#4

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

Tuesday, June 3, 2014 — 9:15 a.m. to 12:15 p.m., only

Student Name: SOLTNS

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. 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.

Use this space for computations.

22 A cell phone company charges \$60.00 a month for up to 1 gigabyte of data. The cost of additional data is \$0.05 per megabyte. If d represents the number of additional megabytes used and c represents the total charges at the end of the month, which linear equation can be used to determine a user's monthly bill?

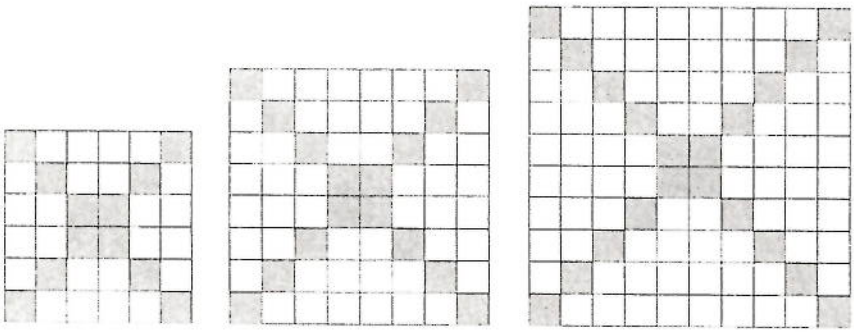
(1) $c = 60 - 0.05d$
(2) $c = 60.05d$
(3) $c = 60d - 0.05$
(4) $c = 60 + 0.05d$

23 The formula for the volume of a cone is $V = \frac{1}{3}\pi r^2 h$. The radius, r, of the cone may be expressed as

(1) $\sqrt{\frac{3V}{\pi h}}$
(2) $\sqrt{\frac{V}{3\pi h}}$
(3) $3\sqrt{\frac{V}{\pi h}}$
(4) $\frac{1}{3}\sqrt{\frac{V}{\pi h}}$

$\frac{3V}{\pi h} = r^2$

24 The diagrams below represent the first three terms of a sequence.



Term 1 Term 2 Term 3

Assuming the pattern continues, which formula determines a_n, the number of shaded squares in the nth term?

(1) $a_n = 4n + 12$
(2) $a_n = 4n + 8$
(3) $a_n = 4n + 4$
(4) $a_n = 4n + 2$

back 5's first. try $n=1$ $n=2$ to check

28 The vertex of the parabola represented by $f(x) = x^2 - 4x + 3$ has coordinates $(2,-1)$. Find the coordinates of the vertex of the parabola defined by $g(x) = f(x - 2)$. Explain how you arrived at your answer.

[The use of the set of axes below is optional.]

$f(x) = x^2 - 4x + 3$

$(x-3)(x-1)$

factor to find zeros

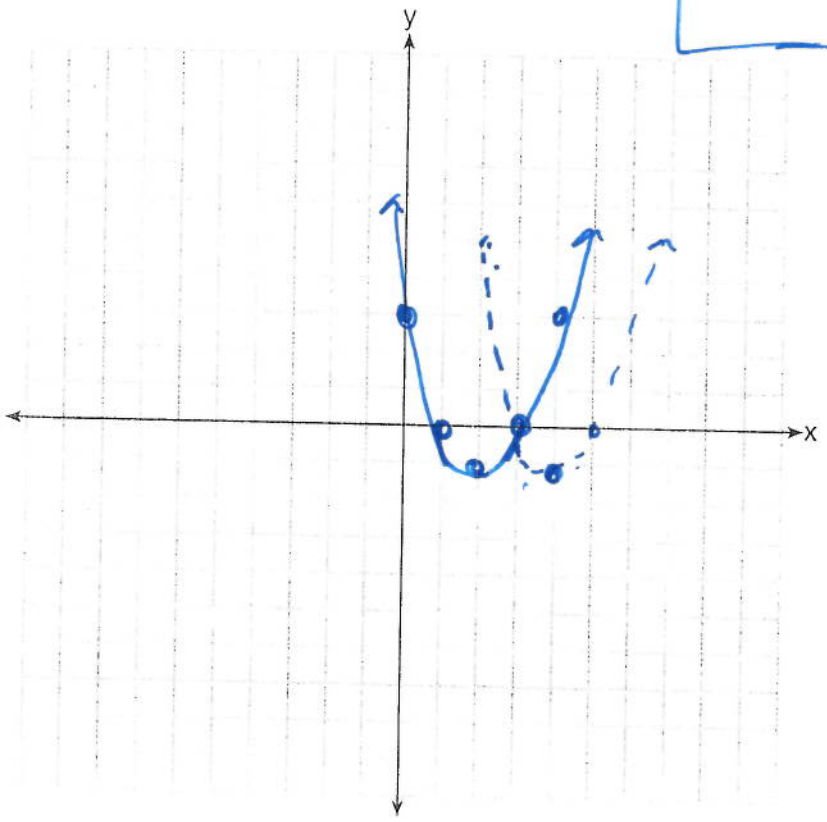
y int = 3

$g(x) = f(x-2)$

means shift 2 units right

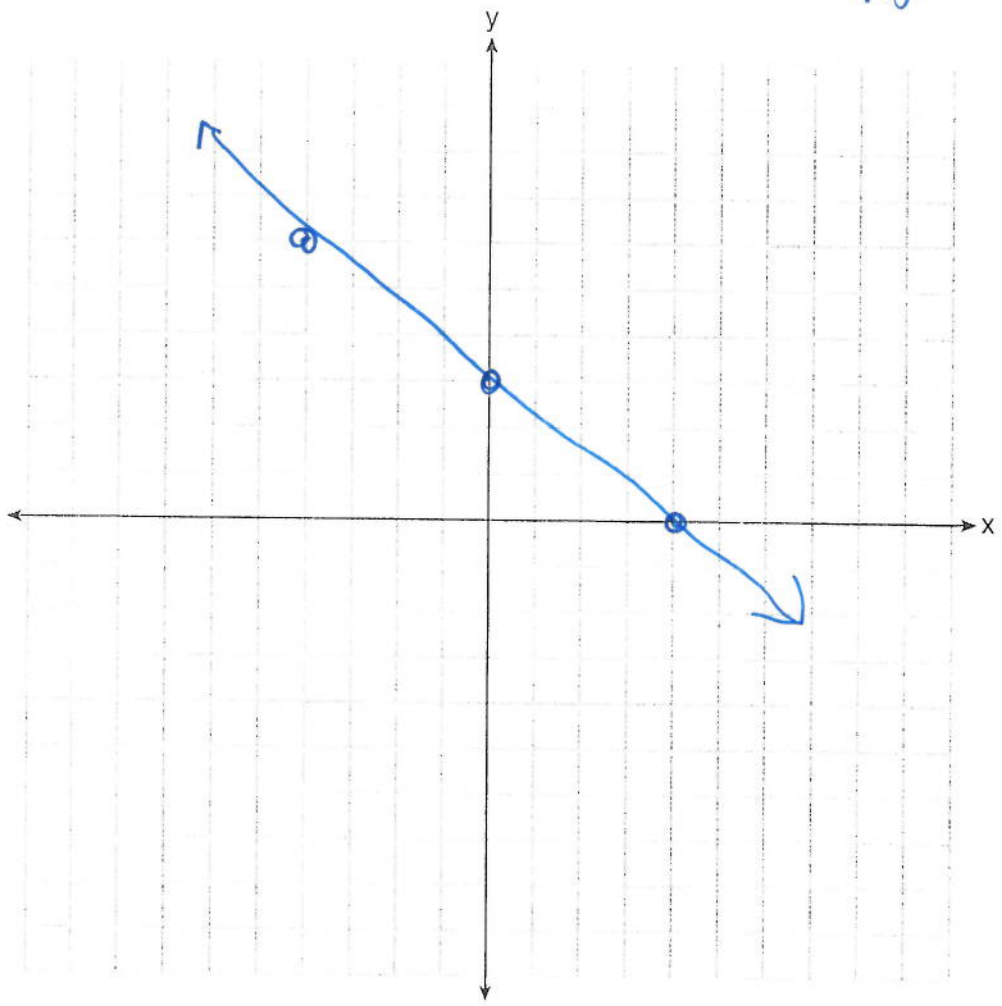
(also can check by plugging in #s)

$(4,-1)$



29 On the set of axes below, draw the graph of the equation $y = -\frac{3}{4}x + 3$.

down 3
right 4



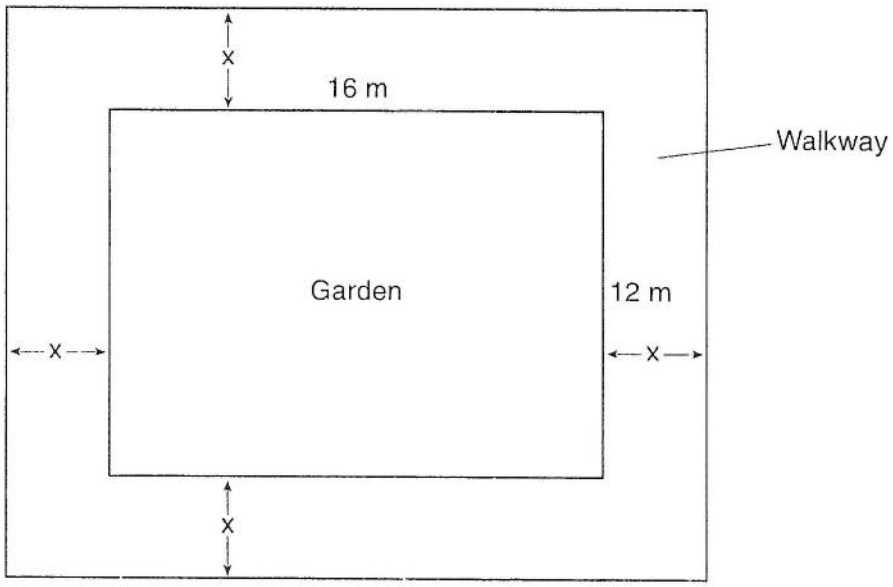
Is the point (3,2) a solution to the equation? Explain your answer based on the graph drawn.

by looking @ graph, no

check: $2 = -\frac{3}{4}(3) + 3$

not true

34 A rectangular garden measuring 12 meters by 16 meters is to have a walkway installed around it with a width of x meters, as shown in the diagram below. Together, the walkway and the garden have an area of 396 square meters.



Write an equation that can be used to find x, the width of the walkway.

$A = lw$ $\quad 396 = (2x+16)(2x+12)$

Describe how your equation models the situation.

$L = x + x + 12$

$W = x + x + 16$

Determine and state the width of the walkway, in meters.

$396 = 4x^2 + 24x + 32x + 192$

$0 = 4x^2 + 24x + 32x - 204$

$4x^2 + 56x - 204 = 0$

$4(x^2 + 14x - 51) = 0$

set = 0 to solve

$4(x+17)(x-3) = 0$

$x = 3$ m

then quadratic formula or factor

35 Caitlin has a movie rental card worth \$175. After she rents the first movie, the card's value is \$172.25. After she rents the second movie, its value is \$169.50. After she rents the third movie, the card is worth \$166.75.

Assuming the pattern continues, write an equation to define $A(n)$, the amount of money on the rental card after n rentals.

$172.25 + x = 175$ $\quad$ $169.50 + x = 172.25$

$x = 2.75$ $\quad$ $x = 2.75$

$A(n) = 175 - 2.75n$

Caitlin rents a movie every Friday night. How many weeks in a row can she afford to rent a movie, using her rental card only? Explain how you arrived at your answer.

$0 \leq 175 - 2.75n$

$63.63 \geq n$

$n = 63$

36 An animal shelter spends \$2.35 per day to care for each cat and \$5.50 per day to care for each dog. Pat noticed that the shelter spent \$89.50 caring for cats and dogs on Wednesday.

Write an equation to represent the possible numbers of cats and dogs that could have been at the shelter on Wednesday.

$2.35c + 5.50d = 89.50$

Pat said that there might have been 8 cats and 14 dogs at the shelter on Wednesday. Are Pat's numbers possible? Use your equation to justify your answer.

$2.35(8) + 5.50(14) \stackrel{?}{=} 89.50$

no.

Later, Pat found a record showing that there were a total of 22 cats and dogs at the shelter on Wednesday. How many cats were at the shelter on Wednesday?

$2.35c + 5.50d = 89.50$

$c + d = 22$

cats = 10

$c = 22 - d \ldots \quad 2.35(22-d) + 5.50d = 89.50$

$d = 22$