing the incorrect trigonometric function, or multiplying the exponents instead of adding them when multiplying terms with exponents.

If a response shows repeated occurrences of the same conceptual error, the student should not be penalized twice. If the same conceptual error is repeated in responses to other questions, credit should be deducted in each response.

For 4- and 6-credit questions, if a response shows one conceptual error and one computational, graphing, or rounding error, the teacher must award credit that takes into account both errors. Refer to the rubric for specific scoring guidelines.

Part II

For each question, use the specific criteria to award a maximum of 2 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(25) **[2]** A correct graph is drawn, and a correct explanation is written.

[1] Appropriate work is shown, but one computational or graphing error is made.

or

[1] Appropriate work is shown, but one conceptual error is made.

or

[1] A correct graph is drawn, but the explanation is incomplete, incorrect, or missing.

or

[1] A correct explanation is written, but no further correct work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(26) **[2]** A correct function is written, such as $f(x) = 6.50x + 4(12)$.

[1] Appropriate work is shown, but one computational error is made.

or

[1] An appropriate expression or an equation that does not use $f(x)$ is written.

or

[1] Appropriate work is shown, but one conceptual error is made.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(27)   **[2]** 7, and a correct explanation is given.

      [1] Appropriate work is shown, but one computational or factoring error is made.

<div align="center">***or***</div>

      [1] Appropriate work is shown, but one conceptual error is made.

<div align="center">***or***</div>

      [1] 7, but the explanation is incomplete, incorrect, or missing.

      [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(28)   **[2]** $x^4 - \frac{5}{2}x^3 + \frac{7}{2}x^2$, and correct work is shown.

      [1] Appropriate work is shown, but one computational error is made.

<div align="center">***or***</div>

      [1] Appropriate work is shown, but one conceptual error is made.

<div align="center">***or***</div>

      [1] Appropriate work is shown to find a correct expression, but the expression is not in standard form.

<div align="center">***or***</div>

      [1] $x^4 - \frac{5}{2}x^3 + \frac{7}{2}x^2$, but no work is shown.

      [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(29)   **[2]** 619.35, and correct work is shown.

    [1] Appropriate work is shown, but one computational or rounding error is made.

                           or

    [1] Appropriate work is shown, but one conceptual error is made.

                           or

    [1] $A = 600(1 + .016)^2$ or an equivalent equation is written, but no further correct work is shown.

                           or

    [1] $600(1 + .016)^2$ or an equivalent expression is written, but no further correct work is shown.

                           or

    [1] 619.35, but no work is shown.

    [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure

(30)   **[2]** 0, and correct work is shown.

    [1] Appropriate work is shown, but one computational or rounding error is made.

                           or

    [1] Appropriate work is shown, but one conceptual error is made.

                           or

    [1] Appropriate work is shown to find $x > -1$, but the smallest integer is not stated or is stated incorrectly.

                           or

    [1] 0, but no work is shown.

    [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(31)   **[2]** Graph *A*, and a correct explanation is written.

        [1] One conceptual error is made.

<div align="center">***or***</div>

        [1] Graph *A*, but an incomplete explanation is given.

        [0] Graph *A*, but no explanation is given.

<div align="center">***or***</div>

        [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(32)   **[2]** A correct equation is written, 4.1, and correct work is shown.

        [1] Appropriate work is shown, but one computational error is made.

<div align="center">***or***</div>

        [1] Appropriate work is shown, but one conceptual error is made.

<div align="center">***or***</div>

        [1] A correct equation is written, but no further correct work is shown.

<div align="center">***or***</div>

        [1] 4.1, but no work is shown.

        [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Part III

For each question, use the specific criteria to award a maximum of 4 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(33)   **[4]** Agree (or yes), and a correct justification is given.

        [3] Appropriate work is shown, but one computational error is made.

or

        [3] Appropriate work is shown, but agree is not stated.

        [2] Appropriate work is shown, but two or more computational errors are made.

or

        [2] Appropriate work is shown, but one conceptual error is made.

        [1] Appropriate work is shown, but one conceptual error and one computational error are made.

or

        [1] $x = -\frac{3}{4}$ and $y = 6$, but no work is shown.

        [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(34)   **[4]** 200, and correct work is shown, 43 and a correct explanation is given.

[3] Appropriate work is shown, but one computational error is made.

or

[3] Appropriate work is shown, but the explanation is incomplete, incorrect, or missing.

[2] Appropriate work is shown, but two or more computational errors are made.

or

[2] Appropriate work is shown, but one conceptual error is made.

or

[2] Appropriate work is shown to find 200, but no further correct work is shown.

or

[2] 200 and 43, but no work is shown.

[1] Appropriate work is shown, but one computational and one conceptual error are made.

or

[1] 200 or 43, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(35)   **[4]** A correct system of inequalities is graphed and at least one inequality is labeled. A correct combination is stated, and a correct explanation is given.

[3] Appropriate work is shown, but one computational, graphing, or labeling error is made.

or

[3] Appropriate work is shown, but the explanation is incomplete, incorrect, or missing.

or

[3] Appropriate work is shown, but a combination is not stated.

[2] Appropriate work is shown, but two or more computational, graphing, or labeling errors are made.

or

[2] Appropriate work is shown, but one conceptual error is made.

or

[2] A correct system of inequalities is graphed, but no further correct work is shown.

or

[2] A correct combination and explanation are given, but no further correct work is shown.

[1] Appropriate work is shown, but one conceptual error and one computational, graphing, or labeling error are made.

or

[1] A correct combination is stated, but no further correct work is shown.

or

[1] $50x + 500y \geq 2500$ and $x + y \leq 15$ are written, but no further correct work is shown.

or

[1] One inequality is graphed and shaded correctly, but no further correct work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

(36) **[4]** $y = 80(1.5)^x$, or an equivalent equation, 3,030,140, no, and correct work is shown and a correct explanation is given.

[3] Appropriate work is shown, but one computational or rounding error is made.

or

[3] Appropriate work is shown, but the explanation is incomplete, incorrect, or missing.

or

[3] The expression $80(1.5)^x$, 3,030,140, no, and correct work is shown and an appropriate explanation is given.

[2] Appropriate work is shown, but two or more computational or rounding errors are made.

or

[2] Appropriate work is shown, but one conceptual error is made.

or

[2] A correct equation is written, but no further correct work is shown.

[1] Appropriate work is shown, but one conceptual error and one computational or rounding error are made.

or

[1] The expression $80(1.5)^x$ is written, but no further correct work is shown.

or

[1] 3,030,140, but no work is shown.

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Part IV

For each question, use the specific criteria to award a maximum of 6 credits. Unless otherwise specified, mathematically correct alternative solutions should be awarded appropriate credit.

(37)   **[6]** A correct graph is drawn, (75, 25) is stated and interpreted, no, and a correct justification is given.

[5] Appropriate work is shown, but one computational or graphing error is made.

or

[5] Appropriate work is shown, but either the interpretation or justification is missing or incorrect.

[4] Appropriate work is shown, but two computational or graphing errors are made.

or

[4] Appropriate work is shown, but one conceptual error is made.

or

[4] A correct graph is drawn, (75, 25) is stated and interpreted, but no further correct work is shown.

or

[4] A correct graph is drawn, (75, 25) and no, but the interpretation and justification are missing or incorrect.

[3] Appropriate work is shown, but three or more computational or graphing or errors are made.

or

[3] Appropriate work is shown, but one conceptual error and one computational or graphing error are made.

or

[3] No, and a correct justification is given, one graphing error is made, but no further correct work is shown.

[2] Appropriate work is shown, but two conceptual errors are made.

or

[2] A correct graph is drawn, but no further correct work is given.

or

[2] (75, 25) and no, but an incomplete or incorrect justification is given, and no graph is drawn.

[1] (75, 25), but no further correct work is shown.

[0] No, but no work is shown.

or

[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously incorrect procedure.

Map to the Common Core Learning Standards
Algebra I (Common Core)
June 2015

Question	Type	Credits	Cluster
1	Multiple Choice	2	F-LE.B
2	Multiple Choice	2	N-Q.A
3	Multiple Choice	2	A-SSE.A
4	Multiple Choice	2	F-IF.A
5	Multiple Choice	2	A-REI.D
6	Multiple Choice	2	A-REI.C
7	Multiple Choice	2	F-IF.C
8	Multiple Choice	2	N-RN.B
9	Multiple Choice	2	F-IF.A
10	Multiple Choice	2	A-SSE.B
11	Multiple Choice	2	F-IF.B
12	Multiple Choice	2	A-APR.B
13	Multiple Choice	2	F-LE.A
14	Multiple Choice	2	F-IF.C
15	Multiple Choice	2	F-LE.A
16	Multiple Choice	2	S-ID.C
17	Multiple Choice	2	A-SSE.A
18	Multiple Choice	2	A-REI.B
19	Multiple Choice	2	A-CED.A
20	Multiple Choice	2	S-ID.A

21	Multiple Choice	2	A-REI.A
22	Multiple Choice	2	F-BF.A
23	Multiple Choice	2	A-REI.B
24	Multiple Choice	2	A-CED.A
25	Constructed Response	2	F-BF.B
26	Constructed Response	2	F-BF.A
27	Constructed Response	2	A-REI.D
28	Constructed Response	2	A-APR.A
29	Constructed Response	2	A-CED.A
30	Constructed Response	2	A-REI.B
31	Constructed Response	2	S-ID.B
32	Constructed Response	2	A-CED.A
33	Constructed Response	4	A-REI.C
34	Constructed Response	4	F-IF.A
35	Constructed Response	4	A-CED.A
36	Constructed Response	4	A-CED.A
37	Constructed Response	6	F-IF.B

Regents Examination in Algebra I (Common Core)

June 2015

Chart for Converting Total Test Raw Scores to Final Examination Scores (Scale Scores)

> The *Chart for Determining the Final Examination Score for the June 2015 Regents Examination in Algebra I (Common Core)* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ on Wednesday, June 17, 2015. Conversion charts provided for previous administrations of the Regents Examination in Algebra I (Common Core) must NOT be used to determine students' final scores for this administration.

Online Submission of Teacher Evaluations of the Test to the Department

Suggestions and feedback from teachers provide an important contribution to the test development process. The Department provides an online evaluation form for State assessments. It contains spaces for teachers to respond to several specific questions and to make suggestions. Instructions for completing the evaluation form are as follows:

1. Go to http://www.forms2.nysed.gov/emsc/osa/exameval/reexameval.cfm.

2. Select the test title.

3. Complete the required demographic fields.

4. Complete each evaluation question and provide comments in the space provided.

5. Click the SUBMIT button at the bottom of the page to submit the completed form.

ALGEBRA I (Common Core)

MODEL RESPONSE SET

Table of Contents

25 Graph the function $y = |x - 3|$ on the set of axes below.

X	y
0	3
1	2
2	1
3	0
4	1
5	2
6	3

Explain how the graph of $y = |x - 3|$ has changed from the related graph $y = |x|$.

Y=|X-3| has changed from graph y=|X|
because it has moved to the right 3.

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

25 Graph the function $y = |x - 3|$ on the set of axes below.
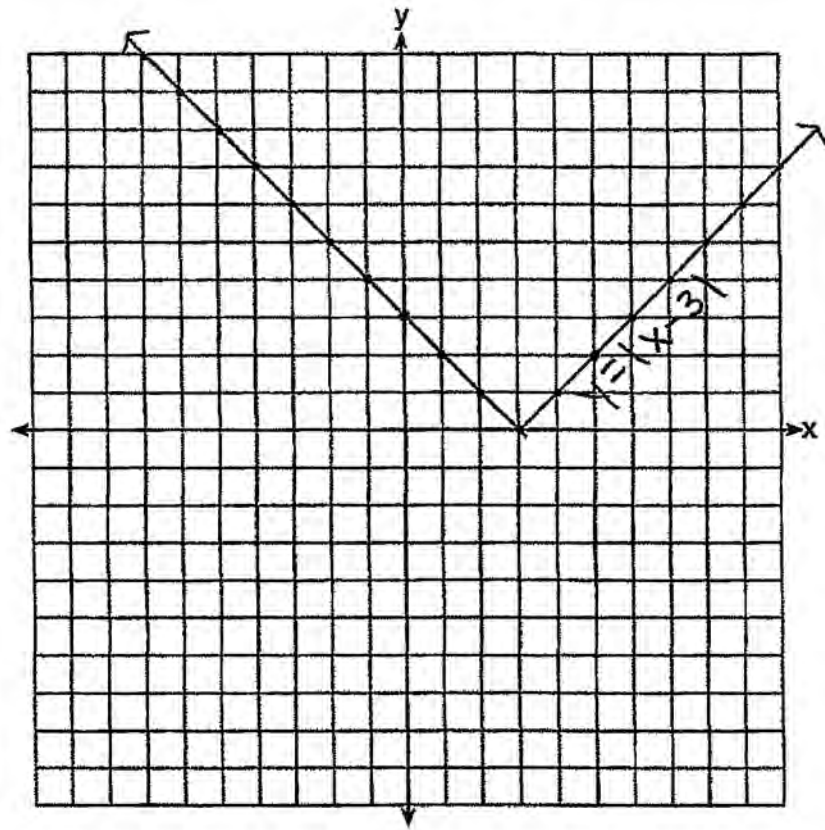
Explain how the graph of $y = |x - 3|$ has changed from the related graph $y = |x|$.

Score 1: The student drew the graph correctly, but gave no explanation.

25 Graph the function $y = |x - 3|$ on the set of axes below.

$y = |x - 3|$
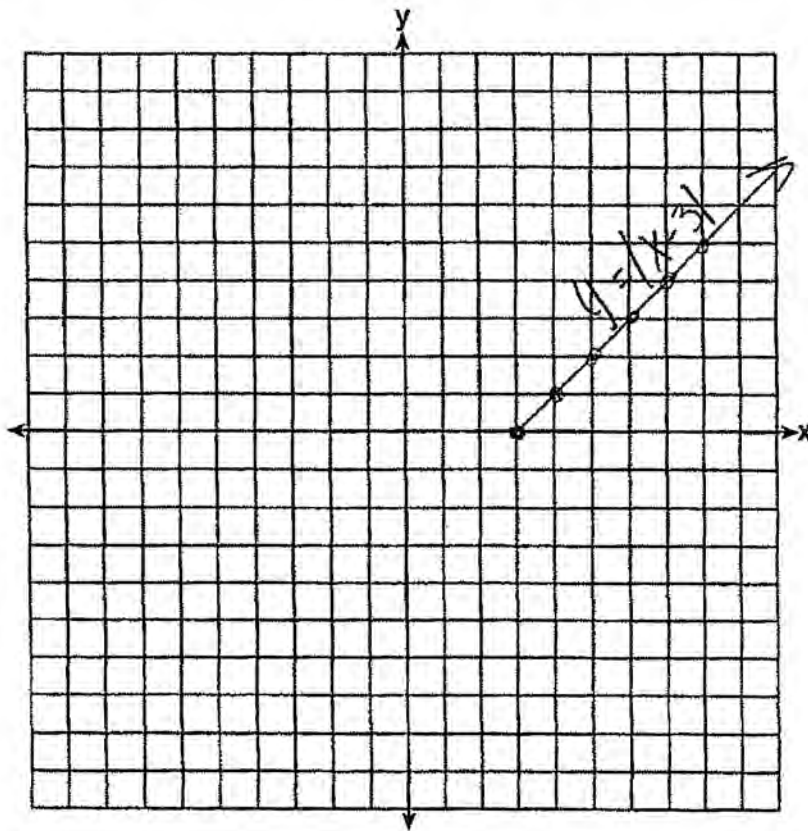
Explain how the graph of $y = |x - 3|$ has changed from the related graph $y = |x|$.

it shifted to the right 3 (horizontal shift)

Score 1: The student made one graphing error by drawing an incomplete absolute value graph.

25 Graph the function $y = |x - 3|$ on the set of axes below.
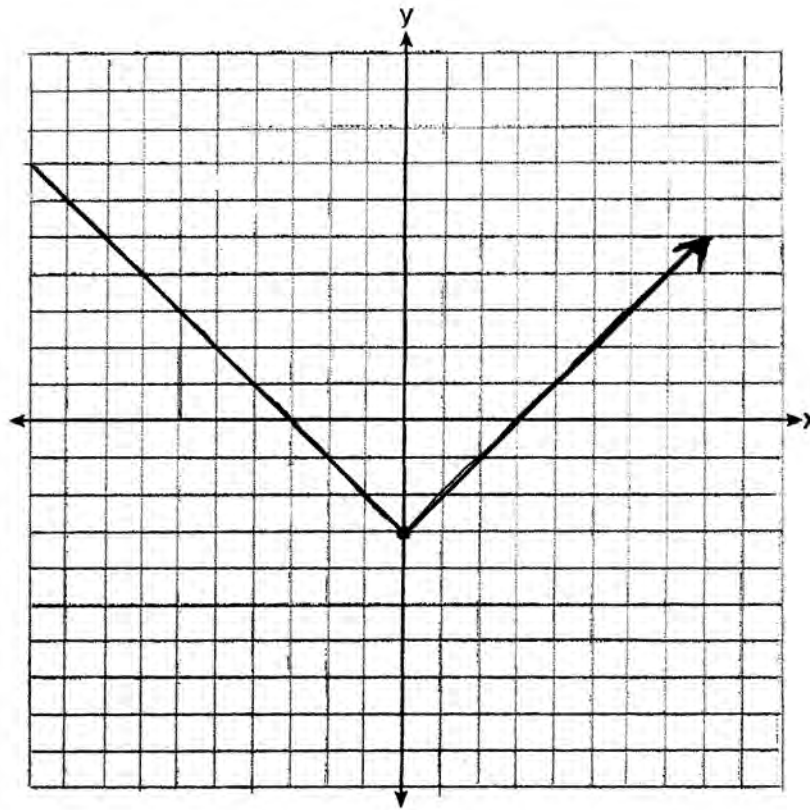
Explain how the graph of $y = |x - 3|$ has changed from the related graph $y = |x|$.

the new one is 3 spaces down
from y=|x|

Score 1:   The student made a transformation error.

25 Graph the function $y = |x - 3|$ on the set of axes below.
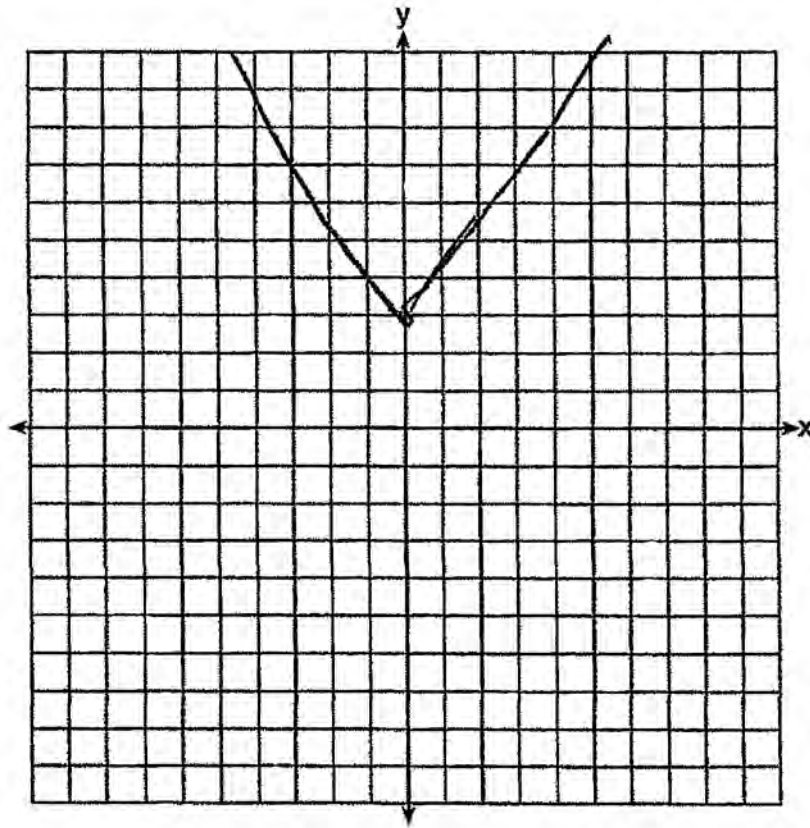
Explain how the graph of $y = |x - 3|$ has changed from the related graph $y = |x|$.

It moved 3

Score 0: The student made a graphing error and gave an incomplete explanation.

26 Alex is selling tickets to a school play. An adult ticket costs $6.50 and a student ticket costs $4.00. Alex sells x adult tickets and 12 student tickets. Write a function, $f(x)$, to represent how much money Alex collected from selling tickets.

$$6.50x + 12(4) = f(x)$$

$$6.50x + 48 = f(x)$$

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

26 Alex is selling tickets to a school play. An adult ticket costs $6.50 and a student ticket costs $4.00. Alex sells *x* adult tickets and 12 student tickets. Write a function, *f(x)*, to represent how much money Alex collected from selling tickets.

$$f(x) = \$6.50(x) + \$4.00(12)$$

$$f(x) = \$6.50x + \$36.00$$

Score 1: The student gave a correct response, but followed it with incorrect work.

26 Alex is selling tickets to a school play. An adult ticket costs $6.50 and a student ticket costs $4.00. Alex sells x adult tickets and 12 student tickets. Write a function, $f(x)$, to represent how much money Alex collected from selling tickets.

$$6.50(x) + 4.00(12) = m$$

Score 1: The student did not write an equation using $f(x)$.

26 Alex is selling tickets to a school play. An adult ticket costs $6.50 and a student ticket costs $4.00. Alex sells x adult tickets and 12 student tickets. Write a function, $f(x)$, to represent how much money Alex collected from selling tickets.

$$12 \times 4 = 48$$

$$48 + 6.50x$$

Score 1: The student wrote an appropriate expression.

26 Alex is selling tickets to a school play. An adult ticket costs $6.50 and a student ticket costs $4.00. Alex sells *x* adult tickets and 12 student tickets. Write a function, *f(x)*, to represent how much money Alex collected from selling tickets.

Adult tickets - $6.50

Student tickets - $4.00

let adult tickets = 6.50x

let student tickets = 4.00 (.12)

$$f(x) = 4(12)$$

$$6.50x = 4(12)$$

$$\frac{6.50x}{6.50} = \frac{48}{6.50}$$

$$x = \$7.3$$

Score 0: The student gave a completely incorrect response.

27 John and Sarah are each saving money for a car. The total amount of money John will save is given by the function $f(x) = 60 + 5x$. The total amount of money Sarah will save is given by the function $g(x) = x^2 + 46$. After how many weeks, x, will they have the same amount of money saved? Explain how you arrived at your answer.

$$60 + 5x = x^2 + 46$$

$$0 = x^2 - 5x - 14$$

$$0 = (x - 7)(x + 2)$$

$$x = 7, -2$$

John and Sarah will save the same amount of money after 7 weeks. I created an equation where John's function is equal to Sarah's. Then I moved everything to one side of the equation and factored. The end result was $x = 7$ and -2. The answer is 7 weeks because you cannot a negative amount of weeks.

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

27 John and Sarah are each saving money for a car. The total amount of money John will save is given by the function $f(x) = 60 + 5x$. The total amount of money Sarah will save is given by the function $g(x) = x^2 + 46$. After how many weeks, x, will they have the same amount of money saved? Explain how you arrived at your answer.

$60 + 5x = x^2 + 46$
$-46 \qquad\qquad -46$

John:

Weeks	Amount
0	60
1	65
2	70
3	75
4	80
5	85
6	90
7	95

Sarah:

Weeks	Amount
0	46
1	47
2	50
3	55
4	62
5	71
6	82
7	95

I created tables for each person and plugged in values for x until I got them to be the same value

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

Question 27

27 John and Sarah are each saving money for a car. The total amount of money John will save is given by the function $f(x) = 60 + 5x$. The total amount of money Sarah will save is given by the function $g(x) = x^2 + 46$. After how many weeks, x, will they have the same amount of money saved? Explain how you arrived at your answer.

7 weeks

$$60 + 5x = x^2 + 46$$
$$-46 \qquad\qquad -46$$

Work is explanation

$$14 + 5x = x^2$$
$$-x^2 - 5x \quad -x^2$$

$$-x^2 + 5x + 14 = 0$$

$$-1(x^2 + 5x + 14)$$

$$-x^2 + 5x + 14$$

$$14x^2$$

$$-14x^2$$
$$-2$$
$$+7$$

$$-x^2 + 7x - 2x + 14$$

$$-x(x-7) -2(x-7)$$

$$(-x-2)(x-7)$$

$$-x-2=0 \qquad x-7=0$$
$$+2 \ +2 \qquad +7 \ +7$$
$$-x = 2 \qquad\quad x = 7$$
$$\frac{-1}{-1} \quad \frac{-1}{-1}$$
$$x = -2$$

Score 1: The student gave no explanation.

27 John and Sarah are each saving money for a car. The total amount of money John will save is given by the function $f(x) = 60 + 5x$. The total amount of money Sarah will save is given by the function $g(x) = x^2 + 46$. After how many weeks, x, will they have the same amount of money saved? Explain how you arrived at your answer.

In Two weeks

I arrived at my answer by subsituting the y's into one equation and then solving

$y = 60 + 5x \qquad y = x^2 + 46$

$x^2 + 46 = 60 + 5x$
$\quad -46 \quad -46$

$x^2 = 14 - 5x$
$+5x \quad -14 \quad -14 \quad +5x$

$x^2 + 5x - 14 = 0$

$(x + 7)(x - 2) = 0$

$x = -7 \quad x = 2$

Score 1: The student made one error. The student copied $5x$ as $-5x$.

27 John and Sarah are each saving money for a car. The total amount of money John will save is given by the function $f(x) = 60 + 5x$. The total amount of money Sarah will save is given by the function $g(x) = x^2 + 46$. After how many weeks, x, will they have the same amount of money saved? Explain how you arrived at your answer.

$$y = 60 + 5x \qquad y = x^2 + 46$$

$$x^2 + 46 = 60 + 5x$$

$$\underline{-46 \quad -46}$$

$$x^2 = 14 - 5x$$

$$+5x - 14 \quad -14 \quad +5x$$

$$x^2 + 5x - 14 = 0$$

$$(x+7)(x-2) = 0$$

$$\cancel{x=7} \quad \boxed{x = 2}$$

$$\boxed{\text{In two weeks}}$$

Score 0: The student made one copying error and gave no explanation.

28 If the difference $(3x^2 - 2x + 5) - (x^2 + 3x - 2)$ is multiplied by $\frac{1}{2}x^2$, what is the result, written in standard form?

$$\left[(3x^2 - 2x + 5) - (x^2 + 3x - 2)\right]\left(\frac{1}{2}x^2\right)$$

$$3x^2 - 2x + 5 - x^2 - 3x + 2$$

$$(2x^2 - 5x + 7)\left(\frac{1}{2}x^2\right)$$

$$1x^4 - 2.5x^3 + 3.5x^2$$

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

28 If the difference $(3x^2 - 2x + 5) - (x^2 + 3x - 2)$ is multiplied by $\frac{1}{2}x^2$, what is the result, written in standard form?

$$3x^2 - 2x + 5 - x^2 - 3x + 2$$

$$\frac{1}{2}x^2 \left(2x^2 - 5x + 7 \right)$$

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

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

28 If the difference $(3x^2 - 2x + 5) - (x^2 + 3x - 2)$ is multiplied by $\frac{1}{2}x^2$, what is the result, written in standard form?

$$(3x^2 - 2x + 5) + (x^2 + 3x + 2)$$

$$\frac{1}{2}x^2 (2x^2 - 5x + 7)$$

$$\boxed{x^4 - \frac{5}{2}x^3 + \frac{7}{2}x^2}$$

$$x^2 (x^2 - \frac{5}{2}x + \frac{7}{2})$$

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

28 If the difference $(3x^2 - 2x + 5) - (x^2 + 3x - 2)$ is multiplied by $\frac{1}{2}x^2$, what is the result, written in standard form?

$$\left(3x^2 - 2x + 5\right) - \left(x^2 + 3x - 2\right) \cdot \left(\frac{1}{2}x^2\right)$$

$$3x^2 - 2x + 5 + - x^2 - 3x + 2$$

$$2x^2 - 5x + 7 \cdot \left(\frac{1}{2}x^2\right)$$

$$\boxed{1x^2 - 5x + 7}$$

Score 1: The student did correct work to find the difference but showed no further correct work.

28 If the difference $(3x^2 - 2x + 5) - (x^2 + 3x - 2)$ is multiplied by $\frac{1}{2}x^2$, what is the result, written in standard form?

$$3x^2 - 2x + 5 - x^2 + 3x - 2$$

$$\frac{1}{2}x^2\left(2x^2 + x + 3\right)$$

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

Score 1: The student did not subtract correctly.

28 If the difference $(3x^2 - 2x + 5) - (x^2 + 3x - 2)$ is multiplied by $\frac{1}{2}x^2$, what is the result, written in standard form?

$$-\frac{3x^2 - 2x + 5}{-\frac{x^2 + 3x - 2}{-2x^2 - 5x + 3}}$$

$$\frac{1}{2}x^2 \left(-2x^2 - 5x + 3\right)$$

$$-1x^4 - 2.5x^3 + 1.5$$

Score 0: The student made several errors when subtracting and multiplying.

29 Dylan invested $600 in a savings account at a 1.6% annual interest rate. He made no deposits or withdrawals on the account for 2 years. The interest was compounded annually. Find, to the *nearest cent*, the balance in the account after 2 years.

$$a = x(1 + r)^t$$

$$a = 600(1 + .016)^2$$

$$\boxed{a \overset{\$}{=} 619.35}$$

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

29 Dylan invested \$600 in a savings account at a 1.6% annual interest rate. He made no deposits or withdrawals on the account for 2 years. The interest was compounded annually. Find, to the *nearest cent*, the balance in the account after 2 years.

$$600 \times .016 = 9.6$$

$$609.6 \times .016 = 9.75$$

$$609.6 + 9.75 = \boxed{619.35}$$

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

29 Dylan invested $600 in a savings account at a 1.6% annual interest rate. He made no deposits or withdrawals on the account for 2 years. The interest was compounded annually. Find, to the *nearest cent*, the balance in the account after 2 years.

$$y = a(.1 + r)^t$$

$$y = \$600(1 + 1.6)^2$$

$$y = \$4056.00$$

$\$4056.00$

Score 1:   The student expressed the rate incorrectly.

29 Dylan invested $600 in a savings account at a 1.6% annual interest rate. He made no deposits or withdrawals on the account for 2 years. The interest was compounded annually. Find, to the *nearest cent*, the balance in the account after 2 years.

600

600
×1.016
3600
6000
6600
9600.0

1.6
600
$9.60

609.60
.016

365760
609600
9.75360
9.80

609.60
+9.80
$619.40

Score 1: The student made a mistake when rounding.

29 Dylan invested $600 in a savings account at a 1.6% annual interest rate. He made no deposits or withdrawals on the account for 2 years. The interest was compounded annually. Find, to the *nearest cent*, the balance in the account after 2 years.

$$y = a\left(1 - \frac{r}{n}\right)^{nx} \qquad y = \$600\left(1 - \frac{.016}{1}\right)^{1 \cdot 2}$$

$$y = \$580.95$$

Score 1: The student used an incorrect sign in the formula, but solved and rounded correctly.

29 Dylan invested $600 in a savings account at a 1.6% annual interest rate. He made no deposits or withdrawals on the account for 2 years. The interest was compounded annually. Find, to the *nearest cent*, the balance in the account after 2 years.

$600

1.6% every year added

1.6% of 600 = 9.6

9.6 × 2 = 19.2

600 + 19.2 = 619.2

$619

Score 0: The student used an incorrect procedure and rounded incorrectly.

30 Determine the smallest integer that makes $-3x + 7 - 5x < 15$ true.

$$-3x + 7 - 5x < 15$$
$$\, -7 \qquad\quad -7$$
$$-3x - 5x < 8$$
$$\frac{-8x}{-8} < \frac{8}{-8}$$
$$x > -1$$

$$\boxed{0}$$

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

30 Determine the smallest integer that makes $-3x + 7 - 5x < 15$ true.

$$-8x + 7 < 15$$
$$-8x < 8$$
$$x < -1$$

There isn't a smallest integer.

Score 1:   The student made an error by not reversing the inequality symbol, but gave an
appropriate response.

30 Determine the smallest integer that makes $-3x + 7 - 5x < 15$ true.

$$-8x < 8$$

$$x < -1$$

Score 0: The student made an error by not reversing the inequality symbol and did not state the smallest integer.

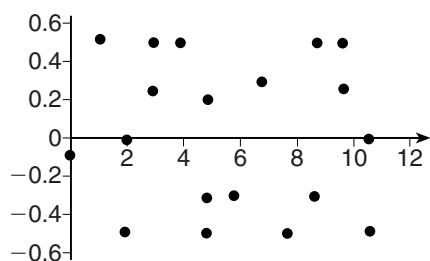**31** The residual plots from two different sets of bivariate data are graphed below.
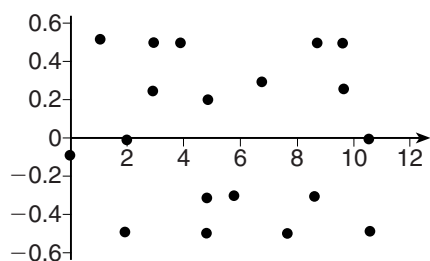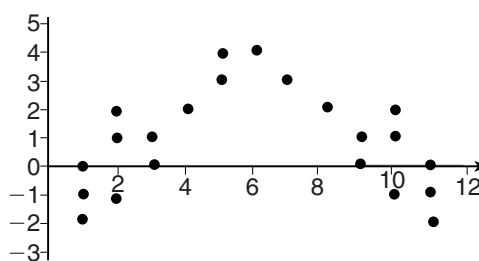
Graph A

Graph B

Explain, using evidence from graph *A* and graph *B*, which graph indicates that the model for the data is a good fit.

Graph A is a good fit because it does not have a clear pattern, whereas Graph B does.

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

31 The residual plots from two different sets of bivariate data are graphed below.
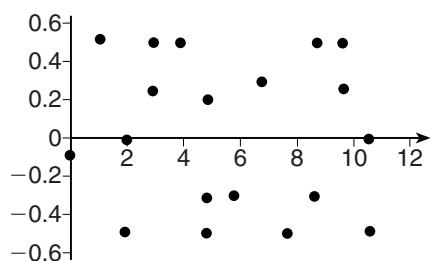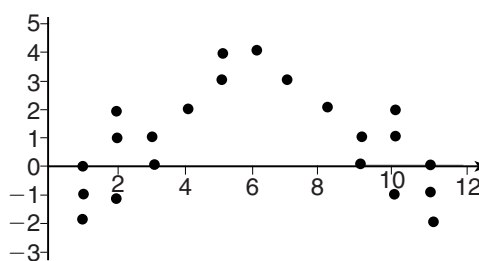
Graph A   **Graph B**

Explain, using evidence from graph *A* and graph *B*, which graph indicates that the model for the data is a good fit.

Graph A

It has random points scattered above and below the line
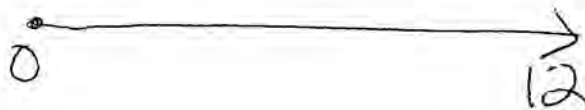
Score 2:   The student has a complete and correct response.

31 The residual plots from two different sets of bivariate data are graphed below.
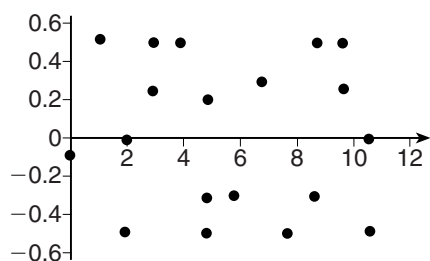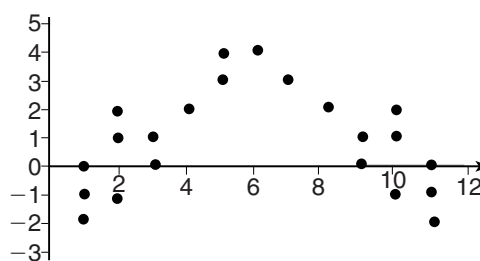
Graph A

Graph B

Explain, using evidence from graph *A* and graph *B*, which graph indicates that the model for the data is a good fit.

Graph A. I say this because the x axis is in the middle of all of the points.

Score 1: The student gave an incomplete explanation.

31 The residual plots from two different sets of bivariate data are graphed below.
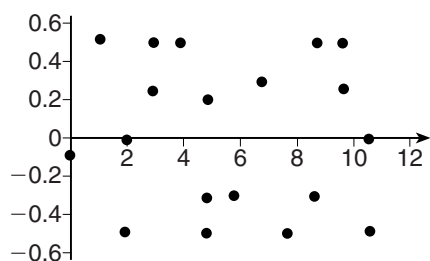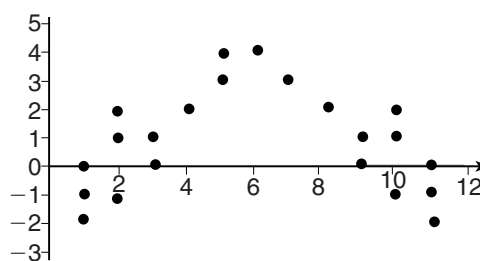
Graph A   **Graph B**

Explain, using evidence from graph *A* and graph *B*, which graph indicates that the model for the data is a good fit.

graph B because it has a curved shape
indicating it is a good fit

Score 1: The student made a conceptual error.

31 The residual plots from two different sets of bivariate data are graphed below.
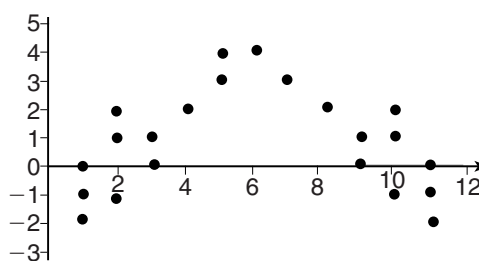
Graph A

Graph B

Explain, using evidence from graph *A* and graph *B*, which graph indicates that the model for the data is a good fit.

Graph B because the dots are tighter together.

Score 0: The student made a completely incorrect response.

32 A landscaper is creating a rectangular flower bed such that the width is half of the length. The area of the flower bed is 34 square feet. Write and solve an equation to determine the width of the flower bed, to the *nearest tenth of a foot*.
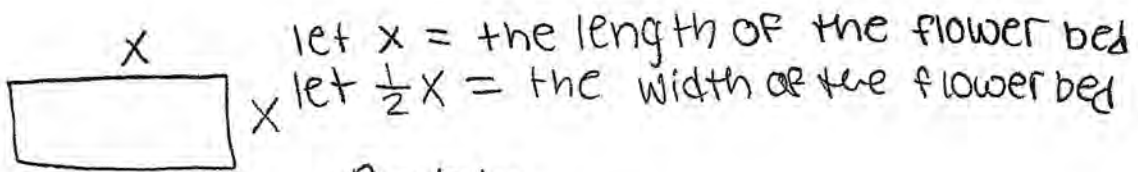
let x = the length of the flower bed
let ½x = the width of the flower bed

$$A = bh$$
$$34 = (x)(\tfrac{1}{2}x)$$
$$\left(\tfrac{2}{1}\right)34 = \tfrac{1}{2}x^2\left(\tfrac{2}{1}\right)$$
$$\sqrt{68} = \sqrt{x^2}$$

8.24621125124 x

+8.2 or -8.2

$$\tfrac{1}{2}(8.2) = 4.1$$

the width of the flower bed is 4.1

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

32 A landscaper is creating a rectangular flower bed such that the width is half of the length. The area of the flower bed is 34 square feet. Write and solve an equation to determine the width of the flower bed, to the *nearest tenth of a foot*.
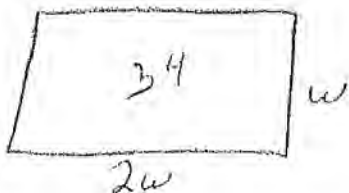
$$w(2w) = 34$$

$$2w^2 = 34$$

$$w^2 = 17$$

$$w = 4.123105625$$

$$\boxed{w \approx 4.1}$$

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

32 A landscaper is creating a rectangular flower bed such that the width is half of the length. The area of the flower bed is 34 square feet. Write and solve an equation to determine the width of the flower bed, to the *nearest tenth of a foot*.

$$A = L \cdot w$$

$$34 = L \cdot \tfrac{1}{2}L$$

$$L = 8.2 \quad \boxed{w = 4.1 \, ft^2}$$

Score 1: The student did correct work to find 4.1, but gave the units as square feet.

32 A landscaper is creating a rectangular flower bed such that the width is half of the length. The area of the flower bed is 34 square feet. Write and solve an equation to determine the width of the flower bed, to the *nearest tenth of a foot*.

$$34 \quad (\tfrac{1}{2}\ell)$$

$$L\left(\tfrac{1}{2}L\right) = 34$$

$$L =$$

Score 1: The student gave a correct equation, but showed no further correct work.

32 A landscaper is creating a rectangular flower bed such that the width is half of the length. The area of the flower bed is 34 square feet. Write and solve an equation to determine the width of the flower bed, to the *nearest tenth of a foot*.

$$L = 2x$$
$$W = x \qquad 2(2x) + 2(x) = 34$$
$$6x = 34$$
$$x = 5.6\overline{6}$$
$$x = 5.7$$

Score 1: The student used the wrong formula.

32 A landscaper is creating a rectangular flower bed such that the width is half of the length. The area of the flower bed is 34 square feet. Write and solve an equation to determine the width of the flower bed, to the *nearest tenth of a foot*.

$$Area = length \times width$$

$$length = x \qquad width = \tfrac{1}{2}x$$

$$x + \tfrac{1}{2}x + x + \tfrac{1}{2}x = 34$$

$$3x = 34$$

$$x = \overline{11.3}$$

$$x = 11.3$$

Score 0: The student used the wrong formula and did not state the width.

33 Albert says that the two systems of equations shown below have the same solutions.

Solution: $\left(-\frac{3}{4}, 6\right)$ Solution: $\left(-\frac{3}{4}, 6\right)$

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

$$12(8x + 9y) = (48)12$$
$$-8(12x + 5y) = (21) \cdot -8$$

$$96x + 108y = 576$$
$$-96x - 40y = -168$$

$$\frac{68y}{68} = \frac{408}{68}$$

$$\boxed{y = 6}$$

$$8x + 9y = 48$$
$$8x + 9(6) = 48$$
$$8x + 54 = 48$$
$$\quad -54 \quad -54$$

$$\frac{8x}{8} = -\frac{6}{8}$$

$$\boxed{x = \frac{-3}{4}}$$

Solution: $\left(-\frac{3}{4}, 6\right)$

I agree with Albert that the two systems have the same Solutions.

$$8x + 9y = 48$$
$$-8.5y = -51$$
$$\frac{-8.5}{-8.5} \quad \frac{-51}{-8.5}$$

$$\boxed{y = 6}$$

$$8x + 9y = 48$$
$$8x + 9(6) = 48$$
$$8x + 54 = 48$$
$$\quad -54 \quad -54$$

$$\frac{8x}{8} = \frac{-6}{8}$$

$$\boxed{x = -3/4}$$

Solution: $\left(-\frac{3}{4}, 6\right)$

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

33 Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer. *yes*

$$8x+9y=48$$
$$12x+5y=21$$

$$12x+5y=21$$
$$12(-.75)+5(6)=21$$
$$-9+30=21$$
$$21=21$$

$$8x+9y=48$$
$$\frac{-8.5y}{-8.5}=\frac{-51}{-8.5}$$
$$y=6$$

$$8x+9x=48$$
$$8x+9(6)=48$$
$$8x+54=48$$
$$\quad -54\;-54$$
$$\frac{8x}{8}=\frac{-6}{8}$$
$$x=-.75$$

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

33 Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

$$^5(8x+9y=48)$$
$$9(12x+5y=21)$$

$$40x+45y=240$$
$$-108x-45y=-189$$
$$-68x=51$$
$$x=-.75$$
$$8(-.75)+9y=48$$
$$-6+9y=48$$
$$9y=54 \quad (-.75, 6)$$
$$y=6$$

$$8x+9y=48$$
$$-8.5y=-51$$
$$y=-42.5$$

$$(53.8125, -42.5)$$

$$8x+9(-42.5)=48$$
$$8x+382.5=48$$
$$8x=430.5$$
$$x=53.8125$$

Disagree. The two systems don't have the same solutions because when you solve for x and y in each system, the solution comes out differently in each one. So I disagree with Albert.

Score 3: The student made a computational error solving for y in the second system.

---

33 Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

Score 2: The student made a conceptual error in the second system by substituting $-8.5y$ for $8x$.

33 Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

Score 2: The student showed correct work to solve one system correctly.

33 Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

$$3 \cdot 8x + 9y = 48$$
$$-2 \cdot 12x + 5y = 21$$

$$24x + 9y = 48$$
$$-24x + 5y = 21$$
$$\overline{\hspace{3cm}}$$
$$14y = 69$$
$$y = \frac{69}{14}$$

$$8x + 9\left(\frac{69}{14}\right) = 48$$
$$8x = \frac{51}{14}$$
$$x = \frac{51}{112}$$

$$8x + 9y = 48$$
$$-8.5y = -51$$
$$y = 6$$

$$8x + 9 \cdot 6 = 48$$
$$8x = -6$$
$$x = -.75$$

Score 1: The student made a conceptual error in the first system and did not state agree or disagree.

33 Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

$$-5(8x + 9y = 48)$$
$$9(12x + 5y = 21)$$

$$-40x - 45 = -240$$
$$60x + 45 = 189$$

$$\frac{20x}{20} = \frac{-51}{20}$$

$$x = -.75$$

$$8(-.75) + 9y = 48$$

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

33 Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

$8x+9y=48$ $8x+9y=48$
$12x+5y=21$ $-8.5y=-51$

I don't agree with Albert because it doesn't show how he had gotten the first and second system of equations for the same solutions.

Score 0: The student did not show work to support a conclusion.

33 Albert says that the two systems of equations shown below have the same solutions.

First System	Second System
$8x + 9y = 48$	$8x + 9y = 48$
$12x + 5y = 21$	$-8.5y = -51$

Determine and state whether you agree with Albert. Justify your answer.

Agree that Albert is write.

Score 0: The student stated agree, but gave no justification.

34 The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \le x \le 40 \\ 15(x - 40) + 400, & x > 40 \end{cases}$$

Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours.

$$580$$
$$-380$$
$$\$200$$

$$10(38) = 380$$

$$15(52-40) + 400 = 580$$

Determine the number of hours an employee must work in order to earn $445. Explain how you arrived at this answer.

x	w(x)
40	400
41	415
42	430
43	445
44	460
45	475

$$15(x-40) + 400$$

$$15(r - 40) + 400$$

43 hours

$$\div 400$$

I used the equation for employes that work more than 40 hrs ina a pattern imerdd

34 The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \le x \le 40 \\ 15(x - 40) + 400, & x > 40 \end{cases}$$

Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours.

difference in salary is 200 dollars

15(52 −40)+400

15 (12) +400

180+400

580

10(38)

380

580−380 = 200

Determine the number of hours an employee must work in order to earn $445. Explain how you arrived at this answer.

445 = 15(x −40) +400

445 = 15x −600 + 400

445 = 15x −200

+200   +200

645 = 15x
15   15

43 = x

You would have to work 43 hours

Score 3: The student did not give an explanation.

34 The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \le x \le 40 \\ 15(x - 40) + 400, & x > 40 \end{cases}$$

Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours.

$$W(52) = 15(52-40)+400$$
$$= 15(12)+400$$
$$= 180+400$$
$$= \$580$$

$$W(32) = 10(32)$$
$$W(32) = \$320$$

$$\begin{array}{r} 580 \\ -320 \\ \hline \$260 \end{array}$$

Determine the number of hours an employee must work in order to earn $445. Explain how you arrived at this answer.

$$445 = 15(x-40)+400$$
$$445 = 15x - 600 + 400$$
$$445 = 15x - 200$$
$$+200 \qquad +200$$
$$\frac{645}{15} = \frac{15x}{15}$$
$$43 = x$$
hrs

An employee must work 43 hours to earn $445. To figure this out, I first had to pick an equation. I picked 15(x-40)+400 because the other equation has a domain of $0 \le x \le 40$, and 40 hours is not enough to earn $445. I set the equation I chose equal to 445 and solved it, and I got 43 hours as an answer

Score 3: The student used 32 hours instead of 38.

34 The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \leq x \leq 40 \\ 15(x - 40) + 400, & x > 40 \end{cases}$$

Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours.

$10 \cdot 52 = 520$

$15(38-40) + 400 = 370$

$\$150$

Determine the number of hours an employee must work in order to earn $445. Explain how you arrived at this answer.

$40 \cdot 10 = 400$

$\begin{array}{r}40\\1\\1\\1\\\frac{1}{2}\end{array}$

$\begin{array}{r}10\\10\\10\\10\\\frac{5}{}\end{array}$

44.5 hours.

They get $10 an hour. 44 hours makes $440. Then I added an extra half hour worth of work to get $445

Score 2: The student made an error in the first part by switching 52 and 38. The student made an error in the second part, but gave an appropriate explanation.

34 The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \le x \le 40 \\ 15(x - 40) + 400, & x > 40 \end{cases}$$

Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours.

$$w(x) = 10x, \quad 0 \le x \le 40 \qquad w(x) = 15(x-40)+400$$
$$x > 40$$

$$w(38) = 10(38)$$

$$\boxed{w(38) = \$380}$$

$$w(52) = 15(52-40)+400$$
$$w(52) = 15(12)+400$$
$$\boxed{w(52) = \$580}$$

✱ A Employee who works 52 hours gets a higher salary

Determine the number of hours an employee must work in order to earn $445. Explain how you arrived at this answer.

About 45 hours

$$w(x) = 10x$$
$$w(45) = 10(45)$$
$$w(45) = 450$$

Score 1: The student showed appropriate work to find 380 and 580, but didn't calculate the difference.

34 The equation to determine the weekly earnings of an employee at The Hamburger Shack is given by $w(x)$, where x is the number of hours worked.

$$w(x) = \begin{cases} 10x, & 0 \le x \le 40 \\ 15(x - 40) + 400, & x > 40 \end{cases}$$

Determine the difference in salary, *in dollars*, for an employee who works 52 hours versus one who works 38 hours.

$10x, 0 \le x \le 40$

$15(x-40) + 400, x > 40$

$15(38-40) + 400 - 30$

$15(52-40) + 400 \quad \$580$

Determine the number of hours an employee must work in order to earn \$445. Explain how you arrived at this answer.

$15(x-40) + 400 = 445$

$15x - 600 + 400 = 445$

$15x - 200 = 445$

$ +200 \quad +200$

An employee must work at least 17 hrs to earn \$145

$\dfrac{15x}{15} = \dfrac{645}{15}$

$x = 16.3$

$X = 17 \text{ hrs}$

Score 0: The student made a conceptual error using the piecewise function, did not find the difference, made a computational error, and did not give an explanation.
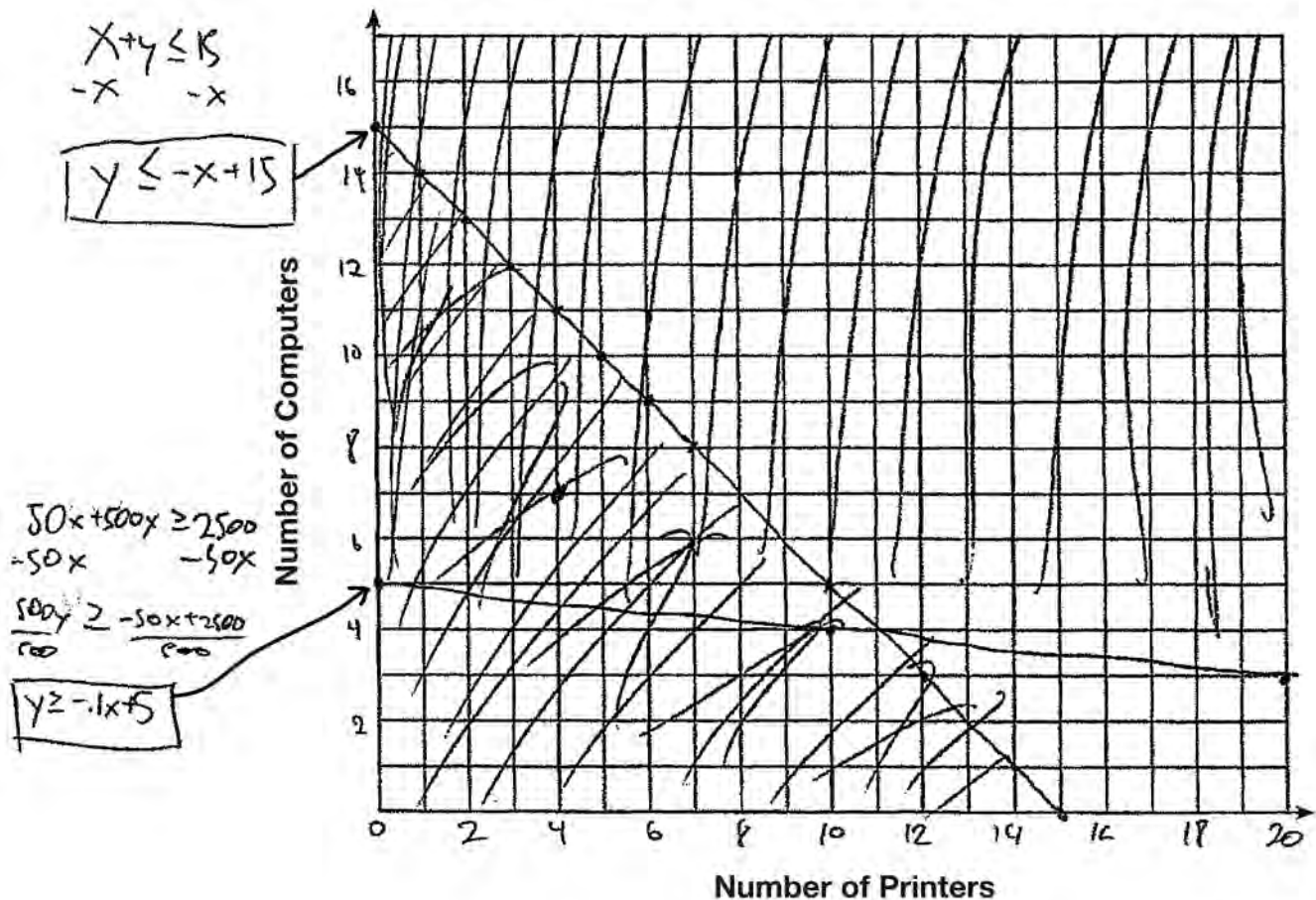
35 An on-line electronics store must sell at least $2500 worth of printers and computers per day. Each printer costs $50 and each computer costs $500. The store can ship a maximum of 15 items per day.

let x=printers let y=computers

$x + y \leq 15$

$50x + 500y \geq 2500$

On the set of axes below, graph a system of inequalities that models these constraints.

$x + y \leq 15$
$-x \quad -x$

$y \leq -x + 15$

$50x + 500y \geq 2500$
$-50x \quad -50x$

$\dfrac{500y}{500} \geq \dfrac{-50x + 2500}{500}$

$y \geq -.1x + 5$

Number of Computers (vertical axis)

Number of Printers (horizontal axis)

Determine a combination of printers and computers that would allow the electronics store to meet all of the constraints. Explain how you obtained your answer.

4 printers, 7 computers.

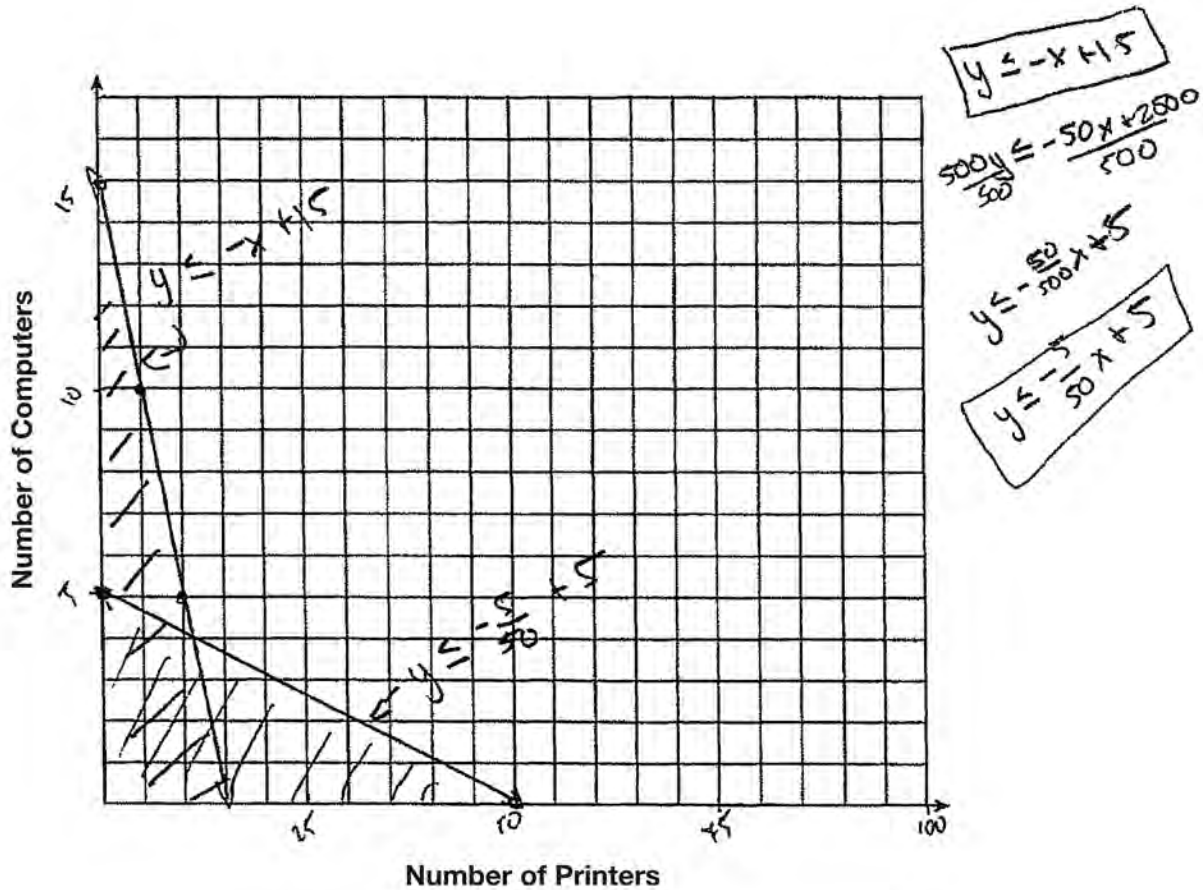I graphed the functions, and looked in the the solution set

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

35 An on-line electronics store must sell at least $2500 worth of printers and computers per day. Each printer costs $50 and each computer costs $500. The store can ship a maximum of 15 items per day.

$$50x + 500y \leq 2500$$
$$x + y \leq 15$$

On the set of axes below, graph a system of inequalities that models these constraints.

$$y \leq -x + 15$$

$$\frac{500y}{500} \leq \frac{-50x + 2500}{500}$$

$$y \leq -\frac{50}{500}x + 5$$

$$y \leq -\frac{5}{50}x + 5$$

Number of Printers

Determine a combination of printers and computers that would allow the electronics store to meet all of the constraints. Explain how you obtained your answer.

1 computer and 5 printers

The part where it is double shaded on the graph.

Score 3: The student did not write one of the inequalities correctly, but gave an appropriate answer.

35 An on-line electronics store must sell at least $2500 worth of printers and computers per day. Each printer costs $50 and each computer costs $500. The store can ship a maximum of 15 items per day.

On the set of axes below, graph a system of inequalities that models these constraints.

$50y + 500x \geq 2500$

$y + 10cx \geq 500$
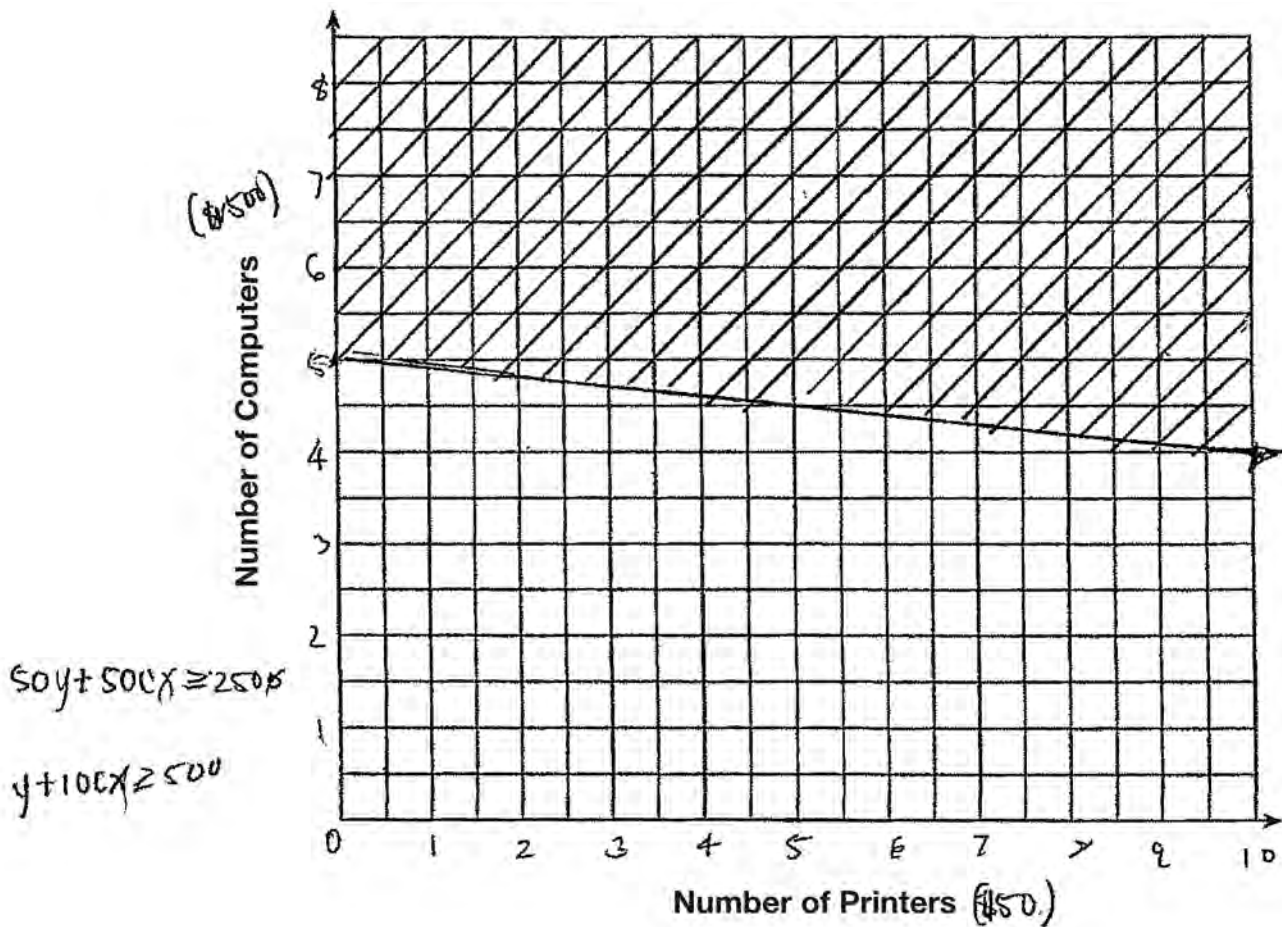
Determine a combination of printers and computers that would allow the electronics store to meet all of the constraints. Explain how you obtained your answer.

at least
~5 computers & 0 printers
~4 computers & 10 printers ~

Score 2: The student graphed one inequality correctly and named a combination correctly, but did not give an explanation.
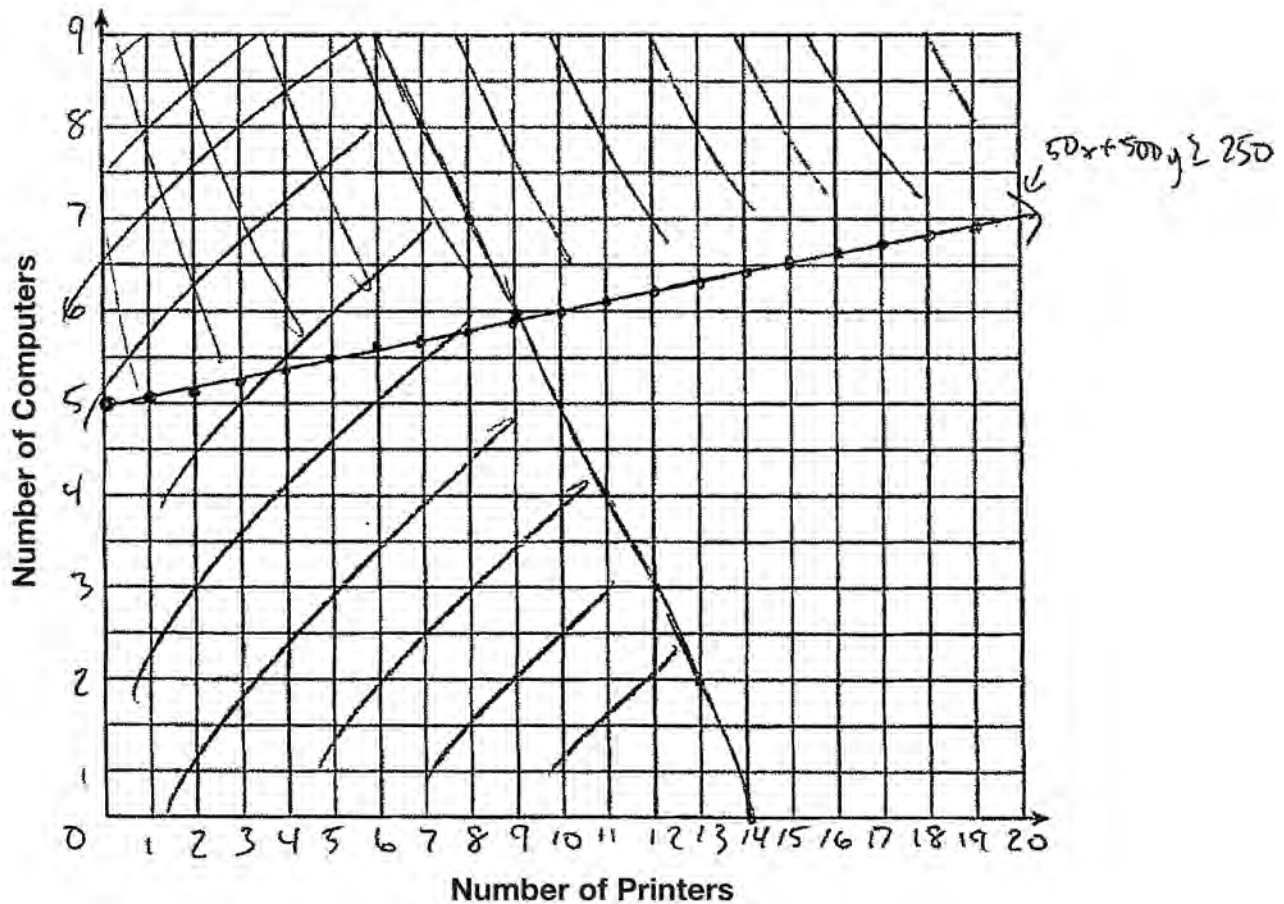
35 An on-line electronics store must sell at least $2500 worth of printers and computers per day. Each printer costs $50 and each computer costs $500. The store can ship a maximum of 15 items per day.

$x = $ printers $y = $ computers $50x + 500y \geq 2500$

On the set of axes below, graph a system of inequalities that models these constraints.

$50x + 500y \geq 250$

Number of Printers

Number of Computers

Determine a combination of printers and computers that would allow the electronics store to meet all of the constraints. Explain how you obtained your answer.

8 computers and 4 printers. the point (4, 8) satisfies both inequalities

Score 2: The student stated a correct combination and a correct explanation.

35 An on-line electronics store must sell at least $2500 worth of printers and computers per day. Each printer costs $50 and each computer costs $500. The store can ship a maximum of 15 items per day.

On the set of axes below, graph a system of inequalities that models these constraints.

Number of Printers
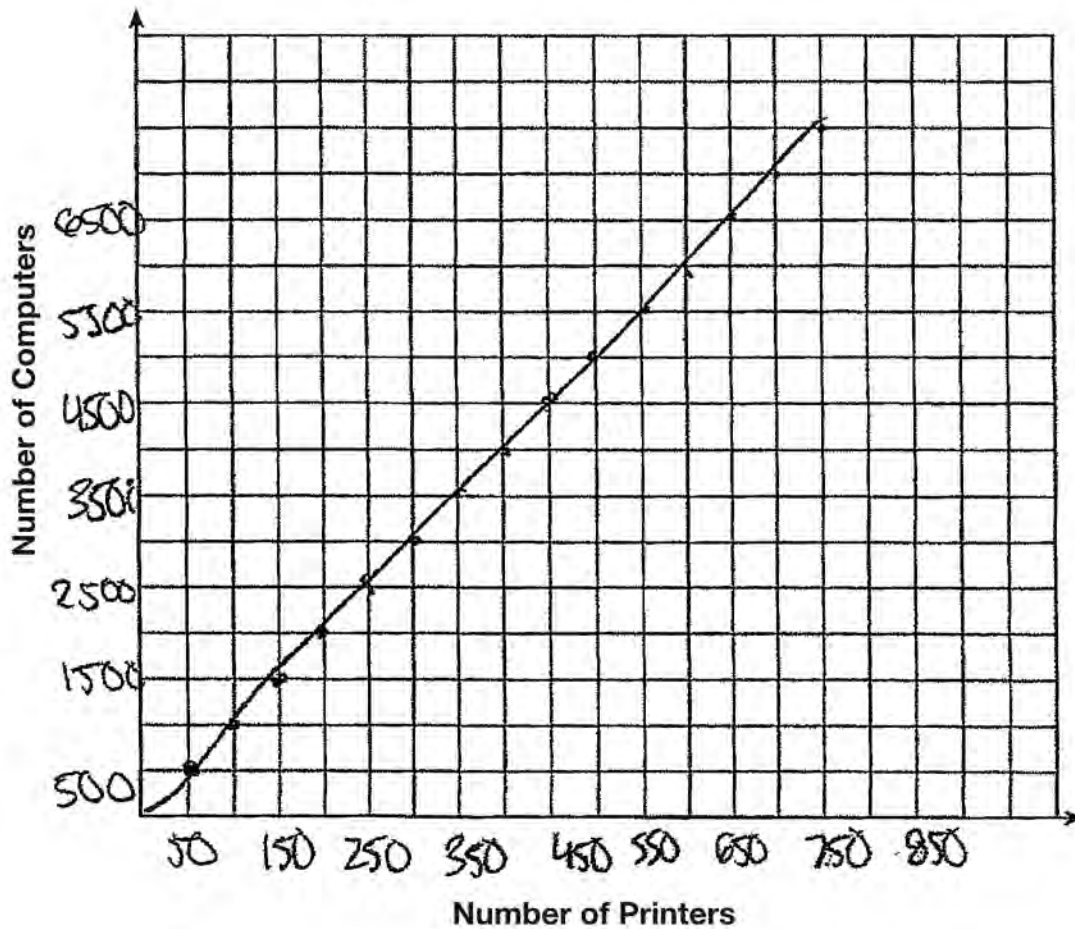
Determine a combination of printers and computers that would allow the electronics store to meet all of the constraints. Explain how you obtained your answer.

10 printers
4 computers
because I used my calculator to multiply till I got to 2500 ☺

Score 1:   The student named a correct combination, but gave an insufficient explanation.

35 An on-line electronics store must sell at least $2500 worth of printers and computers per day. Each printer costs $50 and each computer costs $500. The store can ship a maximum of 15 items per day.

On the set of axes below, graph a system of inequalities that models these constraints.

let p=printer
let c=computer

Number of Computers

Number of Printers

Determine a combination of printers and computers that would allow the electronics store to meet all of the constraints. Explain how you obtained your answer.
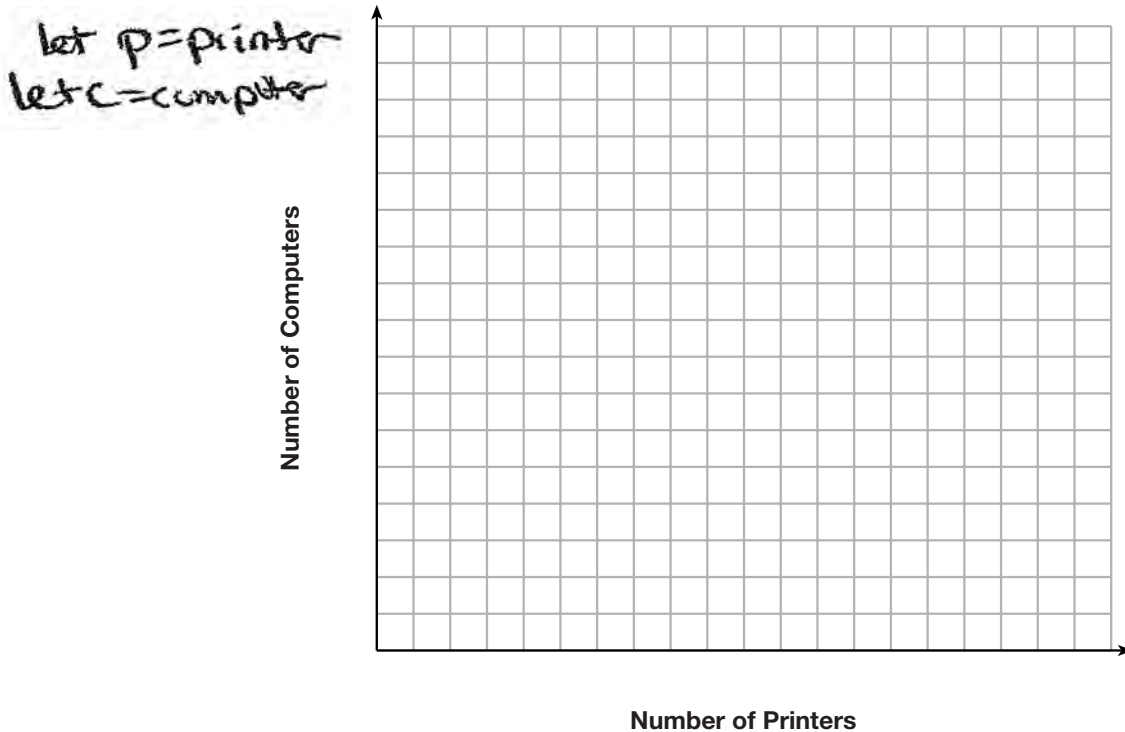
$50p + 500c = 2500$
$-50(p + c = 15)$

$50p + 500c = 2500$
$-50 - 50c = -750$
$450c = 1750$
$\frac{450c}{450} = \frac{1750}{450}$
$c = 4$

$p + c = 15$
$p + c = 15$
$p + 4 = 15$
$-4 \quad -4$
$p = 11$

4 computers
11 printers

Score 1: The student named a correct combination without giving an explanation.

35 An on-line electronics store must sell at least $2500 worth of printers and computers per day. Each printer costs $50 and each computer costs $500. The store can ship a maximum of 15 items per day.

$$50p + 500c \geq 2500$$

On the set of axes below, graph a system of inequalities that models these constraints.
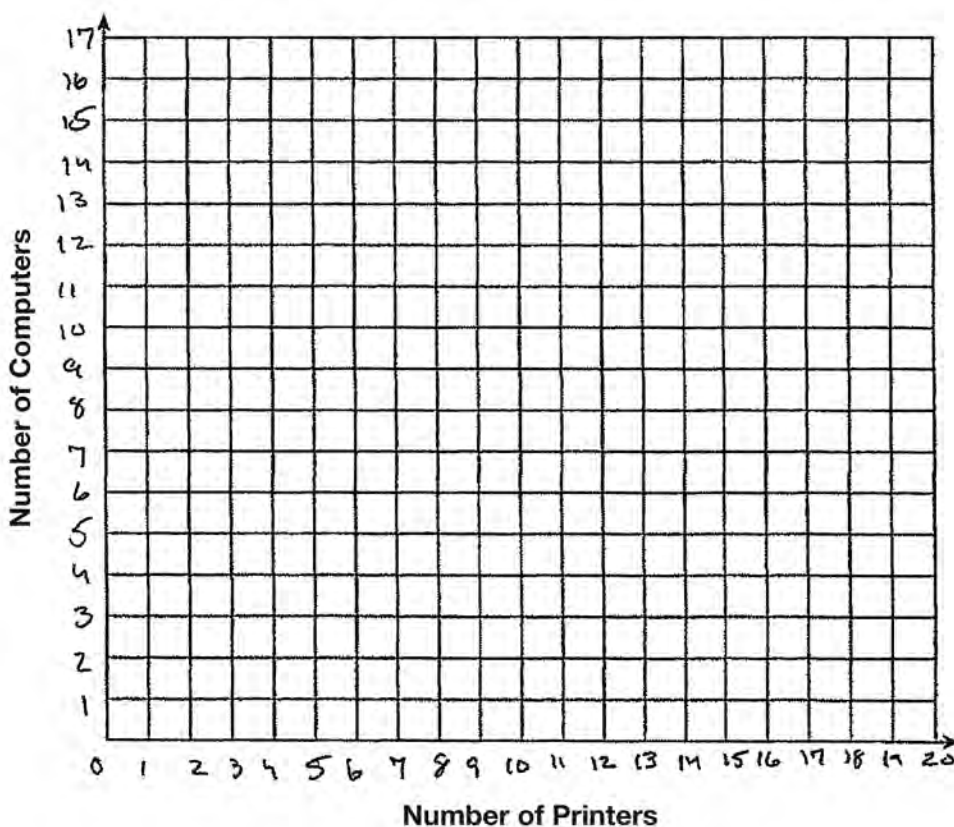
Number of Printers

Determine a combination of printers and computers that would allow the electronics store to meet all of the constraints. Explain how you obtained your answer.

Score 0: The student wrote one inequality, but showed no further correct work.

36 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data.

$$y = 80 * 1.5^x$$

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the *nearest download*.

$$y = 80 * 1.5^{26}$$

3,030,140 downloads

Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

no, the number would be way too big. once everyone downloads it the numbers would slow down.

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

36 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data.

$$f(x) = 120 \cdot 1.5^{x-1}$$

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the *nearest download*.

3,030,140 downloads

Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

No, because there isn't that many people in the world.

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

36 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data.

$$y = 80(1.5)^x$$

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the *nearest download*.

$$y = 80(1.5)^{26}$$

$$y \approx 3,0\ 30,140$$

Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

yes, because we can find the value for the number of downloads with how many weeks there are in a year and plug that in for X.

36 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data.

$$y = ab^x$$
$$a = 80$$
$$b = 1.5$$

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the *nearest download*.

$$80 (1.5)^{26} \approx 3,030,140$$

Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

Score 3: The student did not give an explanation.

36 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data.

$$y = 80 \cdot (1.5)^x$$

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the *nearest download*.

$$80 \cdot (1.5)(26)$$

26th week = 3030140.19529

Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

?

Score 2: The student has a rounding error and did not give an explanation.

36 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data.

$$80(1.5)^x$$

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the *nearest download*.

$$y = 80(1.5)^{26}$$
$$y = 3,030,140$$

Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

Yes because you can use the number of weeks in 1 year for the x value in order to get the answer.

Score 2: The student wrote an expression and gave an incorrect explanation.

36 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

‾‾‾‾‾‾ ‾‾‾‾‾‾ ‾‾‾‾‾‾
+60   +90   +135

Write an exponential equation that models these data.

$$a_1 = 120(n+1) \, 1.5$$

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the *nearest download*.

120 (26 + 1) 1.5
120 (27) 1.5
    3,240 · 1.5 = $\boxed{4,860}$ downloads

Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

No, because the data is going by weeks which is too small to predict the past one year.

Score 1: The student found the correct number of downloads based on an incorrect equation.

36 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data.

$$80 \cdot 1.5^{x}$$

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the *nearest download*.

$$80 * 1.5^{26}$$
$$3030140.195$$

Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

yes because X is the amount of week and you can use the number of weeks in a year as the X

Score 1: The student wrote an expression, made a rounding error, and gave an incorrect explanation.

36 An application developer released a new app to be downloaded. The table below gives the number of downloads for the first four weeks after the launch of the app.

Number of Weeks	1	2	3	4
Number of Downloads	120	180	270	405

Write an exponential equation that models these data.

$$y = 120 + (n-1) \cdot 40$$

Use this model to predict how many downloads the developer would expect in the 26th week if this trend continues. Round your answer to the *nearest download*.

$$y = 120 + (26-1) \cdot 40$$
$$y = 120 + 1040$$
$$y = 1160$$

Would it be reasonable to use this model to predict the number of downloads past one year? Explain your reasoning.

Score 0: The student is completely incorrect.

37 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \le x \le 150$.
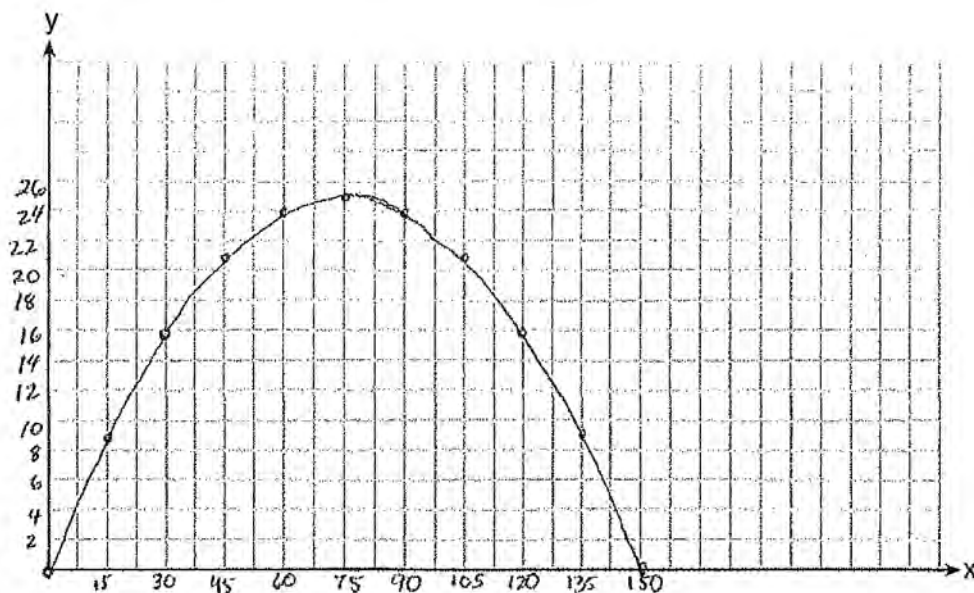
Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

(75,25)

~~If you~~ ~~The~~ When the football is 25 feet high it has traveled 75 feet and is at its highest point.

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.
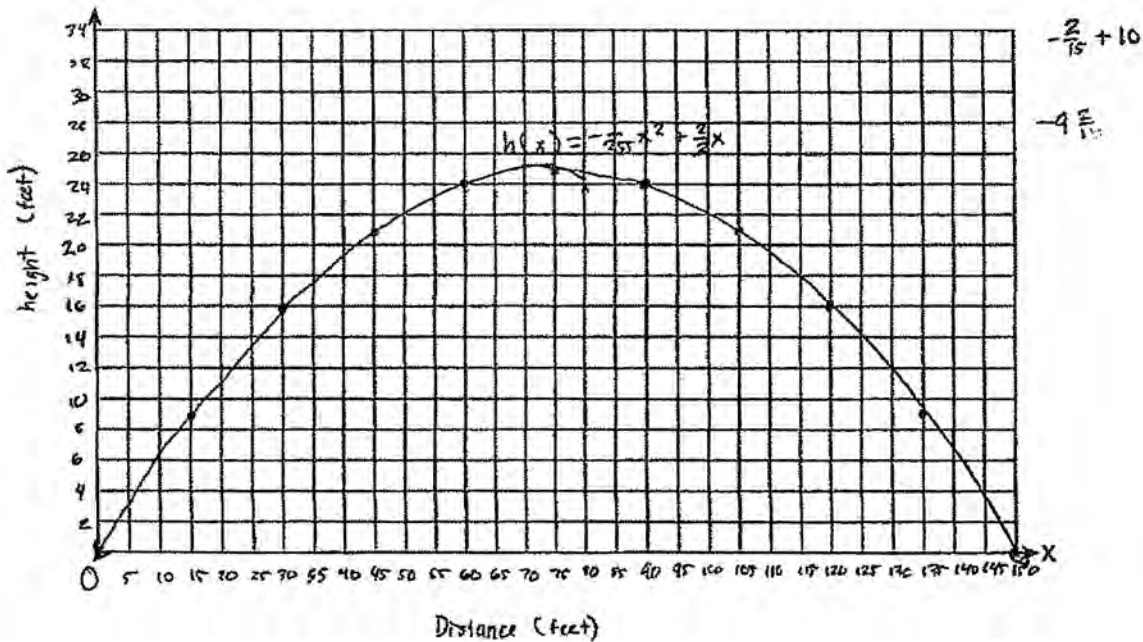
NO because when you convert 45 yards to feet it is only going to be 9 ft. high

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

37 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \le x \le 150$.

$-\frac{1}{225}(15)^2 + \frac{2}{3}\cdot15$

$-\frac{30}{225} + \frac{30}{3}$

$-\frac{2}{15} + 10$

$-4\frac{2}{15}$

$h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$

height (feet)

Distance (feet)

Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

The vertex of h(x) is (75, 25). This means that when the football player's at 75 feet from the kick, the ball will be at it's highest point.

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

When the ball is 45 yards away from the kick, the ball will be high enough to pass over the goal post. The ball will be 21 feet high which is higher than 10 feet. When you plug in 45 as your x in h(x) = $-\frac{1}{225}x^2 + \frac{2}{3}x$ you'll get h(x) is equal to 21. Therefore the ball will be high enough to pass over the goal post.

Score 5: The student did not change yards to feet.

37 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \leq x \leq 150$.
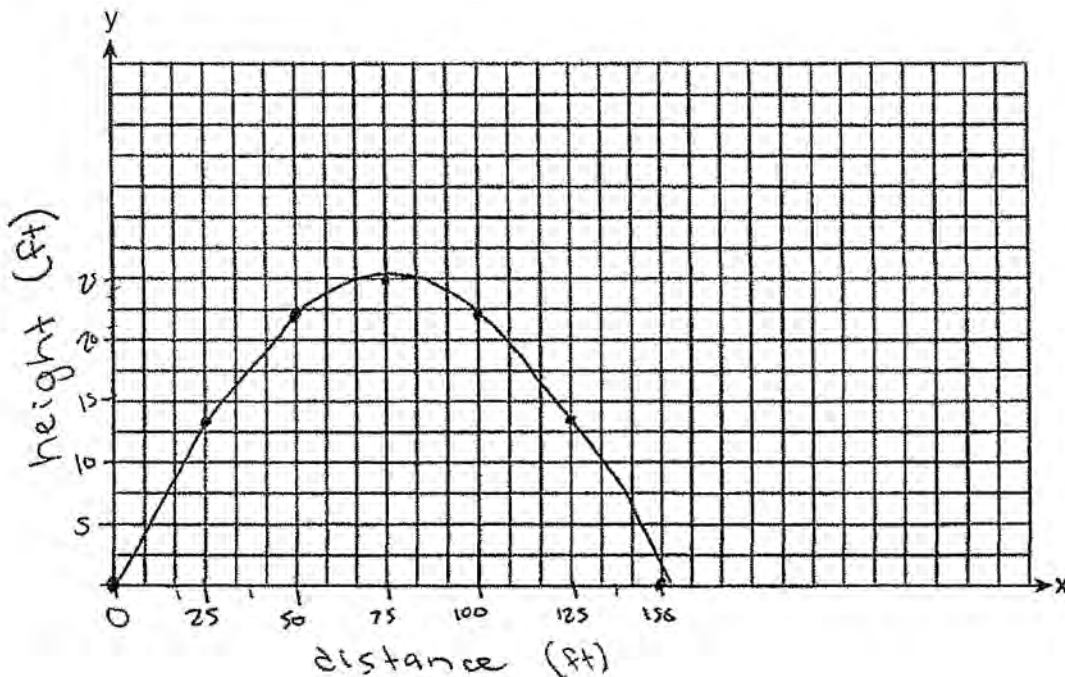
Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

(75,25) the vertex represents the highest height (25ft) that the football reached,

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

NO. at 45 yards away (135 feet), the football will be about 7.5 ft high.

Score 5: The student made a computational error computing the height at 135 feet.

37 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \le x \le 150$.
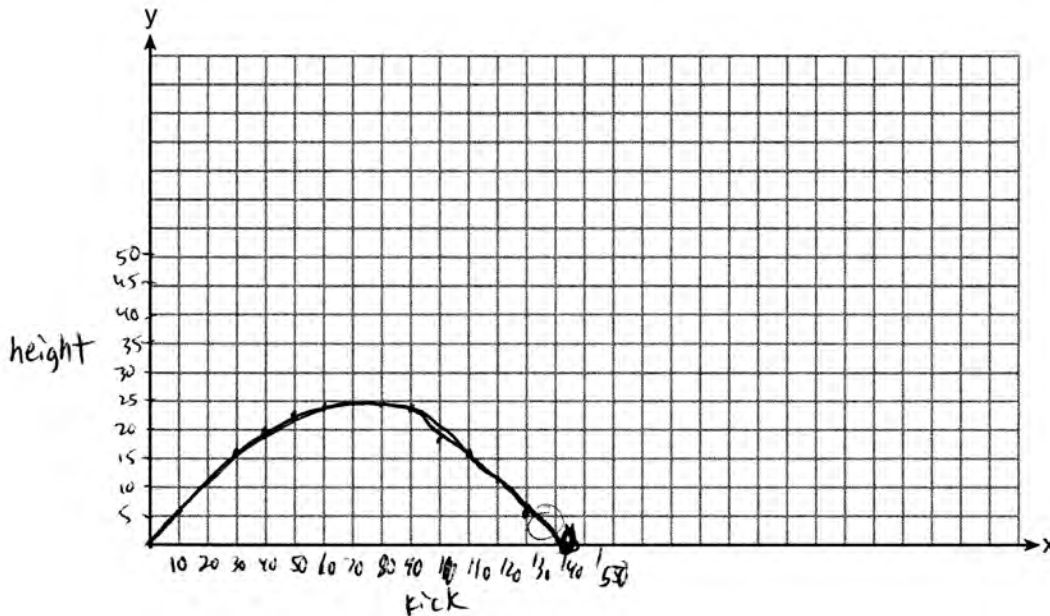
Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

at 75 the ball is at the peak height
of the kick

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

no at 135 feet the ball
is under 10 feet on my graph

Score 4: The student made a graphing error and did not determine the vertex.

37 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \leq x \leq 150$.
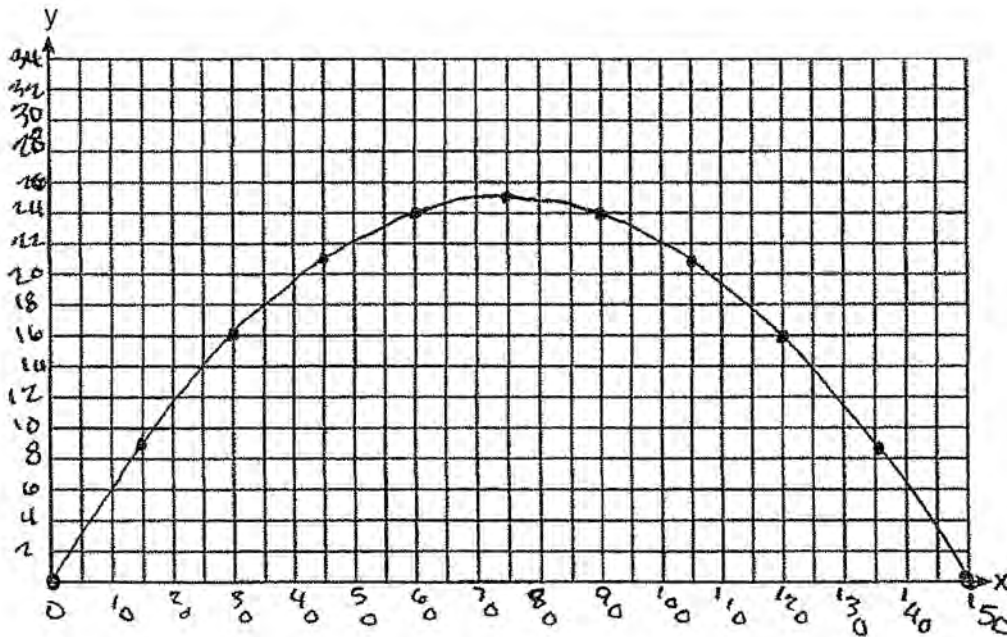
Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

yes, because at 45 yards, the height is 21 feet.

Score 3:   The student did not give the vertex and its meaning, and did not change yards to feet.

37 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \le x \le 150$.
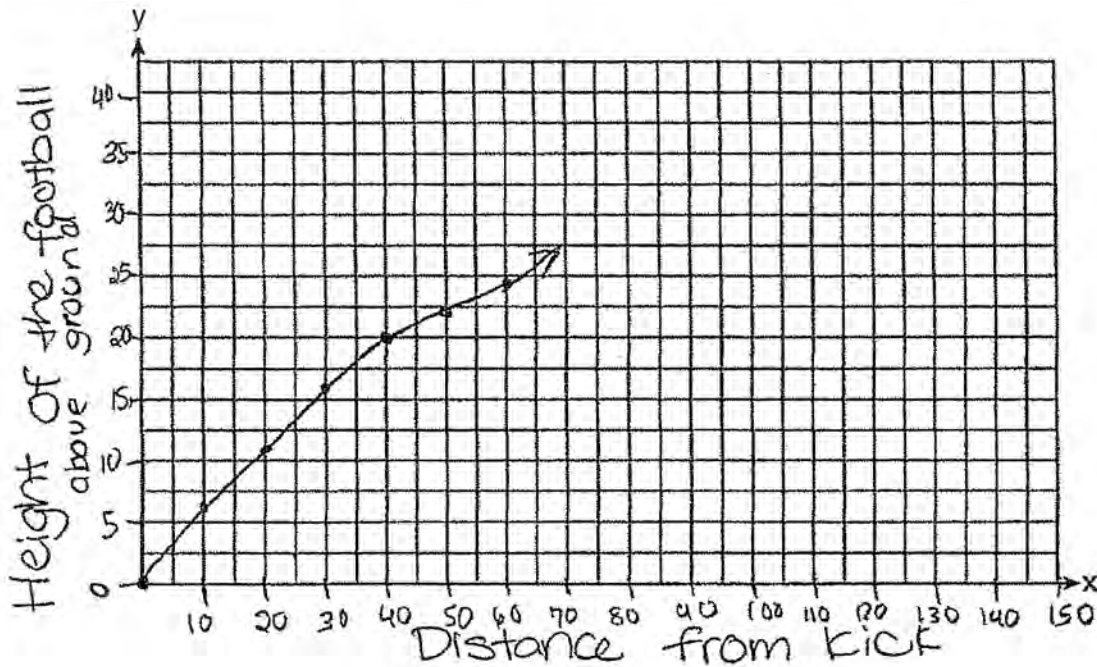
Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

The vertex of h(x) is zero. This means when the distance from the kick is 0, and it hasn't been kicked, the height of the football will also be zero.

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

$-\frac{1}{225}(45)^2 + \frac{2}{3}(45) = 21$

The ball will be high enough because it will reach 21 ft over the ground and the goal post is only 10 ft high.

Score 2: The student did not graph the function over the entire domain. The student wrote a correct justification based on 45 feet.

37 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \leq x \leq 150$.
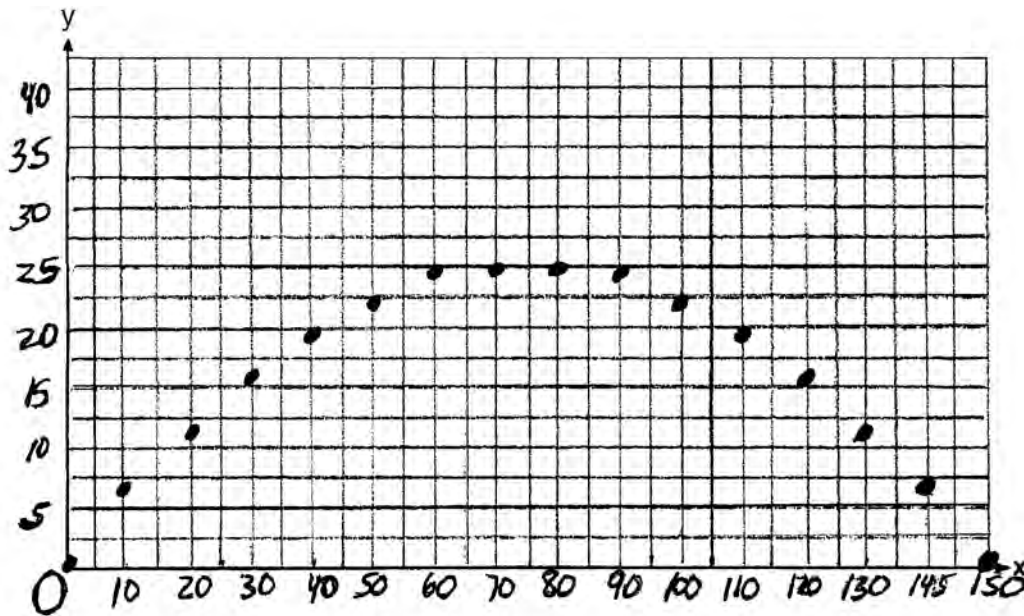
Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

the vertex is between 70 and 80

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

yes

Score 1: The student made one graphing error, did not state or interpret the vertex correctly, and did not justify an incorrect response.

37 A football player attempts to kick a football over a goal post. The path of the football can be modeled by the function $h(x) = -\frac{1}{225}x^2 + \frac{2}{3}x$, where x is the horizontal distance from the kick, and $h(x)$ is the height of the football above the ground, when both are measured in feet.

On the set of axes below, graph the function $y = h(x)$ over the interval $0 \le x \le 150$.
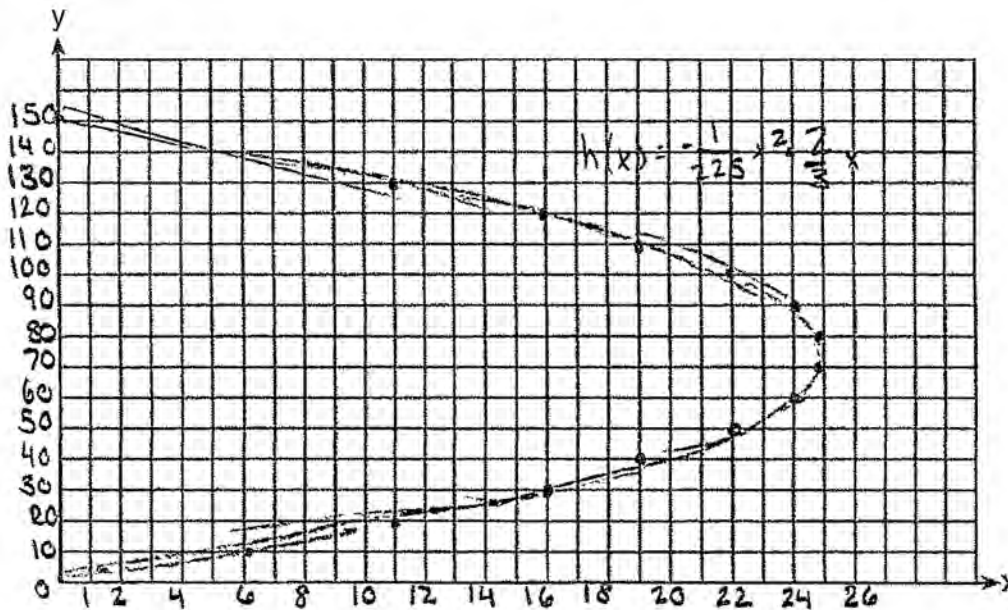
Determine the vertex of $y = h(x)$. Interpret the meaning of this vertex in the context of the problem.

$$(70, 24.889)$$

The goal post is 10 feet high and 45 yards away from the kick. Will the ball be high enough to pass over the goal post? Justify your answer.

Yes

Score 0: The student showed completely incorrect work.

Regents Examination in Algebra I (Common Core) – June 2015

Chart for Converting Total Test Raw Scores to Final Exam Scores (Scale Scores)

(Use for the June 2015 exam only.)

Raw Score	Scale Score	Performance Level	Raw Score	Scale Score	Performance Level	Raw Score	Scale Score	Performance Level
86	100	5	57	74	4	28	64	2
85	98	5	56	74	4	27	63	2
84	97	5	55	73	3	26	62	2
83	96	5	54	73	3	25	61	2
82	94	5	53	73	3	24	60	2
81	93	5	52	73	3	23	59	2
80	92	5	51	72	3	22	57	2
79	90	5	50	72	3	21	56	2
78	89	5	49	72	3	20	55	2
77	88	5	48	72	3	19	53	1
76	86	5	47	71	3	18	52	1
75	85	5	46	71	3	17	50	1
74	84	4	45	71	3	16	48	1
73	83	4	44	71	3	15	46	1
72	82	4	43	70	3	14	44	1
71	81	4	42	70	3	13	42	1
70	80	4	41	70	3	12	39	1
69	80	4	40	70	3	11	37	1
68	79	4	39	69	3	10	34	1
67	78	4	38	69	3	9	31	1
66	78	4	37	69	3	8	28	1
65	77	4	36	68	3	7	25	1
64	77	4	35	68	3	6	22	1
63	76	4	34	67	3	5	19	1
62	76	4	33	67	3	4	15	1
61	75	4	32	66	3	3	12	1
60	75	4	31	66	3	2	8	1
59	75	4	30	65	3	1	4	1
58	74	4	29	64	2	0	0	1

To determine the student's final examination score (scale score), find the student's total test raw score in the column labeled "Raw Score" and then locate the scale score that corresponds to that raw score. The scale score is the student's final examination score. Enter this score in the space labeled "Scale Score" on the student's answer sheet.

Schools are not permitted to rescore any of the open-ended questions on this exam after each question has been rated once, regardless of the final exam score. Schools are required to ensure that the raw scores have been added correctly and that the resulting scale score has been determined accurately.

Because scale scores corresponding to raw scores in the conversion chart change from one administration to another, it is crucial that for each administration the conversion chart provided for that administration be used to determine the student's final score. The chart above is usable only for this administration of the Regents Examination in Algebra I (Common Core).