The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA I (Common Core)

Thursday, January 26, 2017 — 1:15 to 4:15 p.m., only

Student Name Steve Watson

School Name www.jmap.org

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 for 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]

Difference of Perfect Squares

Use this space for computations.

1 Which expression is equivalent to $16x^2 - 36$?

(1) $4(2x - 3)(2x - 3)$

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

(3) $(4x - 6)(4x - 6)$

(4) $(4x + 6)(4x - 6)$

$16x^2 - 36$

$(4x+6)(4x-6)$

$[2(x+3)][2(x-3)]$

$4(x+3)(x-3)$

2 What is the solution set of the equation $(x - 2)(x - a) = 0$?

(1) -2 and a

(2) -2 and $-a$

(3) 2 and a

(4) 2 and $-a$

If $(x-2)$ and $(x-a)$ are factors + their product is zero, one of the factors must be zero. Therefore

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

$x=2$ $\quad x=a$

3 Analysis of data from a statistical study shows a linear relationship in the data with a correlation coefficient of -0.524. Which statement best summarizes this result?

(1) There is a strong positive correlation between the variables.

(2) There is a strong negative correlation between the variables.

(3) There is a moderate positive correlation between the variables.

(4) There is a moderate negative correlation between the variables.

-0.524

negative - eliminate choices 1 and 3

A perfect correlation is ± 1.

No correlation is zero. ± 0.524 is moderate

4 Boyle's Law involves the pressure and volume of gas in a container. It can be represented by the formula $P_1V_1 = P_2V_2$. When the formula is solved for P_2, the result is

(1) $P_1V_1V_2$

(2) $\frac{V_2}{P_1V_1}$

(3) $\frac{P_1V_1}{V_2}$

(4) $\frac{P_1V_2}{V_1}$

Given	P_1V_1	=	P_2V_2
$\div(V_2)$	$\frac{P_1V_1}{V_2}$	=	$\frac{P_2V_2}{V_2}$
Simplify	$\frac{P_1V_1}{V_2}$	=	P_2

Use this space for computations.

5 A radio station did a survey to determine what kind of music to play by taking a sample of middle school, high school, and college students. They were asked which of three different types of music they prefer on the radio: hip-hop, alternative, or classic rock. The results are summarized in the table below.

	Hip-Hop	Alternative	Classic Rock
~~Middle School~~	~~28~~	~~18~~	~~4~~
~~High School~~	~~22~~	~~22~~	~~6~~
College	16	20	14

16 + 20 + 14 = 50

Total college students = 50

14 college students like classic rock.

What percentage of college students prefer classic rock?

(1) 14%

(2) 28%

(3) 33%

(4) 58%

Convert $\frac{14}{50}$ to %

$\frac{14}{50} = \frac{x}{100}$

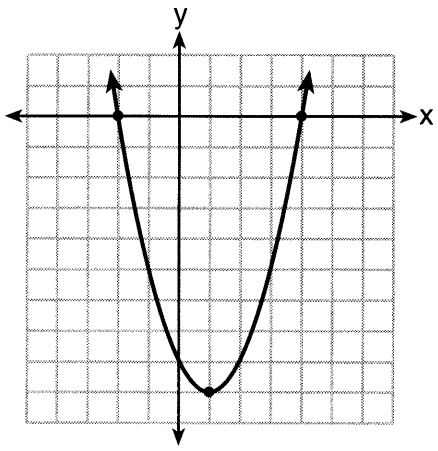
$x = 28$

6 Which function has zeros of −4 and 2?

$f(x) = x^2 + 7x - 8$

(1)

zeros are −8 and 1



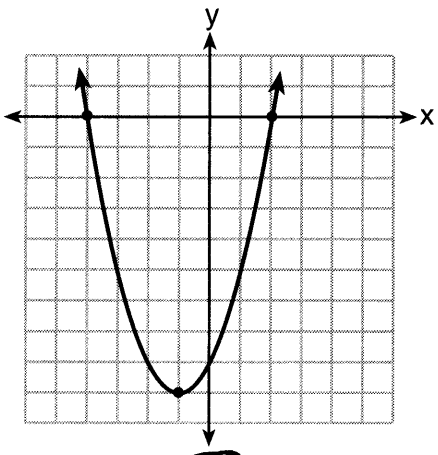
(2)

zeros are −2 and 4

$g(x) = x^2 - 7x - 8$

(3)

zeros are −1 and 8



(4)

zeros are −4 and 2

The zeros of a function are the x values when y = 0.

7 Which expression is equivalent to $2(3g - 4) - (8g + 3)$?

(1) $-2g - 1$

(2) $-2g - 5$

(3) $-2g - 7$

(4) $-2g - 11$

Use this space for computations.

$2(3g-4)$ | $6g-8$

(subtract) $-(8g+3)$ | $-8g-3$ (add)

$-2g-11$

8 In 2014, the cost to mail a letter was 49¢ for up to one ounce. Every additional ounce cost 21¢. Which recursive function could be used to determine the cost of a 3-ounce letter, in cents?

(1) $a_1 = 49; a_n = a_{n-1} + 21$

(2) $a_1 = 0; a_n = 49a_{n-1} + 21$

(3) $a_1 = 21; a_n = a_{n-1} + 49$

(4) $a_1 = 0; a_n = 21a_{n-1} + 49$

$a_1 = 49$, because the first ounce costs 49¢.

9 A car leaves Albany, NY, and travels west toward Buffalo, NY. The equation $D = 280 - 59t$ can be used to represent the distance, D, from Buffalo after t hours. In this equation, the 59 represents the

(1) car's distance from Albany

(2) speed of the car

(3) distance between Buffalo and Albany

(4) number of hours driving

$\text{Speed} = \frac{\text{distance}}{\text{time}}$

$\text{distance} = \text{speed} \times \text{time}$

$59t = \text{speed} \times \text{time}$

$59 = \text{speed}$

10 Faith wants to use the formula $C(f) = \frac{5}{9}(f - 32)$ to convert degrees Fahrenheit, f, to degrees Celsius, $C(f)$. If Faith calculated $C(68)$, what would her result be?

(1) 20° Celsius

(2) 20° Fahrenheit

(3) 154° Celsius

(4) 154° Fahrenheit

$C(f) = \frac{5}{9}(f-32)$

$C(68) = \frac{5}{9}(68-32)$

$C(68) = \frac{5}{9}(36)$

$C(68) = 20$

Use this space for computations.

11 Which scenario represents exponential growth?

(1) A water tank is filled at a rate of 2 gallons/minute. → constant rate of change

(2) A vine grows 6 inches every week. → constant rate of change

(3) A species of fly doubles its population every month during the summer. → exponential – Population = starting amount times 2^t

(4) A car increases its distance from a garage as it travels at a constant speed of 25 miles per hour.

12 What is the *minimum* value of the function $y = |x + 3| - 2$?

(1) -2

(2) 2

(3) 3

(4) -3

x	y
-5	0
-4	-1
-3	-2
-2	-1
-1	0

← minimum is -2

Put function in graphing calculator and inspect the values.

13 What type of relationship exists between the number of pages printed on a printer and the amount of ink used by that printer?

(1) positive correlation, but not causal

(2) positive correlation, and causal

(3) negative correlation, but not causal

(4) negative correlation, and causal

- Both variables increase together, so the correlation is positive. Eliminate 3 + 4.
- Printing causes ink to be used, so the relationship is causal.

14 A computer application generates a sequence of musical notes using the function $f(n) = 6(16)^n$, where n is the number of the note in the sequence and $f(n)$ is the note frequency in hertz. Which function will generate the same note sequence as $f(n)$?

(1) $g(n) = 12(2)^{4n}$

(2) $h(n) = 6(2)^{4n}$

(3) $p(n) = 12(4)^{2n}$

(4) $k(n) = 6(8)^{2n}$

$f(n) = 6(16)^n$ $\quad h(n) = 6(2)^{4n}$

Let $f(n) = h(n)$

$\therefore \; 6(16)^n = 6(2)^{4n}$

$6(16)^n = 6(2^4)^n$

$6(16)^n = 6(16)^n$ ✓

Graphing Calculator Strategy

Put the original function + 4 answer choices in a graphing calculator. The function that produces the same table of values as the original function is the correct choice.

Use this space for computations.

15 Which value of x is a solution to the equation $13 - 36x^2 = -12$?

(1) $\frac{36}{25}$

(3) $-\frac{6}{5}$

(2) $\frac{25}{36}$

(4) $-\frac{5}{6}$

Given	$13 - 36x^2$	$=$	-12
A(12)	$+12$		$+12$
Simplify	$25 - 36x^2$	$=$	0
A($36x^2$)	$+36x^2$		$+36x^2$
Simplify	25	$=$	$36x^2$
D(36)	$\frac{25}{36}$	$=$	$\frac{36x^2}{36}$
Simplify	$\frac{25}{36}$	$=$	x^2
Sq. Rt	$\pm\frac{5}{6}$	$=$	x

16 Which point is a solution to the system below?

Eq. 1 $\quad 2y < -12x + 4 \rightarrow y < -6x + 2$

Eq. 2 $\quad y < -6x + 4$

(1) $\left(1, \frac{1}{2}\right)$

(3) $\left(-\frac{1}{2}, 5\right)$

(2) (0,6)

(4) (−3,2)

Both inequalities have the same slope, so their boundary lines are parallel. The solution must lie below the boundary line for $y < -6x + 2$. Check by substitution

(−3,2) $\quad y < -6x + 2$

$2 < -6(-3) + 2$

$2 < 18 + 2$

$2 < 20$ ✓

17 When the function $f(x) = x^2$ is multiplied by the value a, where $a > 1$, the graph of the new function, $g(x) = ax^2$

(1) opens upward and is wider

(2) opens upward and is narrower

(3) opens downward and is wider

(4) opens downward and is narrower

a is positive, so the parabola opens upward. Eliminate 3 and 4.

Pick any number greater than 1 for the value of (a) and test what happens to the graph when x^2 becomes ax^2.

18 Andy has $310 in his account. Each week, w, he withdraws $30 for his expenses. Which expression could be used if he wanted to find out how much money he had left after 8 weeks?

(1) $310 - 8w$

(3) $310w - 30$

(2) $280 + 30(w - 1)$

(4) $280 - 30(w - 1)$

HINT – Use a graphing calculator. The parabola gets narrower.

w	#
x	y
0	310
1	280
2	250
3	220
4	190
5	160
6	130
7	100
8	70

Use a graphing calculator to see which expression produces this table of values. →

Use this space for computations.

19 The daily cost of production in a factory is calculated using $c(x) = 200 + 16x$, where x is the number of complete products manufactured. Which set of numbers best defines the domain of $c(x)$?

no need for negative #s

no need for fractions

(1) integers

(2) positive real numbers

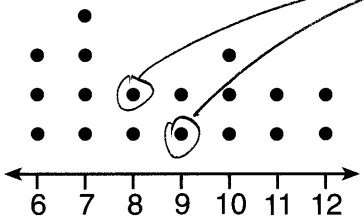
(3) positive rational numbers

(4) whole numbers

no need for irrational #s like π

C(x) will always be a whole #.

20 Noah conducted a survey on sports participation. He created the following two dot plots to represent the number of students participating, by age, in soccer and basketball.

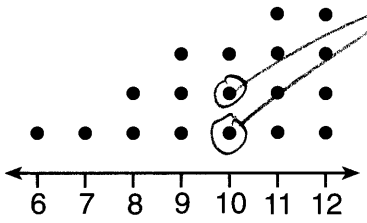


Soccer Players' Ages

spread = 6

median = 8.5

mean = $\frac{156}{18}$



Basketball Players' Ages

spread = 6

median = 10

mean = $\frac{178}{18}$

Which statement about the given data sets is correct? → true

(1) The data for soccer players are skewed right.

(2) The data for soccer players have less spread than the data for basketball players.

Both data sets have the same spread.

(3) The data for basketball players have the same median as the data for soccer players.

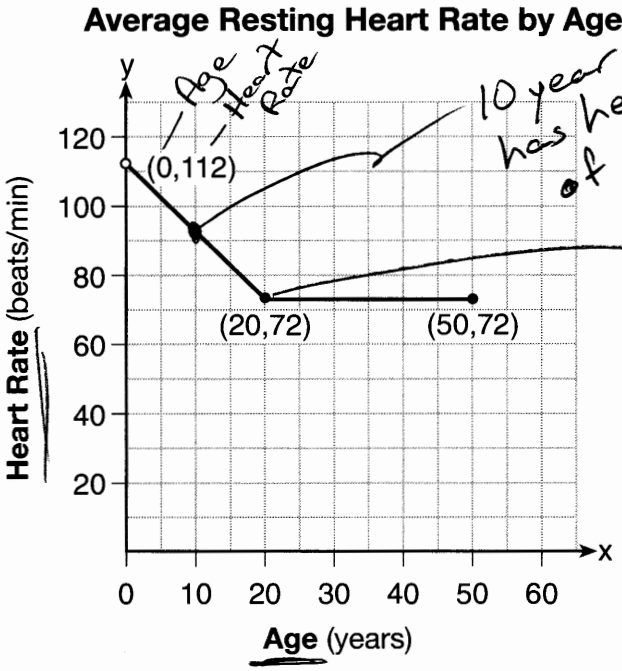
$8.5 \neq 10$

(4) The data for basketball players have a greater mean than the data for soccer players.

$\frac{178}{18} > \frac{156}{18}$ True

Use this space for computations.

21 A graph of average resting heart rates is shown below. The average resting heart rate for adults is 72 beats per minute, but doctors consider resting rates from 60-100 beats per minute within normal range.



10 year old has heart rate of about 92.

20 year old has a heart rate of 72

not true

Which statement about average resting heart rates is *not* supported by the graph?

(1) A 10-year-old has the same average resting heart rate as a 20-year-old.

(2) A 20-year-old has the same average resting heart rate as a 30-year-old.

(3) A 40-year-old may have the same average resting heart rate for ten years.

(4) The average resting heart rate for teenagers steadily decreases.

$92 \neq 72$

$72 = 72$

$72 = 72$

True

22 The method of completing the square was used to solve the equation $2x^2 - 12x + 6 = 0$. Which equation is a correct step when using this method?

(1) $(x - 3)^2 = 6$

(2) $(x - 3)^2 = -6$

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

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

$2x^2 - 12x + 6 = 0$

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

$x^2 - 6x = -3$

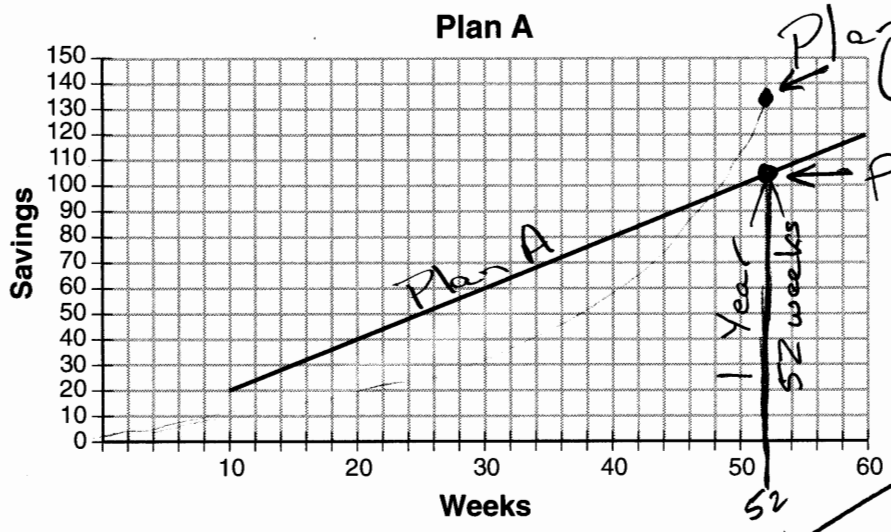
$x^2 - 6x + (-3)^2 = -3 + (-3)^2$

$(x-3)^2 = -3 + 9$

$(x-3)^2 = 6$

Use this space for computations.

23 Nancy works for a company that offers two types of savings plans. Plan *A* is represented on the graph below.



Plan B (52, 135.21)

Plan A (52, 105)

2nd degree equation means this is a quadratic. Eliminate choice 1.

Plan *B* is represented by the function $f(x) = 0.01 + 0.05x^2$, where x is the number of weeks. Nancy wants to have the highest savings possible after a year. Nancy picks Plan *B*.

→ 52 weeks

Her decision is

(1) correct, because Plan *B* is an exponential function and will increase at a faster rate

(2) correct, because Plan *B* is a quadratic function and will increase at a faster rate

(3) incorrect, because Plan *A* will have a higher value after 1 year

(4) incorrect, because Plan *B* is a quadratic function and will increase at a slower rate

Strategy
Calculate $f(52)$ and plot on graph. The choose the higher plan at 52 weeks.

$f(52) = 0.01 + 0.05(52)^2$

$f(52) = 135.21$

24 The 2014 winner of the Boston Marathon runs as many as 120 miles per week. During the last few weeks of his training for an event, his mileage can be modeled by $M(w) = 120(.90)^{w-1}$, where w represents the number of weeks since training began. Which statement is true about the model $M(w)$?

(1) The number of miles he runs will increase by 90% each week.

(2) The number of miles he runs will be 10% of the previous week.

(3) $M(w)$ represents the total mileage run in a given week.

(4) w represents the number of weeks left until his marathon.

x: w	y: M(w)
0	120
1	108
2	97.2
3	87.48
4	78.732
5	70.859

The table view of this function shows that M(w) is total mileage

Part II

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 In attempting to solve the system of equations $y = 3x - 2$ and $6x - 2y = 4$, John graphed the two equations on his graphing calculator. Because he saw only one line, John wrote that the answer to the system is the empty set. Is he correct? Explain your answer.

Eq. #1 $y = 3x - 2$

Eq #2	$6x - 2y$	$=$	4
D2	$\frac{6x - 2y}{2}$	$=$	$\frac{4}{2}$
Simplify	$3x - y$	$=$	2
S(3x)	$-3x$		$-3x$
Simplify	$-y$	$=$	$-3x+2$
M(-1)	y	$=$	$3x-2$

Same

Answer

John is wrong. The two equations show the same relationship between x and y. Since every ordered pair of values that satisfies the first equation also satisfies the second equation, the solution set is not empty.

26 A typical marathon is 26.2 miles. Allan averages 12 kilometers per hour when running in marathons.

Determine how long it would take Allan to complete a marathon, to the *nearest tenth of an hour*. Justify your answer.

1 km = .62 miles (See reference sheet)

Step 1 Convert 12 kilomters per hour to miles per hour

$$\frac{\text{Miles}}{\text{Kilometers}} \left| \frac{.62}{1} = \frac{X}{12} \right.$$

$12(.62) = 7.44$

Allan averages 7.44 miles per hour.

Step 2 Use the speed formula to find time

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$7.44 = \frac{26.2}{\text{time}}$$

$$\text{time} = \frac{26.2}{7.44}$$

$\text{time} = 3.52$ hours

Step 3 Round to nearest tenth of an hour

Answer 3.5 hours

27 Solve the inequality below:

Given	$1.8 - 0.4y \geq 2.2 - 2y$	
A (2y)	$+2y$	$+2y$
Simplify	$1.8 + 1.6y \geq 2.2$	
S (1.8)	-1.8	-1.8
Simplify	$1.6y \geq .4$	
D (1.6)	$\frac{1.6y}{1.6} \geq \frac{.4}{1.6}$	
Simplify	$y \geq \frac{1}{4}$	

Answer

$y \geq \frac{1}{4}$

28 Jakob is working on his math homework. He decides that the sum of the expression $\frac{1}{3} + \frac{6\sqrt{5}}{7}$ must be rational because it is a fraction. Is Jakob correct? Explain your reasoning.

Jakob is not correct.

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

Square root of a prime

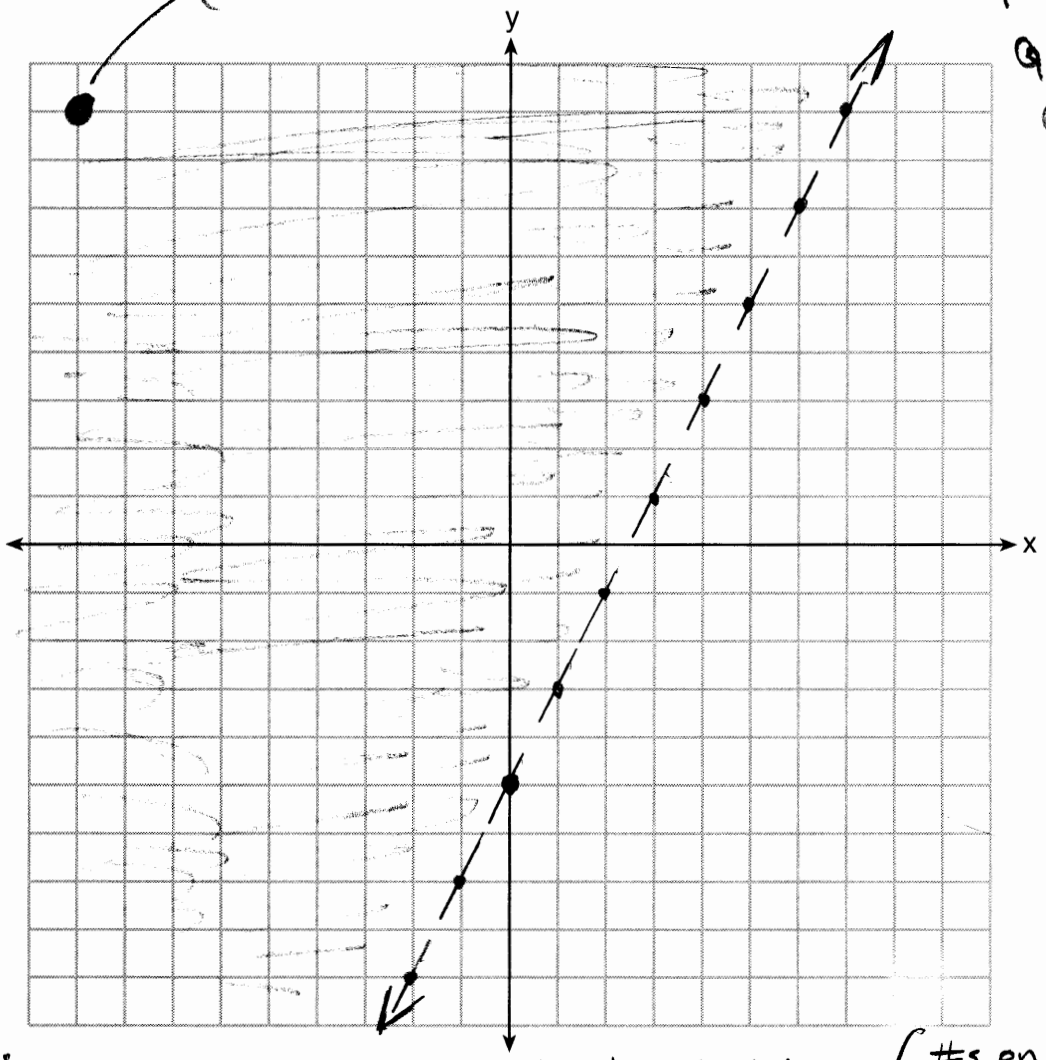
$$\frac{1}{3} + \frac{6\sqrt{5}}{7} = \frac{7 + 18\sqrt{5}}{21}$$

rational # + irrational # = irrational

The square root of any prime is irrational.

29 Graph the inequality $y > 2x - 5$ on the set of axes below.
State the coordinates of a point in its solution.

(-9,9) is a point in the solution set.
Check $y > 2x - 5$
$9 > 2(-9) - 5$
$9 > -18 - 5$
$9 > -23$ ✓



> means shade above the line

dashed line (#s on boundary line are not in solution set)

$y > 2x - 5$

$y = mx + b$

$m = \text{slope} = \frac{\text{rise}}{\text{run}} = \frac{2}{1}$

$b = y\text{-intercept} = -5$

30 Sandy programmed a website's checkout process with an equation to calculate the amount customers will be charged when they download songs.

The website offers a discount. If one song is bought at the full price of $1.29, then each additional song is $.99.

State an equation that represents the cost, C, when s songs are downloaded.

# songs	costs
1	1.29
2	2.28
3	3.27
4	4.26

Answer

$C(s) = 1.29 + .99(s-1)$

Sandy figured she would be charged $52.77 for 52 songs. Is this the correct amount? Justify your answer.

No. The correct amount is #51.76, Sandy is charging #.99 and #1.29 for the first song because she is using the equation $C(s) = 1.29 + .99s$. She needs to change her equation to not charge twice for the first song.

# songs	Correct Cost	Sandy's Costs
1	1.29	2.28
2	2.28	3.27
3	3.27	4.26
52	51.76	52.77

31 A family is traveling from their home to a vacation resort hotel. The table below shows their distance from home as a function of time.

(x_1, y_1) (x_2, y_2)

x	**Time** (hrs)	0	2	5	7
y	**Distance** (mi)	0	140	375	480

Determine the average rate of change between hour 2 and hour 7, including units.

The average rate of change is the slope of the straight line between the two points at the ends of the interval. Find the slope of the straight line between (2, 140) and (7, 480).

$$\text{average rate of change} = \text{slope} = m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$m = \frac{480 - 140}{7 - 2} \quad \frac{\text{miles}}{\text{hours}}$$

$$m = \frac{340}{5} \quad \frac{\text{miles}}{\text{hours}}$$

$$m = \boxed{68 \text{ miles per hours}}$$

answer

32 Nora says that the graph of a circle is a function because she can trace the whole graph without picking up her pencil.

Mia says that a circle graph is *not* a function because multiple values of x map to the same y-value.

Determine if either one is correct, and justify your answer completely.

- A circle is not a function.
- A function has one and only one value of y for each value of X.
- It is okay for multiple values of X to map to the same y-value in a function.
- It is not okay for multiple values of y to map to the same x-value in a function.
- The graph of a function must pass a vertical line test. A circle fails this test.

Nora is incorrect and her reason makes no sense.

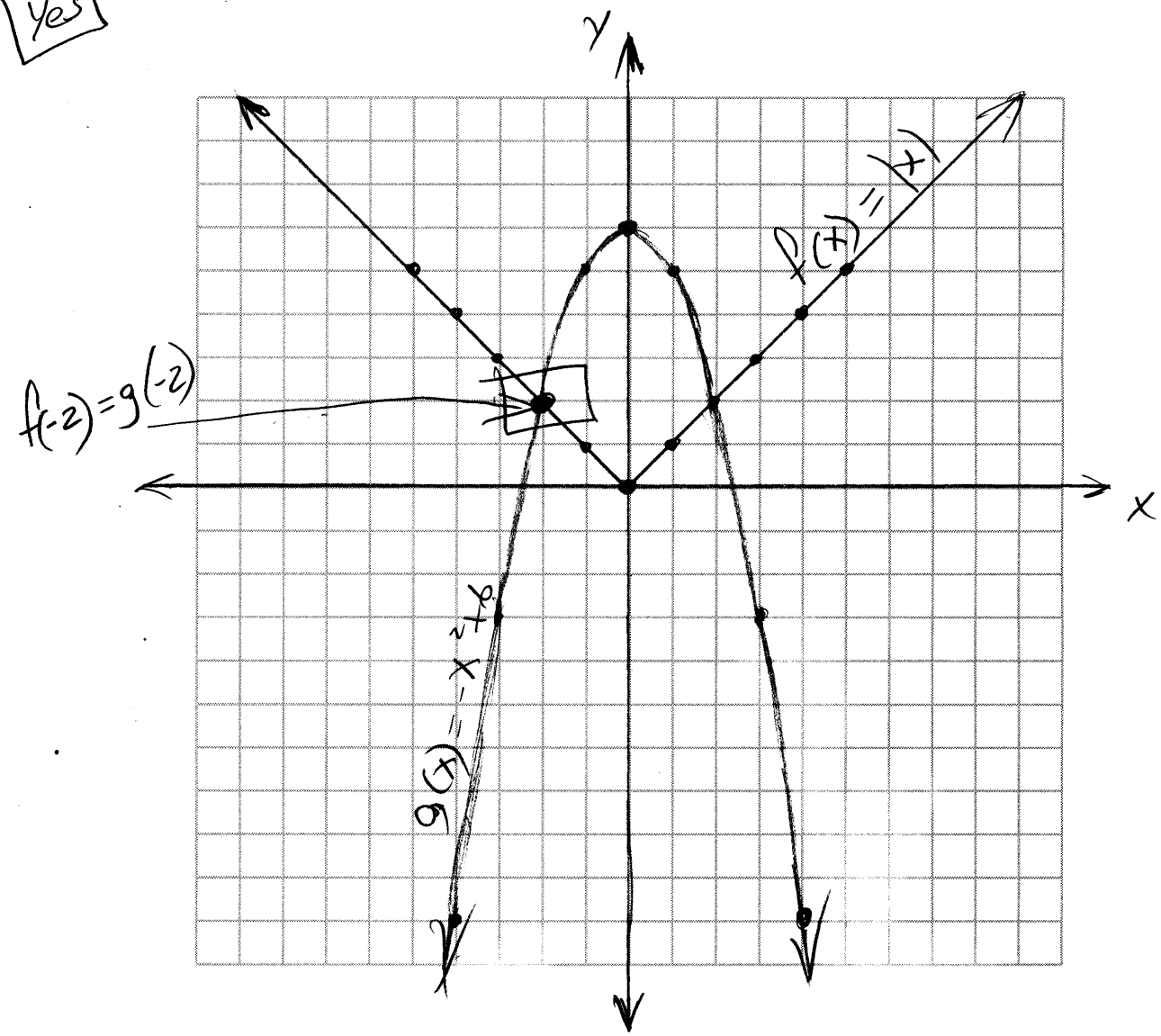
Mia is correct in her conclusion that a circle is not a function, but her reasoning is wrong. She confuses her variables.

Part III

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 Graph $f(x) = |x|$ and $g(x) = -x^2 + 6$ on the grid below.
Does $f(-2) = g(-2)$? Use your graph to explain why or why not.

Yes



34 Two friends went to a restaurant and ordered one plain pizza and two sodas. Their bill totaled $15.95. Later that day, five friends went to the same restaurant. They ordered three plain pizzas and each person had one soda. Their bill totaled $45.90.

Write and solve a system of equations to determine the price of one plain pizza. [Only an algebraic solution can receive full credit.]

Let P represent the cost of one plain pizza.
Let S represent the cost of one soda.

→ Write 2 Equations

Eq. #1 $P + 2S = 15.95$

Eq. #2 $3P + 5S = 45.90$

→ Multiply Eq. #1 times 3

Eq. #1 $3P + 6S = 47.85$

→ Subtract Eq #2 $3P + 5S = 45.90$

$S = 1.95$

→ Solve for P using Eq. #1

$P + 2S = 15.95$

$P + 2(1.95) = 15.95$

$P + 3.90 = 15.95$

$-3.90 \quad -3.90$

$P = 12.05$ Answer

Check Eq #1

$P + 2S = 15.95$

$12.05 + 2(1.95) = 15.95$

$15.95 = 15.95$ ✓

Check Eq. #2

$3P + 5S = 45.90$

$3(12.05) + 5(1.95) = 45.90$ ✓

$45.90 = 45.90$

35 Tanya is making homemade greeting cards. The data table below represents the amount she spends in dollars, $f(x)$, in terms of the number of cards she makes, x.

x	f(x)
4	7.50
6	9
9	11.25
10	12

Strategy Input this table of values in a graphing calculator and use linear regression to write the function rule.

Write a linear function, $f(x)$, that represents the data.

$y = ax + b$
$a = .75$
$b = 4.5$
$r = 1$

$f(x) = .75x + 4.5$

Explain what the slope and y-intercept of $f(x)$ mean in the given context.

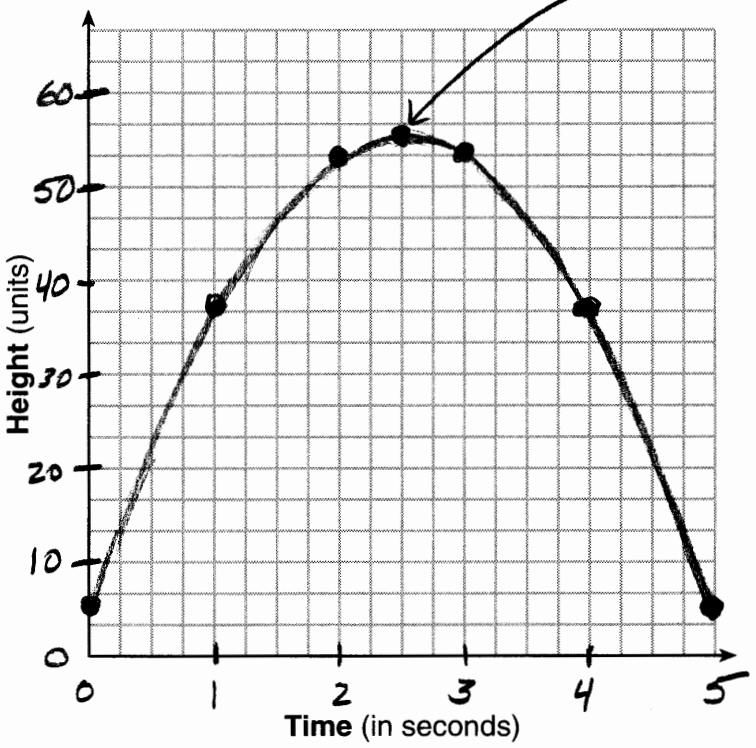
Slope = .75
This represents the amount spent for each card Tanya makes.

y-intercept = 4.50
This represents a fixed cost.

36 Alex launched a ball into the air. The height of the ball can be represented by the equation $h = -8t^2 + 40t + 5$, where h is the height, in units, and t is the time, in seconds, after the ball was launched. Graph the equation from $t = 0$ to $t = 5$ seconds.

Strategy

Use a graphing calculator.



t	h
x	y
0	5
1	37
2	53
2.5	55
3	53
4	37
5	5

State the coordinates of the vertex and explain its meaning in the context of the problem.

(2.5, 55)

seconds units

This means the ball reached a maximum height of 55 units 2 ½ seconds after it was launched.

Part IV

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 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 done in pencil. [6]

37 Ian is borrowing \$1000 from his parents to buy a notebook computer. He plans to pay them back at the rate of \$60 per month. Ken is borrowing \$600 from his parents to purchase a snowboard. He plans to pay his parents back at the rate of \$20 per month.

Write an equation that can be used to determine after how many months the boys will owe the same amount.

Let m represent the # of months
Ian's debt is represented by $I(m) = 1000 - 60m$
Ken's debt is represented by $k(m) = 600 - 20m$
They will owe the same amount when
$1000 - 60m = 600 - 20m$

Determine algebraically and state in how many months the two boys will owe the same amount. State the amount they will owe at this time.

Given	$1000 - 60m$	$=$	$600 - 20m$
A (60m)	$+60m$		$+60m$
Simplify	1000	$=$	$600 + 40m$
S (600)	-600		-600
Simplify	400	$=$	$40m$
D(40)	$\frac{400}{40}$	$=$	$\frac{40m}{40}$
Answer	10	$=$	m

The two boys will owe the same amount after 10 months.
Each will owe \$400.
$1000 - 60(10) = 400$ ✓
$600 - 20(10) = 400$ ✓

Ian claims that he will have his loan paid off 6 months after he and Ken owe the same amount. Determine and state if Ian is correct. Explain your reasoning.

Ian is wrong. He will still owe his parents \$40.
$1000 - 60(16) = 40$
10 months + 6 more months