The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA II (Common Core)

Friday, January 27, 2017 — 9:15 a.m. to 12:15 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 Relative to the graph of $y = 3\sin x$, what is the shift of the graph of $y = 3\sin\left(x + \frac{\pi}{3}\right)$?

(1) $\frac{\pi}{3}$ right

(2) $\frac{\pi}{3}$ left

(3) $\frac{\pi}{3}$ up

(4) $\frac{\pi}{3}$ down

2 A rabbit population doubles every 4 weeks. There are currently five rabbits in a restricted area. If t represents the time, in weeks, and $P(t)$ is the population of rabbits with respect to time, about how many rabbits will there be in 98 days?

(1) 56

(2) 152

(3) 3688

(4) 81,920

3 When factored completely, $m^5 + m^3 - 6m$ is equivalent to

(1) $(m + 3)(m - 2)$

(2) $(m^3 + 3m)(m^2 - 2)$

(3) $m(m^4 + m^2 - 6)$

(4) $m(m^2 + 3)(m^2 - 2)$

4 If $\sin^2(32°) + \cos^2(M) = 1$, then M equals

(1) 32°

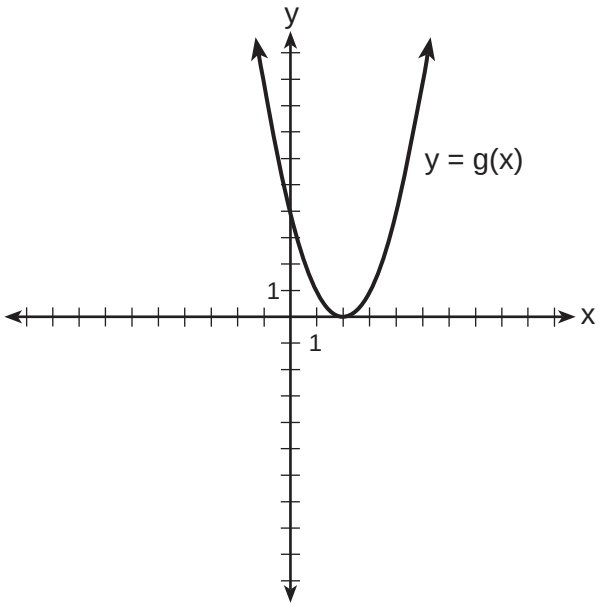
(2) 58°

(3) 68°

(4) 72°

Use this space for computations.

5 What is the solution to the system of equations $y = 3x - 2$ and $y = g(x)$ where $g(x)$ is defined by the function below?



(1) $\{(0,-2)\}$

(2) $\{(0,-2),(1,6)\}$

(3) $\{(1,6)\}$

(4) $\{(1,1),(6,16)\}$

6 Which statement about statistical analysis is *false*?

(1) Experiments can suggest patterns and relationships in data.

(2) Experiments can determine cause and effect relationships.

(3) Observational studies can determine cause and effect relationships.

(4) Observational studies can suggest patterns and relationships in data.

7 The expression $\left(\frac{m^2}{m^{\frac{1}{3}}}\right)^{-\frac{1}{2}}$ is equivalent to

(1) $-\sqrt[6]{m^5}$

(2) $\frac{1}{\sqrt[6]{m^5}}$

(3) $-m\sqrt[5]{m}$

(4) $\frac{1}{m\sqrt[5]{m}}$

Use this space for computations.

8 What is the inverse of the function $y = \log_3 x$?

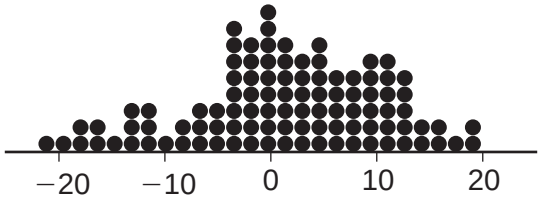
(1) $y = x^3$

(2) $y = \log_x 3$

(3) $y = 3^x$

(4) $x = 3^y$

9 Gabriel performed an experiment to see if planting 13 tomato plants in black plastic mulch leads to larger tomatoes than if 13 plants are planted without mulch. He observed that the average weight of the tomatoes from tomato plants grown in black plastic mulch was 5 ounces greater than those from the plants planted without mulch. To determine if the observed difference is statistically significant, he rerandomized the tomato groups 100 times to study these random differences in the mean weights. The output of his simulation is summarized in the dotplot below.



Differences in Mean Weight (oz.)

Given these results, what is an appropriate inference that can be drawn?

(1) There was no effect observed between the two groups.

(2) There was an effect observed that could be due to the random assignment of plants to the groups.

(3) There is strong evidence to support the hypothesis that tomatoes from plants planted in black plastic mulch are larger than those planted without mulch.

(4) There is strong evidence to support the hypothesis that tomatoes from plants planted without mulch are larger than those planted in black plastic mulch.

10 If $p(x) = ab^x$ and $r(x) = cd^x$, then $p(x) \bullet r(x)$ equals

(1) $ac(b + d)^x$

(2) $ac(b + d)^{2x}$

(3) $ac(bd)^x$

(4) $ac(bd)^{x^2}$

Use this space for computations.

11 The solution to the equation $18x^2 - 24x + 87 = 0$ is

(1) $-\frac{2}{3} \pm 6i\sqrt{158}$

(2) $-\frac{2}{3} \pm \frac{1}{6}i\sqrt{158}$

(3) $\frac{2}{3} \pm 6i\sqrt{158}$

(4) $\frac{2}{3} \pm \frac{1}{6}i\sqrt{158}$

12 When $g(x) = \frac{2}{x+2}$ and $h(x) = \log(x + 1) + 3$ are graphed on the same set of axes, which coordinates best approximate their point of intersection?

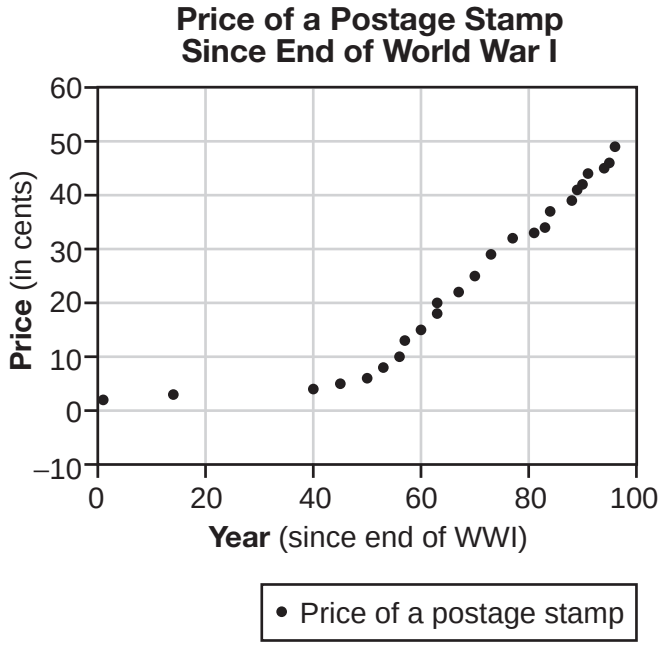
(1) $(-0.9,1.8)$

(2) $(-0.9,1.9)$

(3) $(1.4,3.3)$

(4) $(1.4,3.4)$

13 The price of a postage stamp in the years since the end of World War I is shown in the scatterplot below.



The equation that best models the price, in cents, of a postage stamp based on these data is

(1) $y = 0.59x - 14.82$

(2) $y = 1.04(1.43)^x$

(3) $y = 1.43(1.04)^x$

(4) $y = 24\sin(14x) + 25$

Use this space for computations.

14 The eighth and tenth terms of a sequence are 64 and 100. If the sequence is either arithmetic or geometric, the ninth term can *not* be

(1) -82

(2) -80

(3) 80

(4) 82

15 The loudness of sound is measured in units called decibels (dB). These units are measured by first assigning an intensity I_0 to a very soft sound that is called the threshold sound. The sound to be measured is assigned an intensity, I, and the decibel rating, d, of this sound is found using $d = 10 \log \frac{I}{I_0}$. The threshold sound audible to the average person is 1.0×10^{-12} W/m^2 (watts per square meter).

Consider the following sound level classifications:

Moderate	45-69 dB
Loud	70-89 dB
Very loud	90-109 dB
Deafening	>110 dB

How would a sound with intensity 6.3×10^{-3} W/m^2 be classified?

(1) moderate

(2) loud

(3) very loud

(4) deafening

16 Pedro and Bobby each own an ant farm. Pedro starts with 100 ants and says his farm is growing exponentially at a rate of 15% per month. Bobby starts with 350 ants and says his farm is steadily *decreasing* by 5 ants per month.

Assuming both boys are accurate in describing the population of their ant farms, after how many months will they both have approximately the same number of ants?

(1) 7

(2) 8

(3) 13

(4) 36

Use this space for computations.

17 What is the solution, if any, of the equation $\frac{2}{x+3} - \frac{3}{4-x} = \frac{2x-2}{x^2-x-12}$?

(1) –1
(2) –5
(3) all real numbers
(4) no real solution

18 In 2013, approximately 1.6 million students took the Critical Reading portion of the SAT exam. The mean score, the modal score, and the standard deviation were calculated to be 496, 430, and 115, respectively. Which interval reflects 95% of the Critical Reading scores?

(1) 430 ± 115
(2) 430 ± 230
(3) 496 ± 115
(4) 496 ± 230

19 Which statement regarding the graphs of the functions below is *untrue*?

$f(x) = 3 \sin 2x$, from $-\pi < x < \pi$
$g(x) = (x - 0.5)(x + 4)(x - 2)$
$h(x) = \log_2 x$
$j(x) = -|4x - 2| + 3$

(1) $f(x)$ and $j(x)$ have a maximum y-value of 3.
(2) $f(x)$, $h(x)$, and $j(x)$ have one y-intercept.
(3) $g(x)$ and $j(x)$ have the same end behavior as $x \to -\infty$.
(4) $g(x)$, $h(x)$, and $j(x)$ have rational zeros.

20 When $g(x)$ is divided by $x + 4$, the remainder is 0. Given $g(x) = x^4 + 3x^3 - 6x^2 - 6x + 8$, which conclusion about $g(x)$ is true?

(1) $g(4) = 0$
(2) $g(-4) = 0$
(3) $x - 4$ is a factor of $g(x)$.
(4) No conclusion can be made regarding $g(x)$.

Use this space for computations.

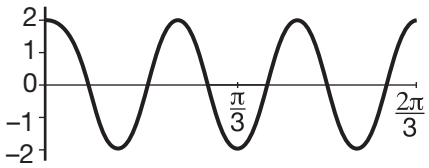
21 Joelle has a credit card that has a 19.2% annual interest rate compounded monthly. She owes a total balance of B dollars after m months. Assuming she makes no payments on her account, the table below illustrates the balance she owes after m months.

m	B
0	1000.00
10	1172.00
19	1352.00
36	1770.80
60	2591.90
69	2990.00
72	3135.80
73	3186.00

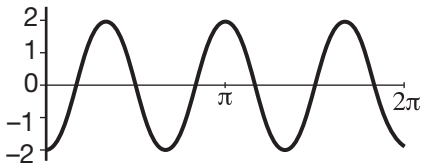
Over which interval of time is her average rate of change for the balance on her credit card account the greatest?

(1) month 10 to month 60
(2) month 19 to month 69
(3) month 36 to month 72
(4) month 60 to month 73

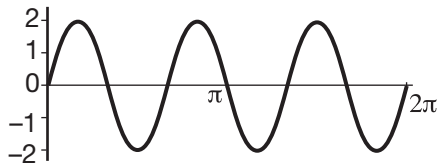
22 Which graph represents a cosine function with no horizontal shift, an amplitude of 2, and a period of $\frac{2\pi}{3}$?



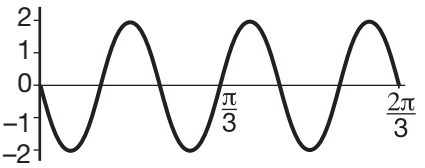
(1)



(3)



(2)



(4)

Use this space for computations.

23 According to a pricing website, Indroid phones lose 58% of their cash value over 1.5 years. Which expression can be used to estimate the value of a \$300 Indroid phone in 1.5 years?

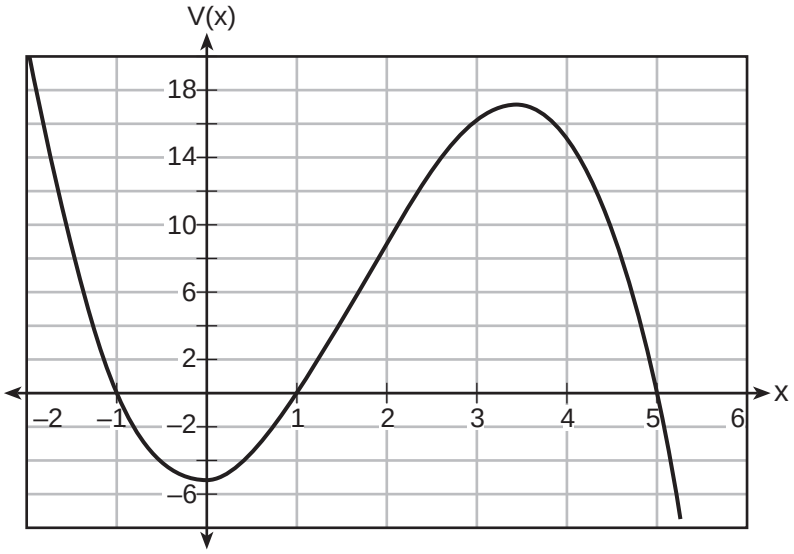
(1) $300e^{-0.87}$

(2) $300e^{-0.63}$

(3) $300e^{-0.58}$

(4) $300e^{-0.42}$

24 A cardboard box manufacturing company is building boxes with length represented by $x + 1$, width by $5 - x$, and height by $x - 1$. The volume of the box is modeled by the function below.



Over which interval is the volume of the box changing at the fastest average rate?

(1) [1,2]

(2) [1,3.5]

(3) [1,5]

(4) [0,3.5]

Part II

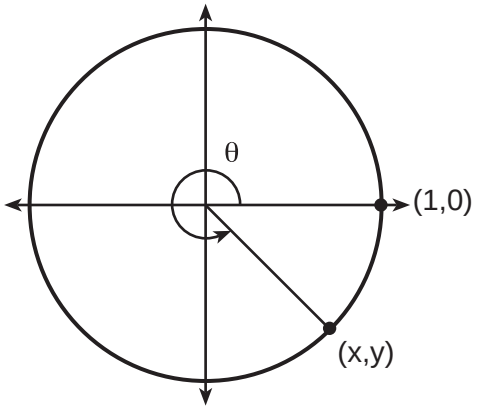
Answer all 8 questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. Utilize the information provided for each question to determine your answer. Note that diagrams are not necessarily 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 Express $(1 - i)^3$ in $a + bi$ form.

26 An orange-juice processing plant receives a truckload of oranges. The quality control team randomly chooses three pails of oranges, each containing 50 oranges, from the truckload. Identify the sample and the population in the given scenario.

State *one* conclusion that the quality control team could make about the population if 5% of the sample was found to be unsatisfactory.

27 Using the unit circle below, explain why $\csc\theta = \frac{1}{y}$.

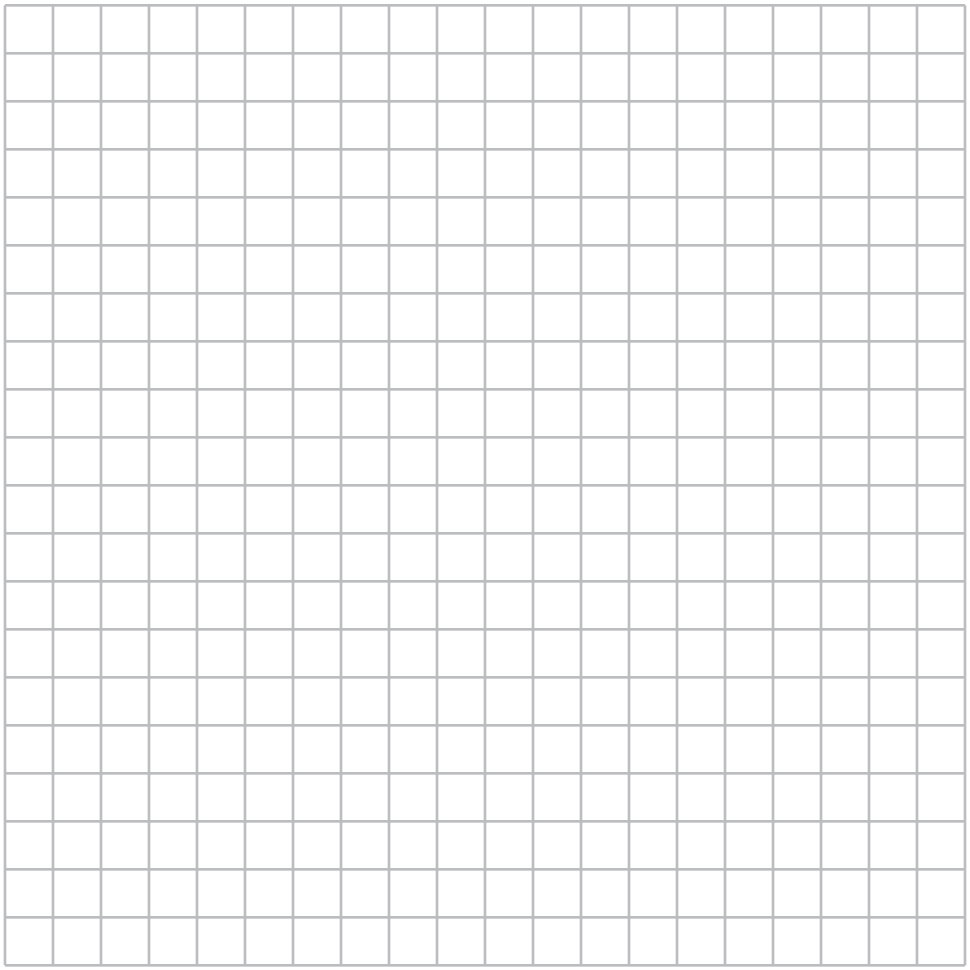


28 The function $M(t)$ represents the mass of radium over time, t, in years.

$$M(t) = 100e^{\frac{\left(ln\frac{1}{2}\right)t}{1590}}$$

Determine if the function $M(t)$ represents growth or decay. Explain your reasoning.

29 On the grid below, sketch a cubic polynomial whose zeros are 1, 3, and −2.



30 Given the equal terms $\sqrt[3]{x^5}$ and $y^{\frac{5}{6}}$, determine and state y, in terms of x.

31 The results of a survey of the student body at Central High School about television viewing preferences are shown below.

	Comedy Series	Drama Series	Reality Series	Total
Males	95	65	70	230
Females	80	70	110	260
Total	175	135	180	490

Are the events "student is a male" and "student prefers reality series" independent of each other? Justify your answer.

32 Given $f(x) = 3x^2 + 7x - 20$ and $g(x) = x - 2$, state the quotient and remainder of $\frac{f(x)}{g(x)}$, in the form $q(x) + \frac{r(x)}{g(x)}$.

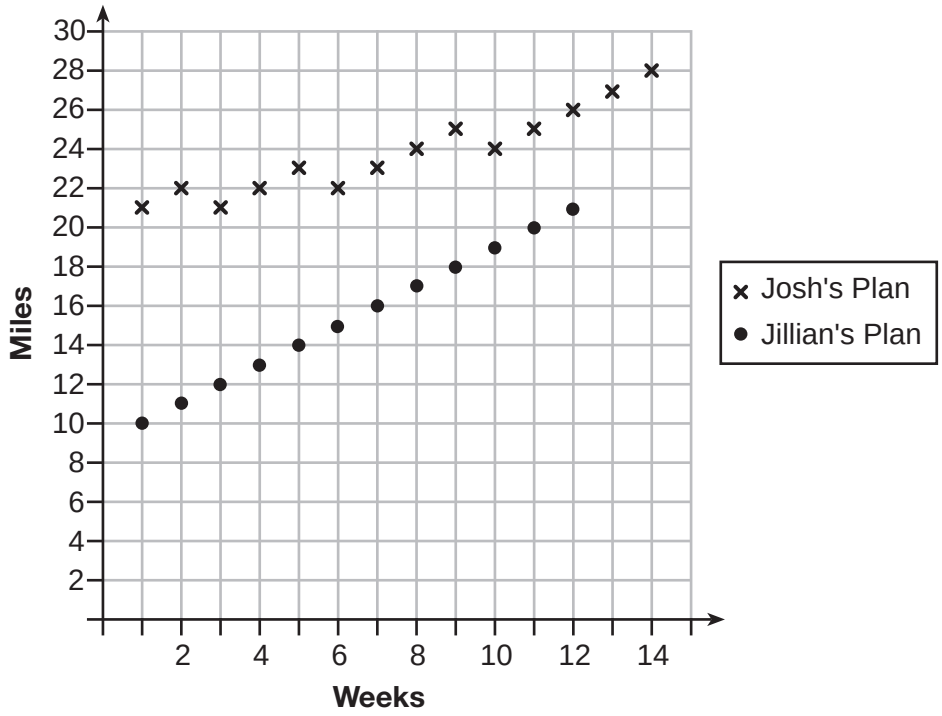
Part III

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 Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 10x^2 + 11x - 7 = (x - 4)(2x^2 + hx + 3) + k$$

34 Elaina has decided to run the Buffalo half-marathon in May. She researched training plans on the Internet and is looking at two possible plans: Jillian's 12-week plan and Josh's 14-week plan. The number of miles run per week for each plan is plotted below.



Which one of the plans follows an arithmetic pattern? Explain how you arrived at your answer.

Write a recursive definition to represent the number of miles run each week for the duration of the plan you chose.

Jillian's plan has an alternative if Elaina wanted to train instead for a full 26-mile marathon. Week one would start at 13 miles and follow the same pattern for the half-marathon, but it would continue for 14 weeks. Write an explicit formula, in *simplest form*, to represent the number of miles run each week for the full-marathon training plan.

35 The guidance department has reported that of the senior class, 2.3% are members of key club, K, 8.6% are enrolled in AP Physics, P, and 1.9% are in both.

Determine the probability of P given K, to the *nearest tenth of a percent*.

The principal would like a basic interpretation of these results. Write a statement relating your calculated probabilities to student enrollment in the given situation.

36 Using the formula below, determine the monthly payment on a 5-year car loan with a monthly percentage rate of 0.625% for a car with an original cost of $21,000 and a $1000 down payment, to the *nearest cent*.

$$P_n = PMT\left(\frac{1-\left(1+i\right)^{-n}}{i}\right)$$

P_n = present amount borrowed

n = number of monthly pay periods

PMT = monthly payment

i = interest rate per month

The affordable monthly payment is $300 for the same time period. Determine an appropriate down payment, to the *nearest dollar*.

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 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.

How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.

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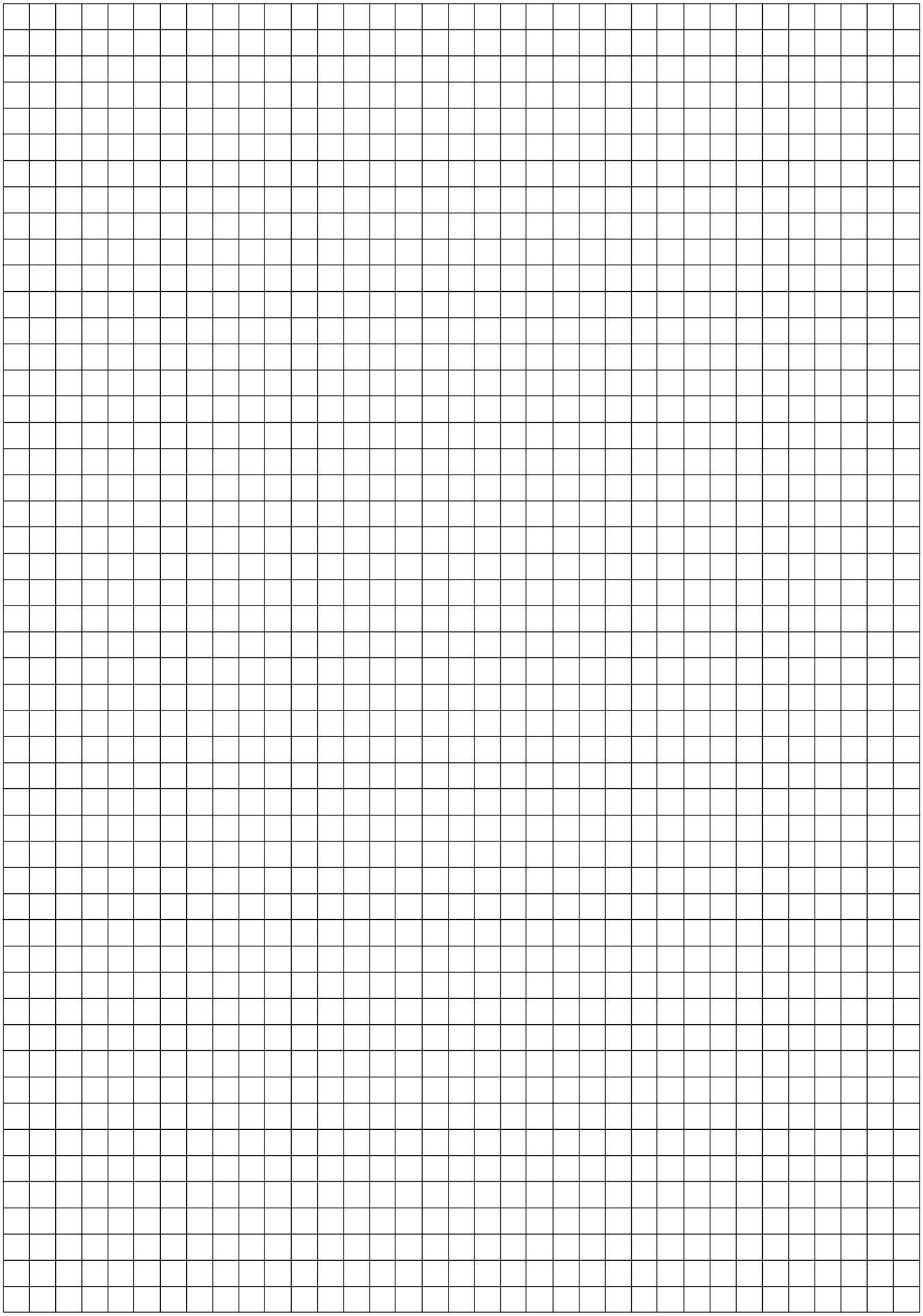
Scrap Graph Paper — This sheet will not be scored.



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High School Math Reference Sheet

1 inch = 2.54 centimeters
1 meter = 39.37 inches
1 mile = 5280 feet
1 mile = 1760 yards
1 mile = 1.609 kilometers

1 kilometer = 0.62 mile
1 pound = 16 ounces
1 pound = 0.454 kilogram
1 kilogram = 2.2 pounds
1 ton = 2000 pounds

1 cup = 8 fluid ounces
1 pint = 2 cups
1 quart = 2 pints
1 gallon = 4 quarts
1 gallon = 3.785 liters
1 liter = 0.264 gallon
1 liter = 1000 cubic centimeters

Triangle	$A = \frac{1}{2}bh$
Parallelogram	$A = bh$
Circle	$A = \pi r^2$
Circle	$C = \pi d$ or $C = 2\pi r$
General Prisms	$V = Bh$
Cylinder	$V = \pi r^2 h$
Sphere	$V = \frac{4}{3}\pi r^3$
Cone	$V = \frac{1}{3}\pi r^2 h$
Pyramid	$V = \frac{1}{3}Bh$

Pythagorean Theorem	$a^2 + b^2 = c^2$
Quadratic Formula	$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
Arithmetic Sequence	$a_n = a_1 + (n - 1)d$
Geometric Sequence	$a_n = a_1 r^{n-1}$
Geometric Series	$S_n = \frac{a_1 - a_1 r^n}{1 - r}$ where $r \neq 1$
Radians	1 radian $= \frac{180}{\pi}$ degrees
Degrees	1 degree $= \frac{\pi}{180}$ radians
Exponential Growth/Decay	$A = A_0 e^{k(t - t_0)} + B_0$

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ALGEBRA II (COMMON CORE)

FOR TEACHERS ONLY

The University of the State of New York
REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA II (Common Core)

Friday, January 27, 2017 — 9:15 a.m. to 12:15 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 II (Common Core). More detailed information about scoring is provided in the publication *Information Booklet for Scoring the Regents Examination in Algebra II (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 Friday, January 27, 2017. 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). 2	(9). 2	(17). . . . . 1 . . . . .
(2). 1	(10). 3	(18). . . . . 4 . . . . .
(3). 4	(11). 4	(19). . . . . 2 . . . . .
(4). 1	(12). 2	(20). . . . . 2 . . . . .
(5). 4	(13). 3	(21). . . . . 4 . . . . .
(6). 3	(14). 1	(22). . . . . 3 . . . . .
(7). 2	(15). 3	(23). . . . . 1 . . . . .
(8). 3	(16). 2	(24). . . . . 1 . . . . .

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 II (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/algebratwo/.

General Rules for Applying Mathematics Rubrics

I. General Principles for Rating

The rubrics for the constructed-response questions on the Regents Examination in Algebra II (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 II (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 a 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]** $-2 - 2i$

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

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.

(26) **[2]** Sample: three pails of oranges, population: the truckload of oranges, and a correct conclusion is stated.

[1] One conceptual error is made.

or

[1] Three pails of oranges, the truckload of oranges, but they are labeled incorrectly or not at all. A correct conclusion is stated.

[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]** A correct explanation is written.

[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.

(28) **[2]** Decay, and a correct explanation is written.

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

or

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

or

[1] Decay, but an incomplete explanation is written.

[0] Decay, but no explanation is written.

or

[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]** A correct sketch is drawn that includes intercepts at (1,0), (3,0), and (−2,0).

[1] One graphing error is made.

or

[1] 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.

(30) **[2]** $y = x^2$ or equivalent, and correct algebraic work is shown.

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

or

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

or

[1] $y = x^2$, but no work is shown.

or

[1] Appropriate work is shown, but the expression x^2 is written.

[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]** No, and a correct justification is given.

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

or

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

or

[1] No, but an incomplete justification is given.

[0] No, but no justification is given.

or

[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]** $3x + 13 + \frac{6}{x-2}$, and correct work is shown.

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

or

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

or

[1] The quotient $3x + 13$ and the remainder 6 are found, but no further correct work is shown.

or

[1] Appropriate work is shown to find 3, 13, and 6 by synthetic division, but no further correct work is shown.

or

[1] $3x + 13 + \frac{6}{x-2}$, 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.

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]** $h = -2$, $k = 5$, and correct work is shown.

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

or

[3] Appropriate work is shown, but the answers are not labeled or labeled incorrectly.

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

or

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

or

[2] Appropriate work is shown to find $h = -2$ or $k = 5$.

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

or

[1] $h = -2$, $k = 5$, 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]** Jillian's plan, a correct explanation, $\begin{cases} a_1 = 10 \\ a_n = a_{n-1} + 1 \end{cases}$ and $a_n = 12 + n$ or equivalent equations are written.

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

or

[3] Appropriate work is shown, but Jillian is not stated or the explanation is missing or incorrect.

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

or

[2] Jillian's plan, a correct explanation, and $\begin{cases} a_1 = 10 \\ a_n = a_{n-1} + 1 \end{cases}$, but no further correct work is shown.

or

[2] $a_n = 12 + n$, but no further correct work is shown.

[1] Jillian's plan and a correct explanation, but no further correct work is shown.

or

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

[0] Jillian's plan, but no further correct 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.

(35) **[4]** 82.6% and correct work is shown, and a correct statement is written.

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

or

[3] Appropriate work is shown to find 82.6%, but the statement is missing or incorrect.

[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] Appropriate work is shown to find the probability of $(K|P)$ as 22.1%, and an appropriate statement is written.

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

or

[1] The formula for determining conditional probability is written, but no further correct work is shown.

or

[1] Appropriate work is shown to find 22.1%, but a statement is missing or incorrect.

or

[1] 82.6%, 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.

(36) **[4]** \$400.76 and \$6028 and correct work is shown.

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

[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] Appropriate work is shown to find \$400.76, but no further correct work is shown.

or

[2] Appropriate work is shown to find \$6028, but no further correct work is shown.

or

[2] \$400.76 and \$6028, but no work is shown.

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

or

[1] \$400.76 or \$6028, 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]** 4, and correct algebraic work is shown, 327 and correct work is shown.

[5] Appropriate work is shown, but one computational, factoring, simplification, or rounding error is made.

or

[5] Appropriate work is shown to find 4, 2.25, and 327, but 2.25 is not rejected.

or

[5] Appropriate work is shown, but no conversion to miles is made.

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

or

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

or

[4] Appropriate work is shown to find 4, but no further correct work is shown.

or

[4] 4, but a method other than algebraic is used, and 327 is given.

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

or

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

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

or

[2] A quadratic equation in standard form is written, but no further correct work is shown.

or

[2] Appropriate work is shown to find 327, but no further correct work is shown.

or

[2] 4 and 327, but no work is shown.

[1] Appropriate work is shown, but two conceptual errors and one computational, factoring, simplification, or rounding errors are made.

or

[1] 4 or 327, 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.

Map to the Common Core Learning Standards
Algebra II (Common Core)
January 2017

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

21	Multiple Choice	2	F-IF.B
22	Multiple Choice	2	F-IF.C
23	Multiple Choice	2	F-LE.A
24	Multiple Choice	2	F-IF.B
25	Constructed Response	2	N-CN.A
26	Constructed Response	2	S-IC.A
27	Constructed Response	2	F-TF.A
28	Constructed Response	2	F-IF.C
29	Constructed Response	2	A-APR.B
30	Constructed Response	2	N-RN.A
31	Constructed Response	2	S-CP.A
32	Constructed Response	2	A-APR.D
33	Constructed Response	4	A-APR.C
34	Constructed Response	4	F-BF.A
35	Constructed Response	4	S-CP.B
36	Constructed Response	4	A-SSE.B
37	Constructed Response	6	A-REI.A

Regents Examination in Algebra II (Common Core)

January 2017

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

The *Chart for Determining the Final Examination Score for the January 2017 Regents Examination in Algebra II (Common Core)* will be posted on the Department's web site at: http://www.p12.nysed.gov/assessment/ by Friday, January 27, 2017. Conversion charts provided for previous administrations of the Regents Examination in Algebra II (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.

The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

ALGEBRA II (Common Core)

Friday, January 27, 2017 — 9:15 a.m. to 12:15 p.m.

MODEL RESPONSE SET

Table of Contents

Question 25

25 Express $(1 - i)^3$ in $a + bi$ form.

$(1-i)(1-i)(1-i)$

$(1-i-i+i^2)(1-i)$

$(1-2i+-1)(1-i)$

$(-2i)(1-i)$

$-2i+2i^2$

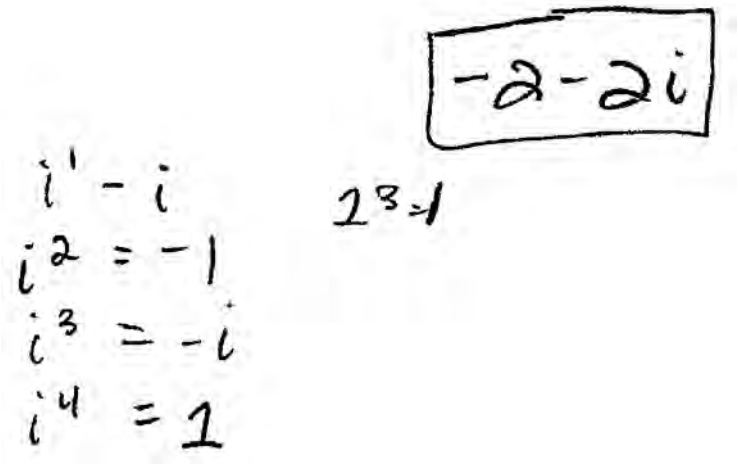
$-2i-2$

$-2-2i$

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

Question 25

25 Express $(1 - i)^3$ in $a + bi$ form.



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

Question 25

25 Express $(1 - i)^3$ in $a + bi$ form.

$(1-i)(1-i)^2$

$(1-i)(1-2i+i^2)$

$(1-i)(-2i)$

$\boxed{-2i-2}$

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

Question 25

25 Express $(1 - i)^3$ in $a + bi$ form.

$(1-i)(1-i)(1-i)$

$(1-i-i+i^2)(1-i)$

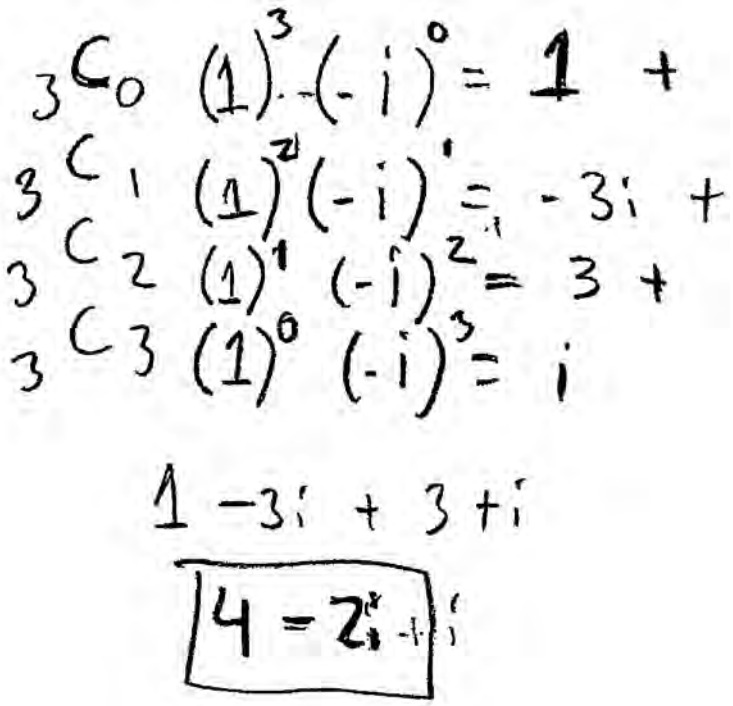
$1-i-i+i^2-i+i^2+i^2-i^3$

$-i^3+3i^2-3i+1$

Score 1: The student did not simplify powers of i.

Question 25

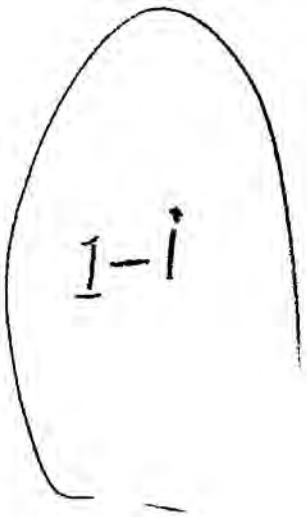
25 Express $(1 - i)^3$ in $a + bi$ form.



Score 1: The student made one computational error.

Question 25

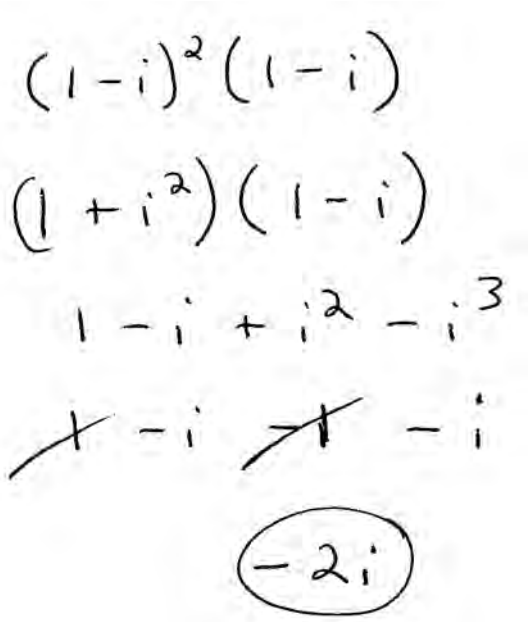
25 Express $(1 - i)^3$ in $a + bi$ form.



Score 0: The student gave a completely incorrect response.

Question 25

25 Express $(1 - i)^3$ in $a + bi$ form.



Score 0: The student made multiple errors.

Question 26

26 An orange-juice processing plant receives a truckload of oranges. The quality control team randomly chooses three pails of oranges, each containing 50 oranges, from the truckload. Identify the sample and the population in the given scenario.

The population is the truckload of oranges

The sample are the oranges in the pails

State *one* conclusion that the quality control team could make about the population if 5% of the sample was found to be unsatisfactory.

It's pretty likely that most of the oranges are satisfactory.

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

Question 26

26 An orange-juice processing plant receives a truckload of oranges. The quality control team randomly chooses three pails of oranges, each containing 50 oranges, from the truckload. Identify the sample and the population in the given scenario.

Sample = 3 pails of 50 oranges
population = truckload

State *one* conclusion that the quality control team could make about the population if 5% of the sample was found to be unsatisfactory.

Some of the population may also be unsatisfactory.

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

Question 26

26 An orange-juice processing plant receives a truckload of oranges. The quality control team randomly chooses three pails of oranges, each containing 50 oranges, from the truckload. Identify the sample and the population in the given scenario.

Sample: 50 oranges
Population: 3 pails

State *one* conclusion that the quality control team could make about the population if 5% of the sample was found to be unsatisfactory.

It is likely that approximately 5% of all the oranges are unsatisfactory.

Score 1: The student only stated a correct conclusion.

Question 26

26 An orange-juice processing plant receives a truckload of oranges. The quality control team randomly chooses three pails of oranges, each containing 50 oranges, from the truckload. Identify the sample and the population in the given scenario.

the population is 50 oranges
and the sample is 3 pails

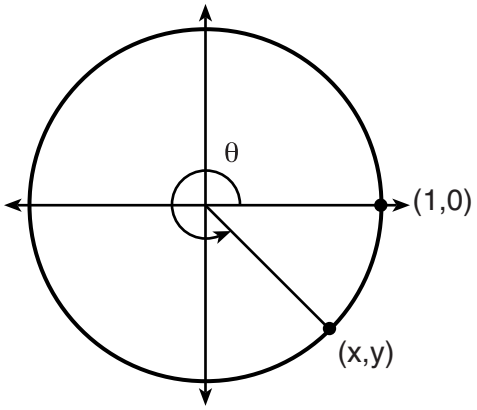
State *one* conclusion that the quality control team could make about the population if 5% of the sample was found to be unsatisfactory.

95% of the population is satisfactory

Score 0: The student only identified the sample correctly.

Question 27

27 Using the unit circle below, explain why $\csc\theta = \frac{1}{y}$.

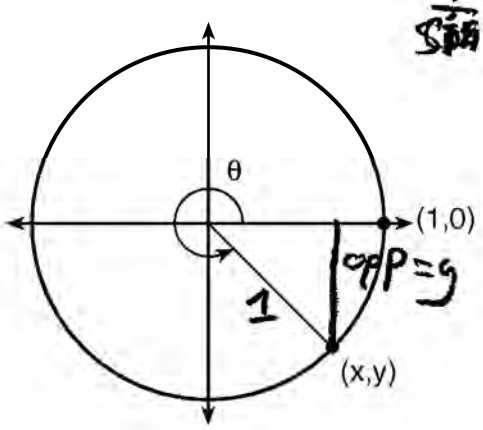


cscθ is equal to $\frac{1}{\sin\theta}$, and sinθ on a unit circle (with radius=1) is equal to the y value of the point. so, If sinθ=y and $\csc\theta = \frac{1}{\sin\theta}$ it is also true to say $\csc\theta = \frac{1}{y}$.

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

Question 27

27 Using the unit circle below, explain why $\csc\theta = \frac{1}{y}$.



$\csc = \frac{h}{o}$

$\frac{1}{\sin\theta} = \frac{\theta}{h}$

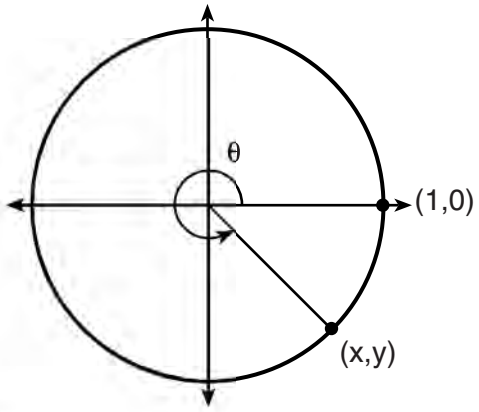
$\csc\theta = \frac{1}{y}$ because on the unit circle the hypotenuse is always 1 and y is the opposite leg.

$\csc\theta = \frac{hyp}{opp}$.

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

Question 27

27 Using the unit circle below, explain why $\csc\theta = \frac{1}{y}$.



$\csc = \frac{1}{\sin}$

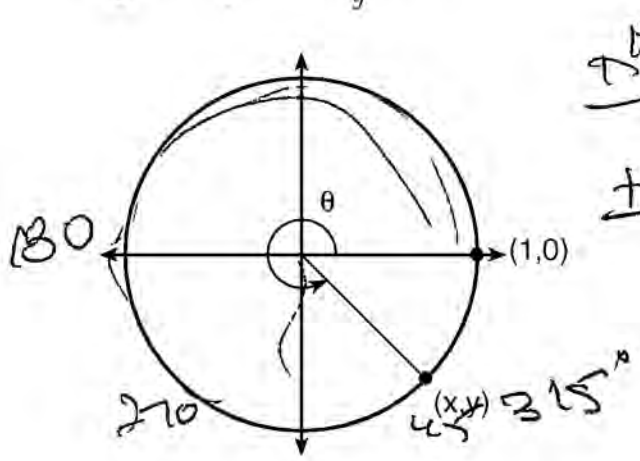
$\sin\theta = \frac{y}{1} = y$

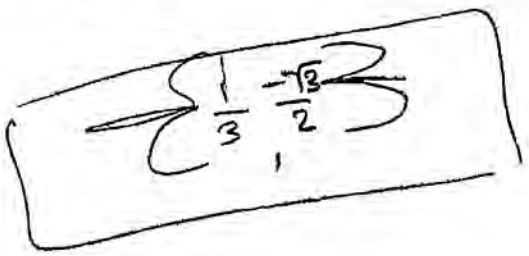
$\csc = \frac{1}{\sin} = \frac{1}{y}$

Score 1: The student did not write an explanation.

Question 27

27 Using the unit circle below, explain why $\csc\theta = \frac{1}{y}$.





(I tried)

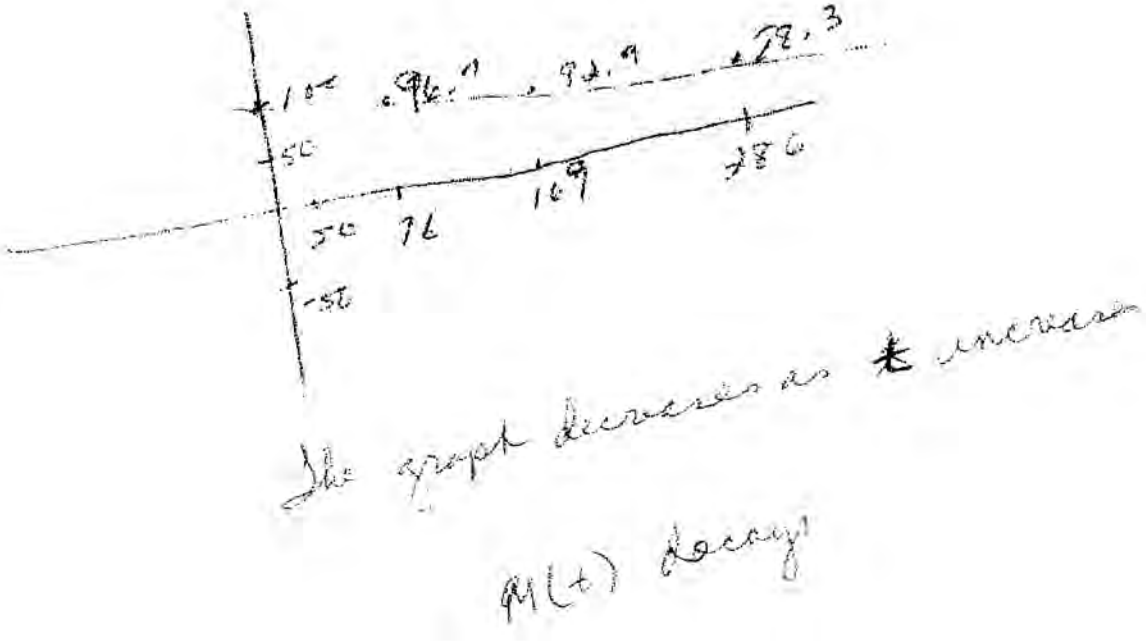
Score 0: The student showed no appropriate work and did not write an explanation.

Question 28

28 The function $M(t)$ represents the mass of radium over time, t, in years.

$$M(t) = 100e^{\frac{\left(ln\frac{1}{2}\right)t}{1590}}$$

Determine if the function $M(t)$ represents growth or decay. Explain your reasoning.



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

Question 28

28 The function $M(t)$ represents the mass of radium over time, t, in years.

$$M(t) = 100e^{\frac{\left(ln\frac{1}{2}\right)t}{1590}}$$

Determine if the function $M(t)$ represents growth or decay. Explain your reasoning.

Decay

$\ln .5 \approx -.6931$

when $t \geq 0$, $\frac{(\ln .5)t}{1590}$ will be negative.

Therefore, the exponent will be negative, representing exponential decay

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

Question 28

28 The function $M(t)$ represents the mass of radium over time, t, in years.

$$M(t) = 100e^{\frac{\left(ln\frac{1}{2}\right)t}{1590}}$$

Determine if the function $M(t)$ represents growth or decay. Explain your reasoning.

Decay because the $\frac{1}{2}$ signifys that it is decay, not growth.

Score 1: The student gave an incomplete explanation.

Question 28

28 The function $M(t)$ represents the mass of radium over time, t, in years.

$$M(t) = 100e^{\frac{\left(ln\frac{1}{2}\right)t}{1590}}$$

Determine if the function $M(t)$ represents growth or decay. Explain your reasoning.

$100e^{\frac{\left(\ln\frac{1}{2}\right)\cdot 2}{1540}} = 99.91$

$100e^{\frac{\left(\ln\frac{1}{2}\right)\cdot 6}{1540}} = 99.738$

decay

Score 1: The student showed appropriate work, but did not write an explanation.

Question 28

28 The function $M(t)$ represents the mass of radium over time, t, in years.

$$M(t) = 100e^{\frac{\left(ln\frac{1}{2}\right)t}{1590}}$$

Determine if the function $M(t)$ represents growth or decay. Explain your reasoning.

Decay!

Score 0: The student did not write an explanation.

Question 28

28 The function $M(t)$ represents the mass of radium over time, t, in years.

$$M(t) = 100e^{\frac{\left(ln\frac{1}{2}\right)t}{1590}}$$

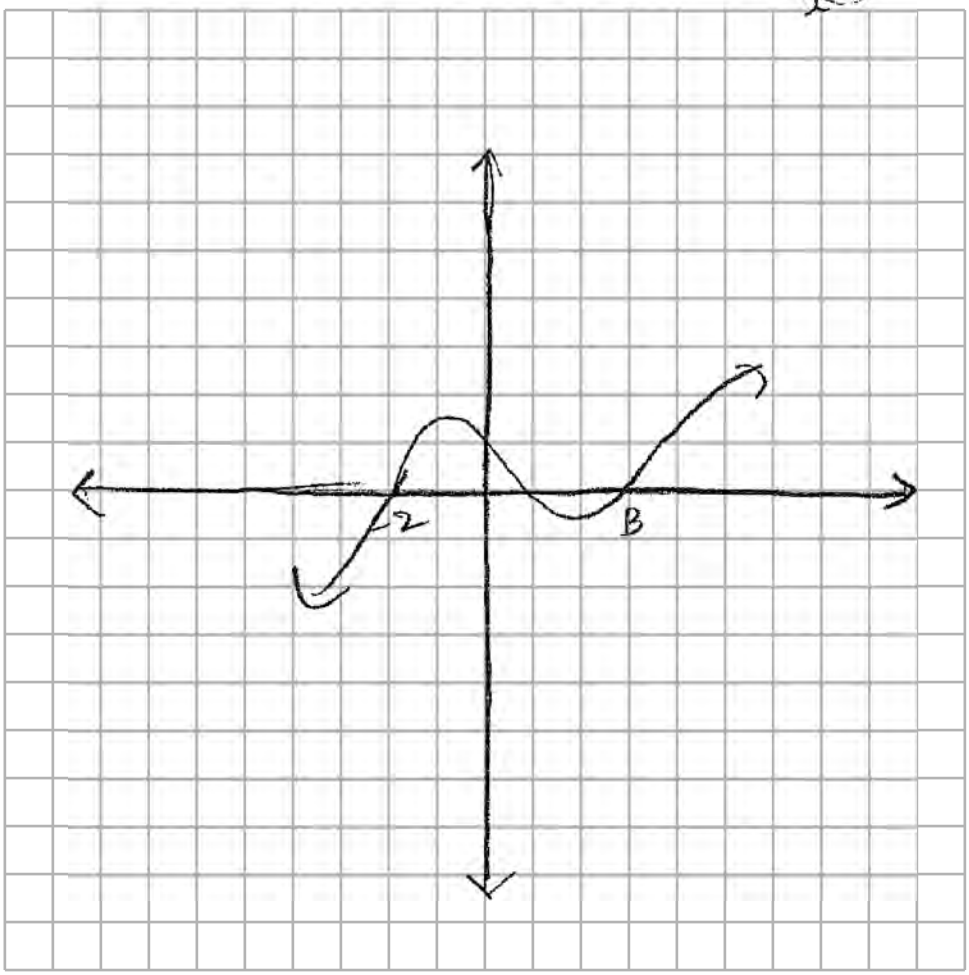
Determine if the function $M(t)$ represents growth or decay. Explain your reasoning.

$M(t) = 100e^{\frac{(\ln\frac{1}{2})t}{1590}}$ decay of .05

Score 0: The student showed no appropriate work and did not write an explanation.

Question 29

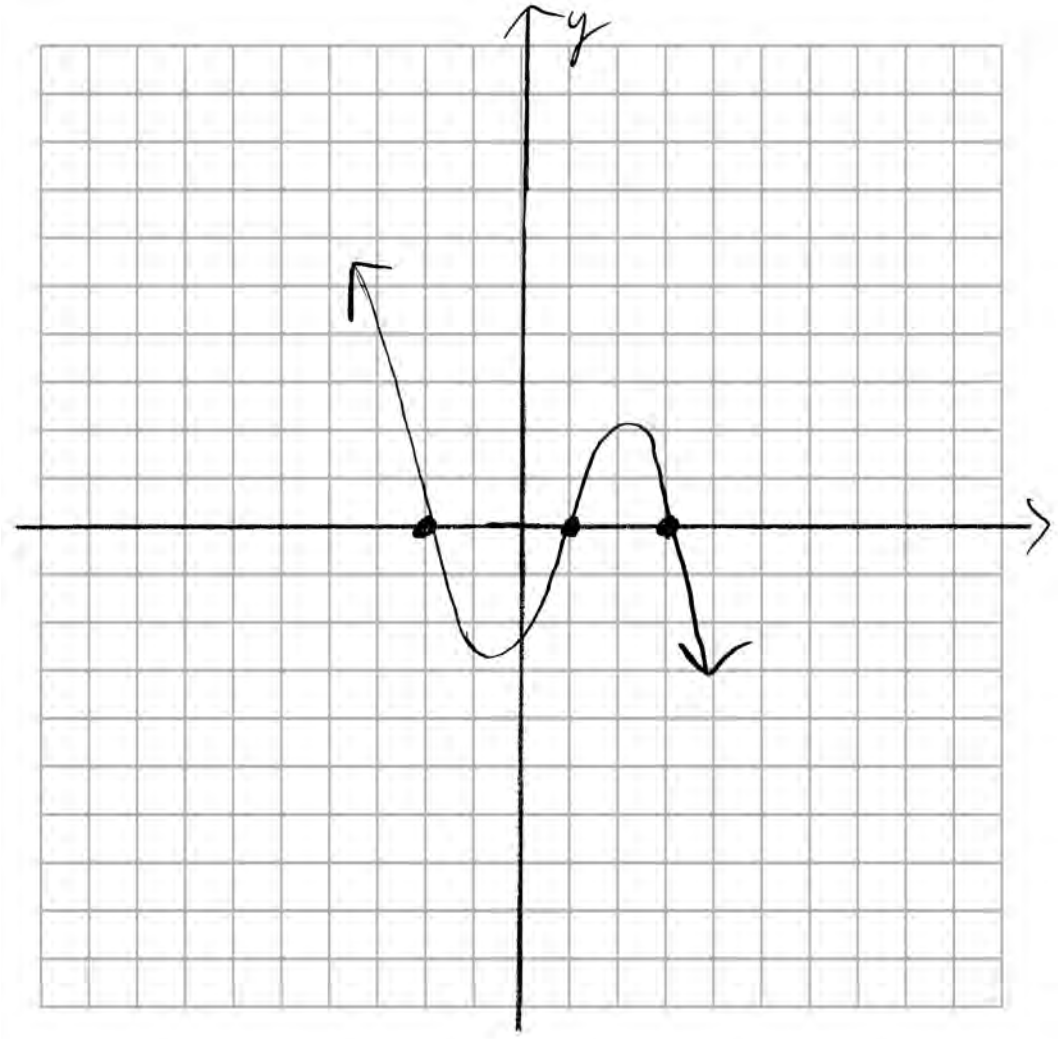
29 On the grid below, sketch a ~~cubic polynomial whose~~ zeros are 1, 3, and −2.



Score 2: The student gave a correct sketch.

Question 29

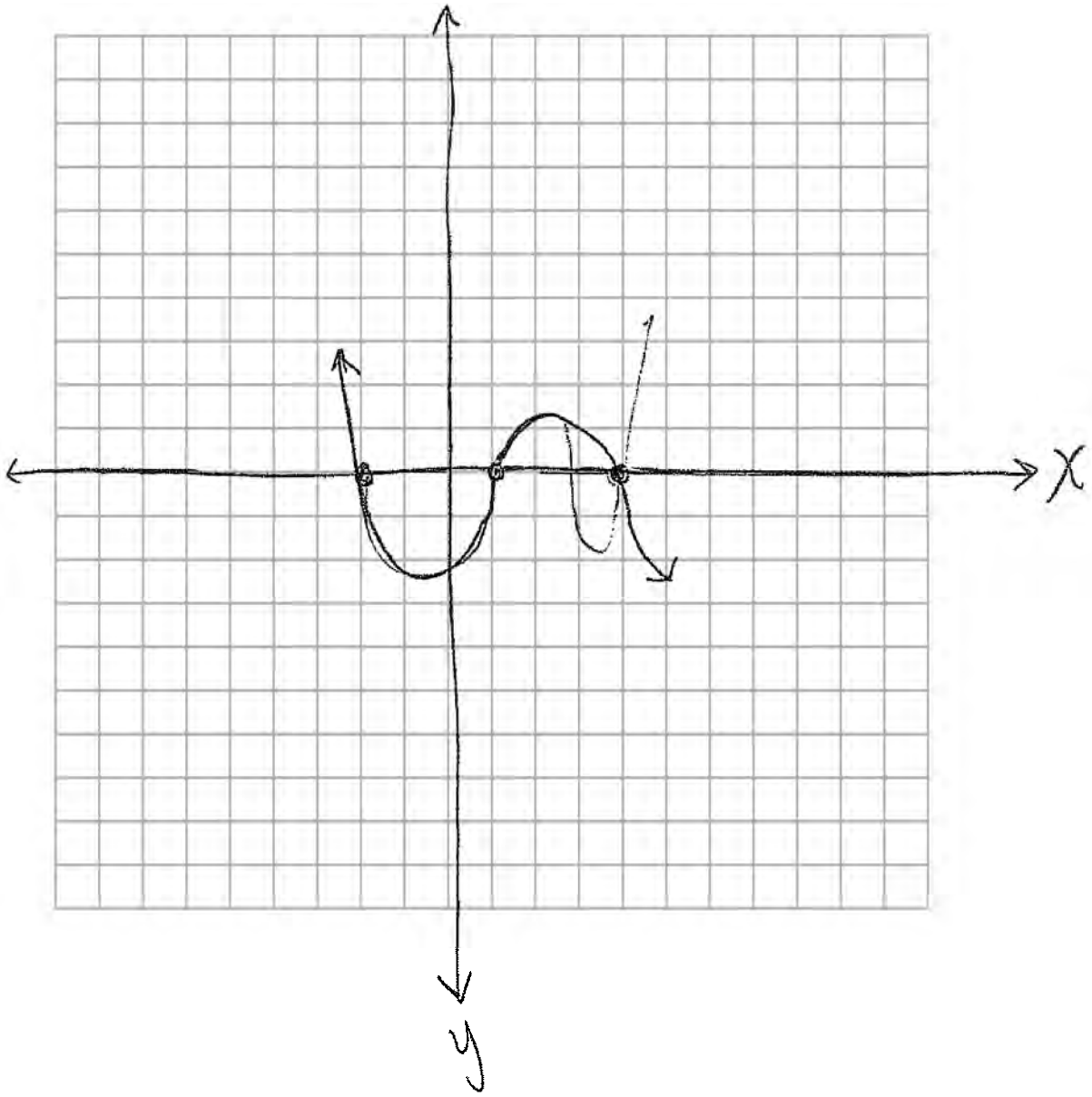
29 On the grid below, sketch a cubic polynomial whose zeros are 1, 3, and −2.



Score 2: The student gave a correct sketch.

Question 29

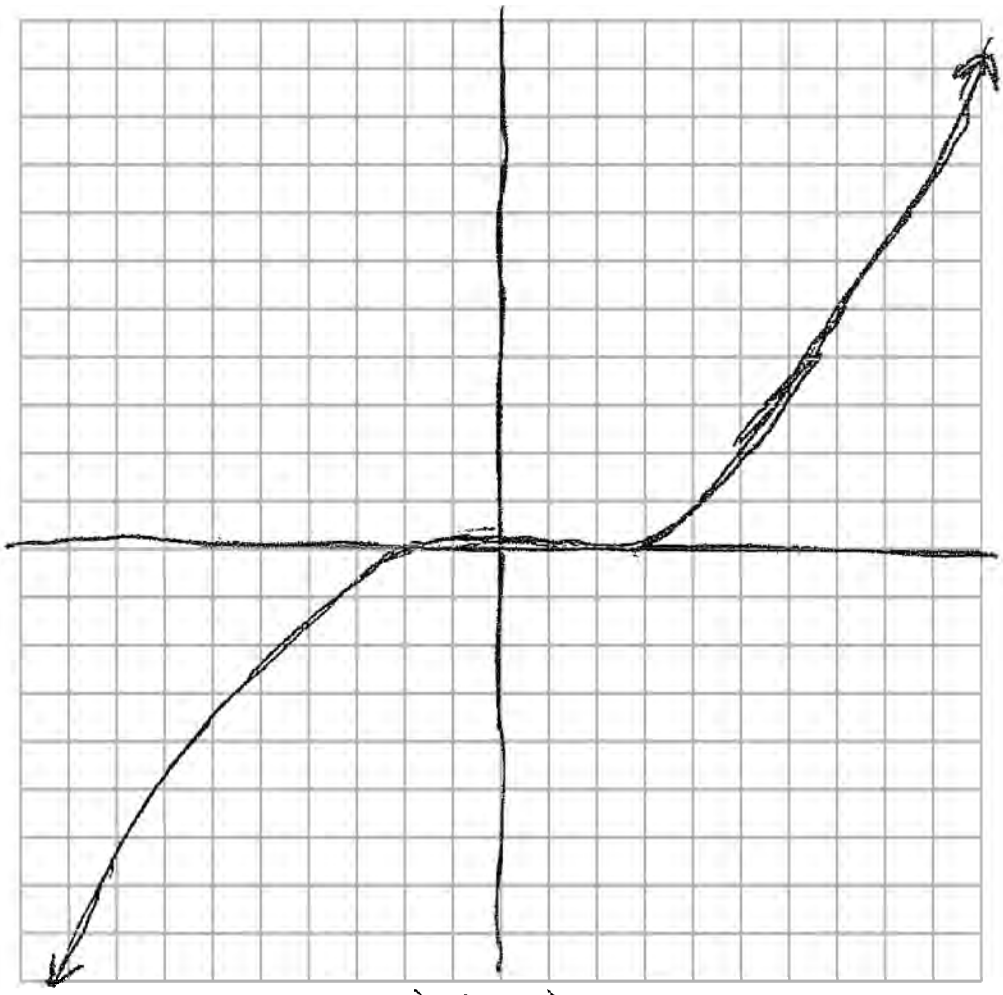
29 On the grid below, sketch a cubic polynomial whose zeros are 1, 3, and −2.



Score 1: The student made one graphing error.

Question 29

29 On the grid below, sketch a cubic polynomial whose zeros are 1, 3, and −2.



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

x^3-2x^2-5x+6

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

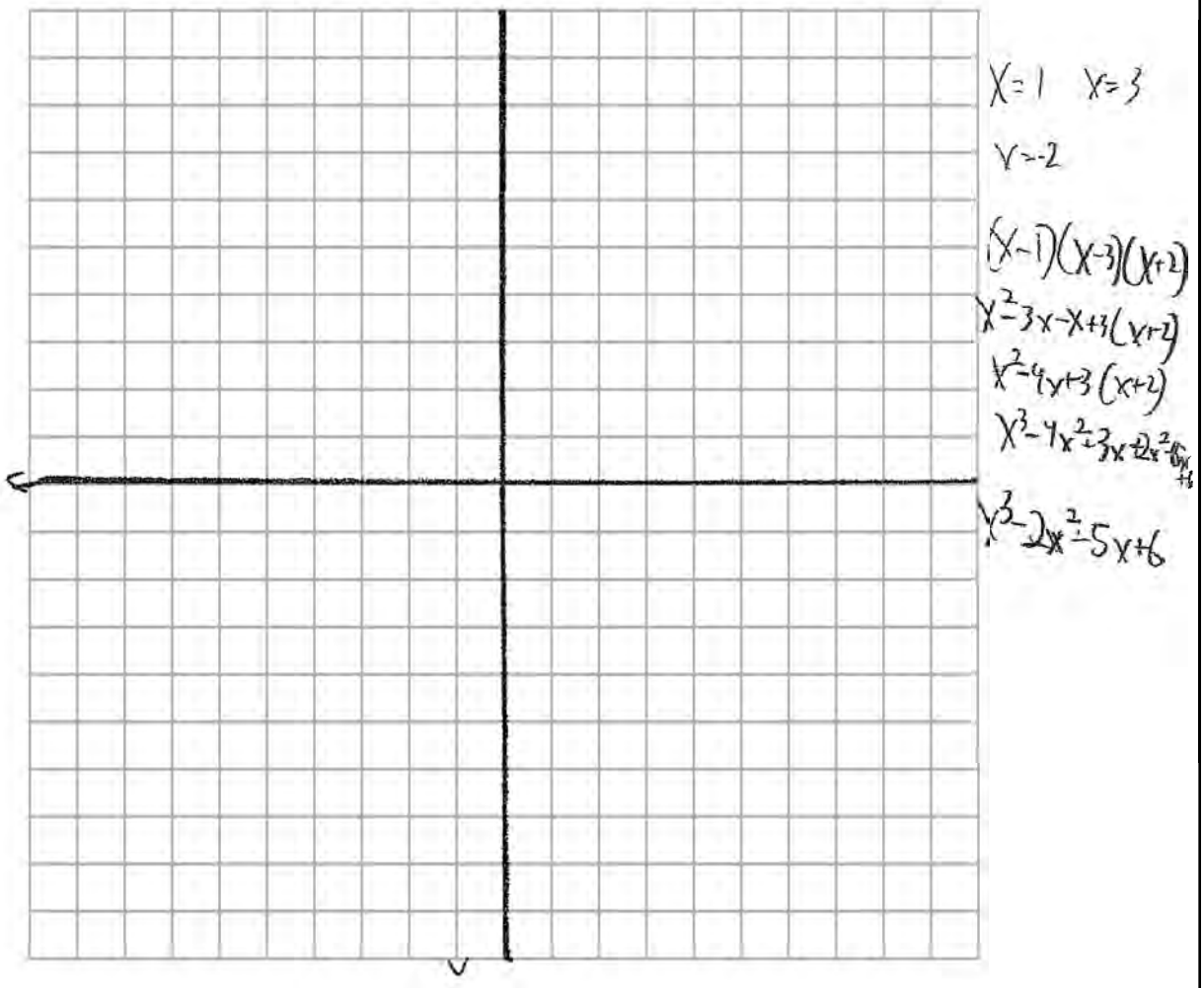
$(x^2-4x+3)(x+2)$

$x^3+2x^2-4x^2-8x+3x+6$

Score 1: The student produced an insufficient sketch.

Question 29

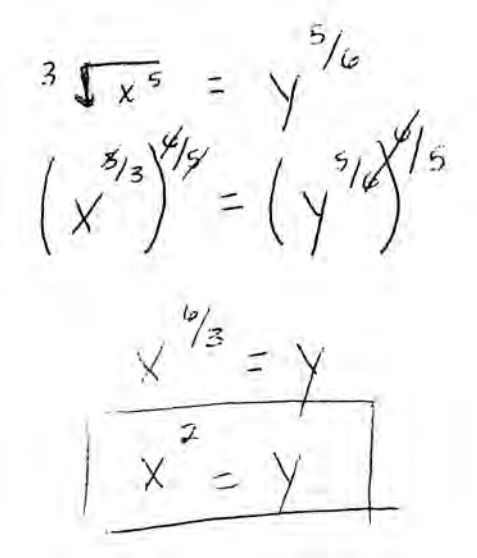
29 On the grid below, sketch a cubic polynomial whose zeros are 1, 3, and −2.



Score 0: The student did not provide a sketch.

Question 30

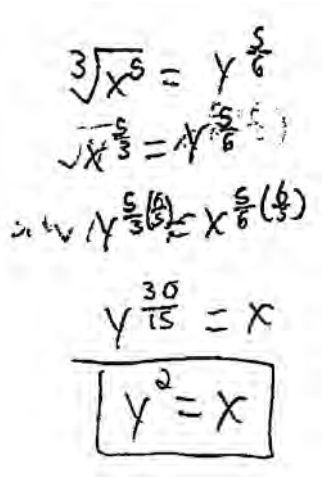
30 Given the equal terms $\sqrt[3]{x^5}$ and $y^{\frac{5}{6}}$, determine and state y, in terms of x.



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

Question 30

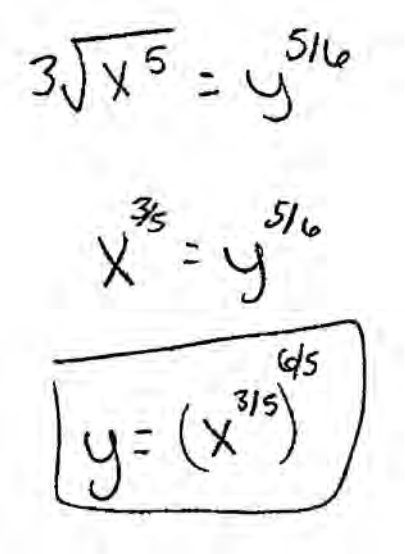
30 Given the equal terms $\sqrt[3]{x^5}$ and $y^{\frac{5}{6}}$, determine and state y, in terms of x.



Score 1: The student made a transcription error.

Question 30

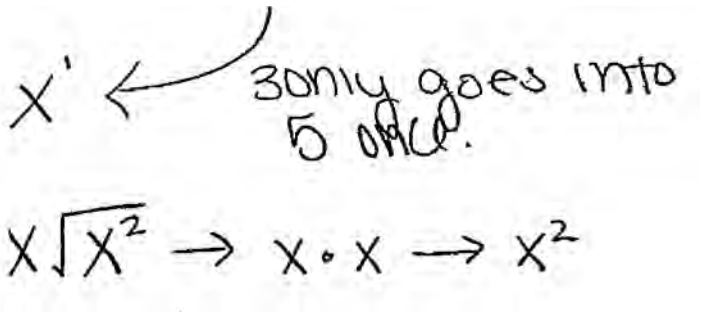
30 Given the equal terms $\sqrt[3]{x^5}$ and $y^{\frac{5}{6}}$, determine and state y, in terms of x.



Score 1: The student interchanged the root and power.

Question 30

30 Given the equal terms $\sqrt[3]{x^5}$ and $y^{\frac{5}{6}}$, determine and state y, in terms of x.



Score 0: The student used an incorrect procedure to get x^2.

Question 31

31 The results of a survey of the student body at Central High School about television viewing preferences are shown below.

	Comedy Series	Drama Series	Reality Series	Total
Males	95	65	70	230
Females	80	70	110	260
Total	175	135	180	490

Are the events "student is a male" and "student prefers reality series" independent of each other? Justify your answer.

Two events are independent if $P(R \text{ and } M) = P(R) \cdot P(M)$

$\frac{70}{490} \stackrel{?}{=} \frac{180}{490} \cdot \frac{230}{490}$

$\frac{70}{490} \stackrel{?}{=} \frac{41400}{240,100}$

$\frac{1}{7} \neq \frac{414}{2401}$

No, because

$P(R \text{ and } M) \neq P(R) \cdot P(m)$

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

Question 31

31 The results of a survey of the student body at Central High School about television viewing preferences are shown below.

	Comedy Series	Drama Series	Reality Series	Total
Males	95	65	70	230
Females	80	70	110	260
Total	175	135	180	490

Are the events "student is a male" and "student prefers reality series" independent of each other? Justify your answer.

$P(M/R) \stackrel{?}{=} P(M)$

$70/180 \neq 230/490$

$.3888... \neq .4693...$

The events are not independent because $P(m/R) \neq P(m)$

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

Question 31

31 The results of a survey of the student body at Central High School about television viewing preferences are shown below.

	Comedy Series	Drama Series	Reality Series	Total
Males	95	65	70	230
Females	80	70	110	260
Total	175	135	180	490

Are the events "student is a male" and "student prefers reality series" independent of each other? Justify your answer.

$\frac{230}{490} = .47$ $\frac{70}{230} = .30$

No because they have different probabilities.

Score 1: The student found one of the probabilities incorrectly in comparison.

Question 31

31 The results of a survey of the student body at Central High School about television viewing preferences are shown below.

	Comedy Series	Drama Series	Reality Series	Total
Males	95	65	70	230
Females	80	70	110	260
Total	175	135	180	490

Are the events "student is a male" and "student prefers reality series" independent of each other? Justify your answer.

$P(m) \cdot P(R) \stackrel{?}{=} P(m \text{ and } R)$

$\frac{230}{490} \cdot \frac{180}{490} \stackrel{?}{=} \frac{70}{490}$

$\frac{41400}{240100} \neq \frac{70}{490}$

Score 1: The student gave a correct justification, but did not state 'no'.

Question 31

31 The results of a survey of the student body at Central High School about television viewing preferences are shown below.

	Comedy Series	Drama Series	Reality Series	Total
Males	95	65	70	230
Females	80	70	110	260
Total	175	135	180	490

Are the events "student is a male" and "student prefers reality series" independent of each other? Justify your answer.

$\frac{230}{490} \approx .46$ $\frac{180}{490} = .36$

different probabilities.

Score 0: The student found one of the probabilities incorrectly in comparison and did not state "no".

Question 31

31 The results of a survey of the student body at Central High School about television viewing preferences are shown below.

	Comedy Series	Drama Series	Reality Series	Total
Males	95	65	70	230
Females	80	70	110	260
Total	175	135	180	490

Male : $\frac{230}{490}$

Male reality : $\frac{70}{230}$

Are the events "student is a male" and "student prefers reality series" independent of each other? Justify your answer.

No, because the amount of male students who prefer reality shows is dependent on the amount of total males there are.

Score 0: The student compared incorrect probabilities and gave an incorrect justification.

Question 32

32 Given $f(x) = 3x^2 + 7x - 20$ and $g(x) = x - 2$, state the quotient and remainder of $\frac{f(x)}{g(x)}$, in the form $q(x) + \frac{r(x)}{g(x)}$.

$$
\begin{array}{r|l}
x-2 & 3x^2+7x-20 \\
 & -3x^2+6x \\
\hline
 & 13x-20 \\
 & -13x+26 \\
\hline
 & 6
\end{array}
$$

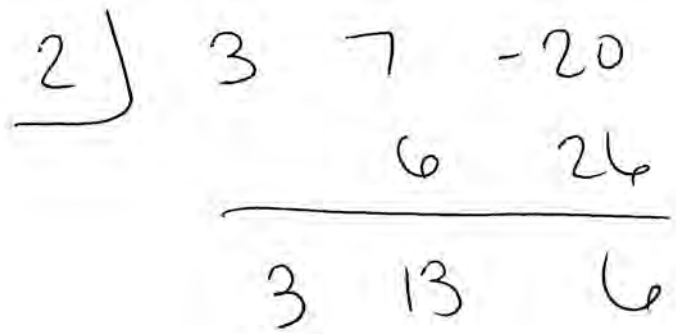
$3x+13$

$(3x+13)+\frac{6}{x-2}$

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

Question 32

32 Given $f(x) = 3x^2 + 7x - 20$ and $g(x) = x - 2$, state the quotient and remainder of $\frac{f(x)}{g(x)}$, in the form $q(x) + \frac{r(x)}{g(x)}$.

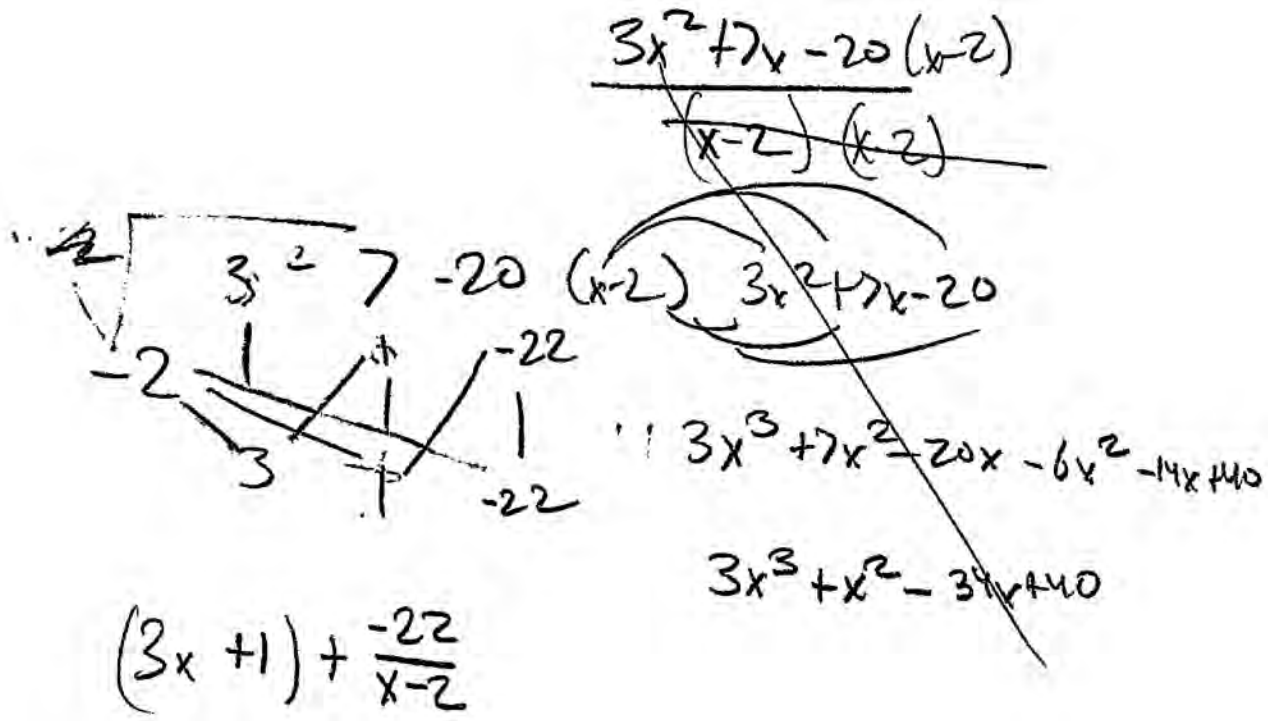


Answer: $3x + 13 + \frac{6}{x-2}$

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

Question 32

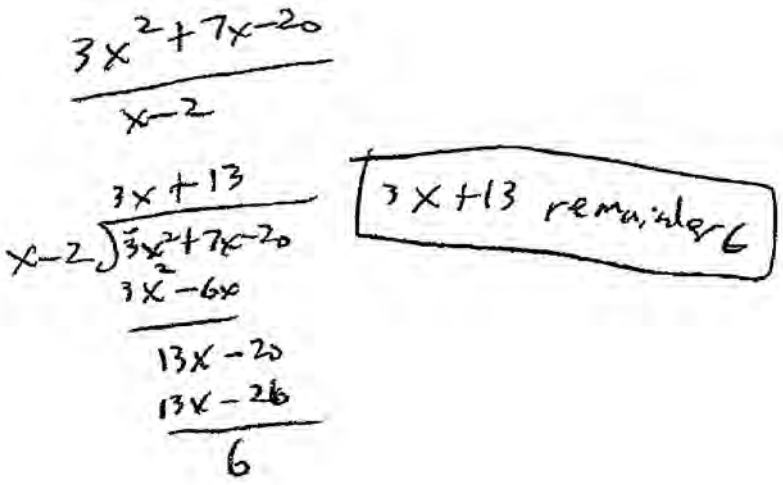
32 Given $f(x) = 3x^2 + 7x - 20$ and $g(x) = x - 2$, state the quotient and remainder of $\frac{f(x)}{g(x)}$, in the form $q(x) + \frac{r(x)}{g(x)}$.



Score 1: The student used −2 instead of 2.

Question 32

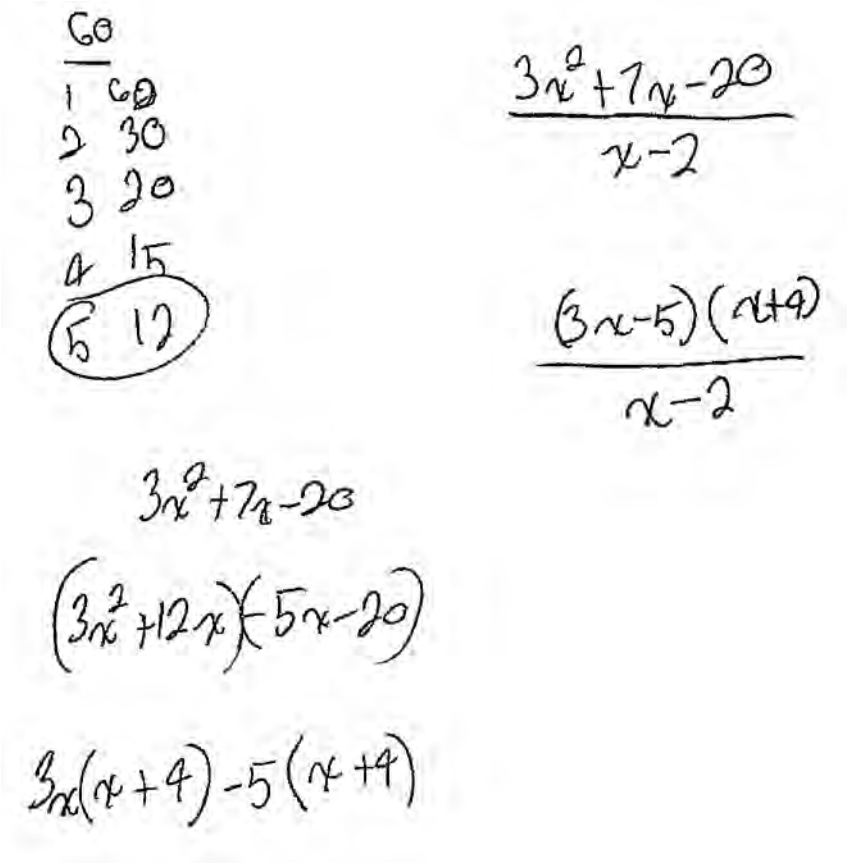
32 Given $f(x) = 3x^2 + 7x - 20$ and $g(x) = x - 2$, state the quotient and remainder of $\frac{f(x)}{g(x)}$, in the form $q(x) + \frac{r(x)}{g(x)}$.



Score 1: The student did not give the answer in the required form.

Question 32

32 Given $f(x) = 3x^2 + 7x - 20$ and $g(x) = x - 2$, state the quotient and remainder of $\frac{f(x)}{g(x)}$, in the form $q(x) + \frac{r(x)}{g(x)}$.



Score 0: The student did not use a correct procedure to find a quotient that has a remainder.

Question 33

33 Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 10x^2 + 11x - 7 = (x - 4)(2x^2 + hx + 3) + k$$

$2x^3+hx^2+3x-8x^2-4hx-12+k$

$2x^3 + hx^2 - 8x^2 + 3x - 4hx - 12 + k$

$-8x^2 + hx^2 = -10x^2$

$x^2(-8+h) = x^2(-10)$

$-8+h = -10$

$h = -2$

$3x - 4hx = 11x$

$x(3 - 4h) = x(11)$

$3 - 4h = 11$

$-4h = 8$

$h = -2$

$-12 + k = -7$

$k = 5$

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

Question 33

33 Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 10x^2 + 11x - 7 = (x - 4)(2x^2 + hx + 3) + k$$

$2x^3 - 10x^2 + 11x - 7 = 2x^2 + hx^2 - 4hx + K$

$2x^3 - 10x^2 + 11x - 7 = hx^2 - 4hx + K$

$-2x^3 + 8x^2 - 3x + 12$

$-2x^2 + 8x + 5 = hx^2 - 4hx + K$

$h = -2$

$K = 5$

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

Question 33

33 Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 10x^2 + 11x - 7 = (x - 4)(2x^2 + hx + 3) + k$$

$2x^3-10x^2+11x-7=2x^3+hx^2+3x-8x^2-4hx-12+k$

$-2x^3+8x^2-3x+12$ $-3x+12$ $-2x^3$ $+8x^2$

$-2x^2+8x+10=hx^2-4hx+k$

$-2(x^2-4x-5)=hx^2-4hx+k$

$h=-2$ $\quad k=10$

Score 3: The student made one computational error.

Question 33

33 Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 10x^2 + 11x - 7 = (x - 4)(2x^2 + hx + 3) + k$$

$2x^3 - 10x^2 + 11x - 7$

$2x(x-5)$ (illegible)

$(x-4)(2x^2+hx+3)+k$

$2x^3 + hx^2 + 3x - 8x^2 - 4hx - 12 + k$

$2x^3 + (h-8)x^2 - hx - 12 + k$

$h = 18$
$k = 5$

Score 2: The student only found the correct value for k.

Question 33

33 Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 10x^2 + 11x - 7 = (x - 4)(2x^2 + hx + 3) + k$$

$2x^3 - 10x^2 + 11x - 7 = 2x^3 + hx^2 + 3x - 8x^2 - 4hx - 12 + k$

$= 2x^3 + hx^2 - 8x^2 + 3x - 4hx - 12 + k$

Score 1: The student distributed correctly.

Question 33

33 Algebraically determine the values of h and k to correctly complete the identity stated below.

$$2x^3 - 10x^2 + 11x - 7 = (x - 4)(2x^2 + hx + 3) + k$$

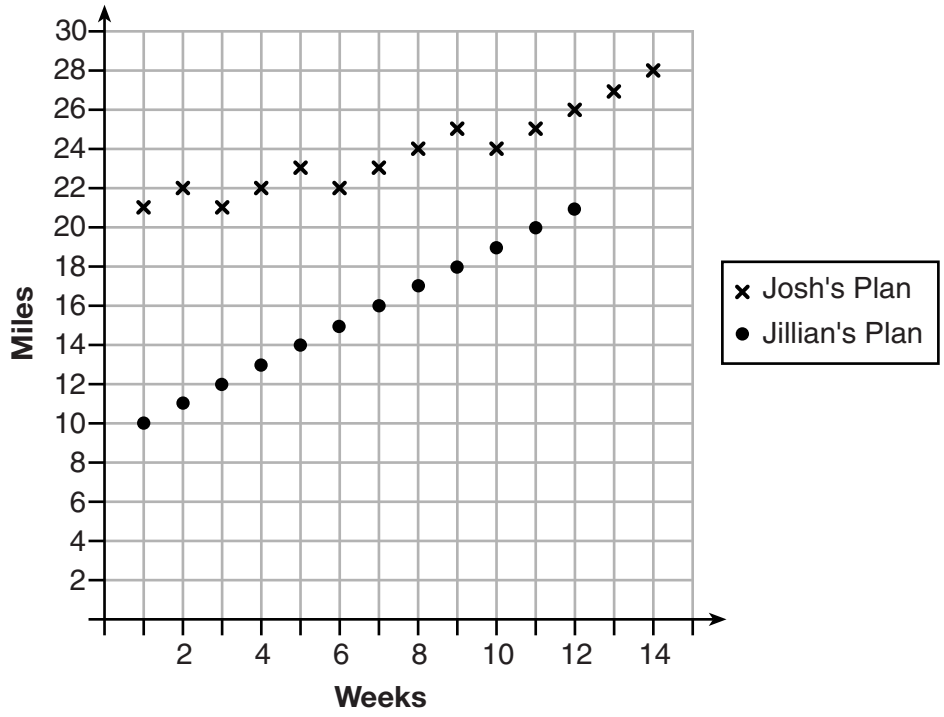
$2x^3-10x^2+11x-7=2x^3+hx^2+3x-8x^2-4hx+12+k$

$2x^3-10x^2+11x-7=2x^3-8hx^2-hx+12+k$

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

Question 34

34 Elaina has decided to run the Buffalo half-marathon in May. She researched training plans on the Internet and is looking at two possible plans: Jillian's 12-week plan and Josh's 14-week plan. The number of miles run per week for each plan is plotted below.



Which one of the plans follows an arithmetic pattern? Explain how you arrived at your answer.

Jillian's because hers increases by one each time, unlike Josh's whose does not have a value added each week.

Write a recursive definition to represent the number of miles run each week for the duration of the plan you chose.

Jillian's $a_{n+1} = a_n + d$

$a_{n+1} = a_n + 1$

$a_1 = 10$

Jillian's plan has an alternative if Elaina wanted to train instead for a full 26-mile marathon. Week one would start at 13 miles and follow the same pattern for the half-marathon, but it would continue for 14 weeks. Write an explicit formula, in *simplest form*, to represent the number of miles run each week for the full-marathon training plan.

$a_1 = 13$ $a_n = a_1 + (n-1)d$

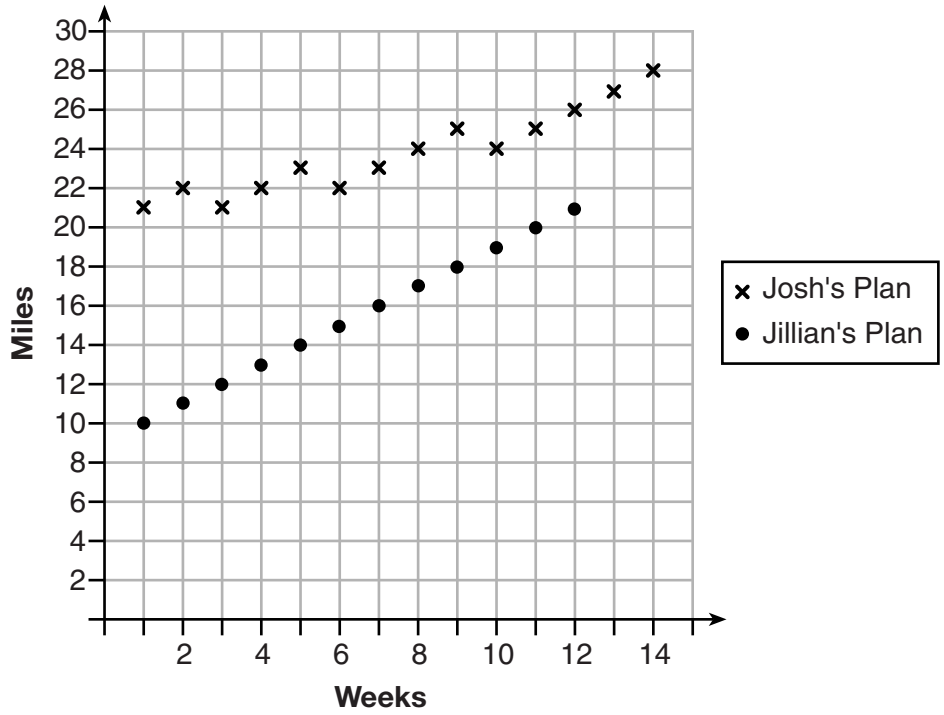
$a_n = 13 + (n-1)1$

$a_n = n + 12$

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

Question 34

34 Elaina has decided to run the Buffalo half-marathon in May. She researched training plans on the Internet and is looking at two possible plans: Jillian's 12-week plan and Josh's 14-week plan. The number of miles run per week for each plan is plotted below.



Which one of the plans follows an arithmetic pattern? Explain how you arrived at your answer.

Jillian's plan follows an arithmetic pattern because from the graph it is visible that one mile extra is added each week.

Write a recursive definition to represent the number of miles run each week for the duration of the plan you chose.

$a_1 = 10$

$a_{n-1} + 1 = a_n$

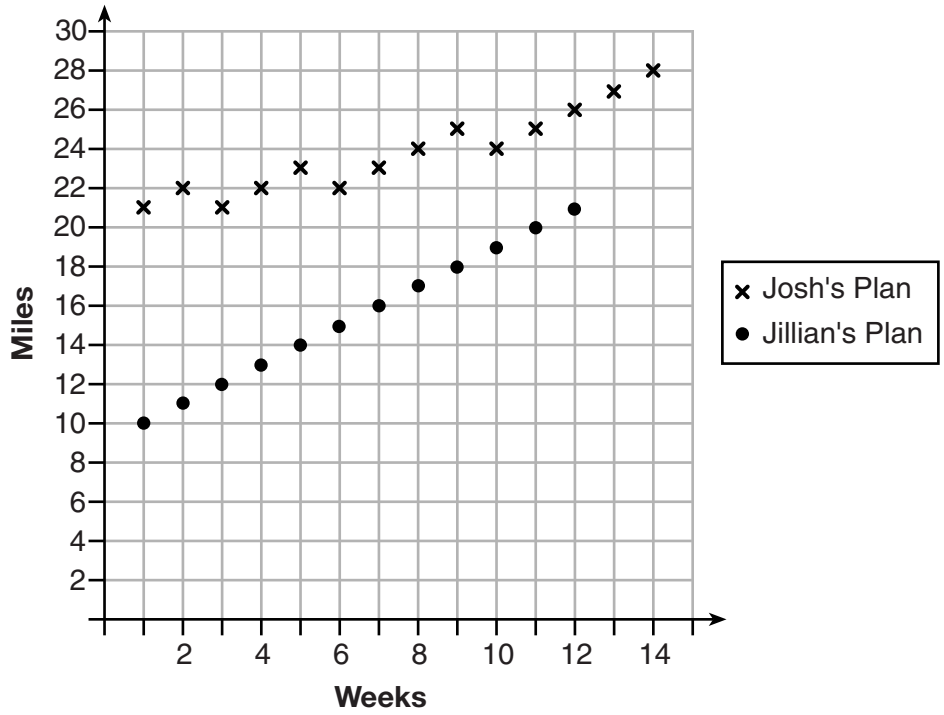
Jillian's plan has an alternative if Elaina wanted to train instead for a full 26-mile marathon. Week one would start at 13 miles and follow the same pattern for the half-marathon, but it would continue for 14 weeks. Write an explicit formula, in *simplest form*, to represent the number of miles run each week for the full-marathon training plan.

$a_n = 13 + (n-1)1$

Score 3: The student did not express the explicit formula in simplest form.

Question 34

34 Elaina has decided to run the Buffalo half-marathon in May. She researched training plans on the Internet and is looking at two possible plans: Jillian's 12-week plan and Josh's 14-week plan. The number of miles run per week for each plan is plotted below.



Which one of the plans follows an arithmetic pattern? Explain how you arrived at your answer.

Jillian's, because one mile is added each week

Write a recursive definition to represent the number of miles run each week for the duration of the plan you chose.

$t_1 = 10$

$t_n = 1 + t_{n-1}$

Jillian's plan has an alternative if Elaina wanted to train instead for a full 26-mile marathon. Week one would start at 13 miles and follow the same pattern for the half-marathon, but it would continue for 14 weeks. Write an explicit formula, in *simplest form*, to represent the number of miles run each week for the full-marathon training plan.

$t_n = t_1 + d(n-1)$

$t_n = 13 + 1(n-1)$

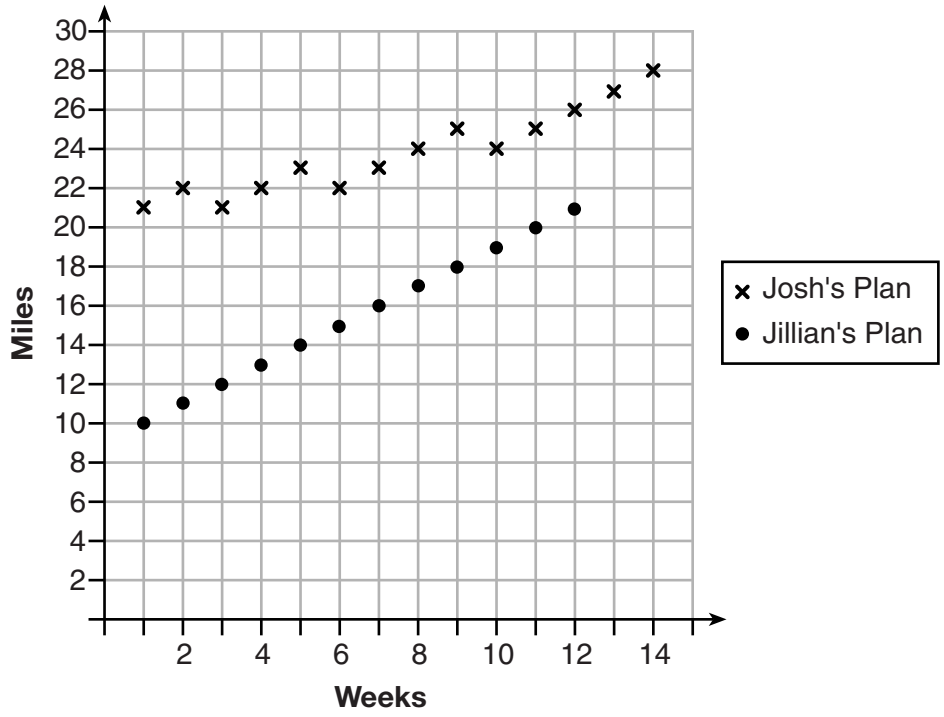
$t_n = 13 + n - 1$

$t_n = 12 + n$

Score 3: The student gave an incorrect recursive definition.

Question 34

34 Elaina has decided to run the Buffalo half-marathon in May. She researched training plans on the Internet and is looking at two possible plans: Jillian's 12-week plan and Josh's 14-week plan. The number of miles run per week for each plan is plotted below.



Which one of the plans follows an arithmetic pattern? Explain how you arrived at your answer.

Jillian because she increased the distance run by 1 mile each week.

Write a recursive definition to represent the number of miles run each week for the duration of the plan you chose.

$a_1 = 10$

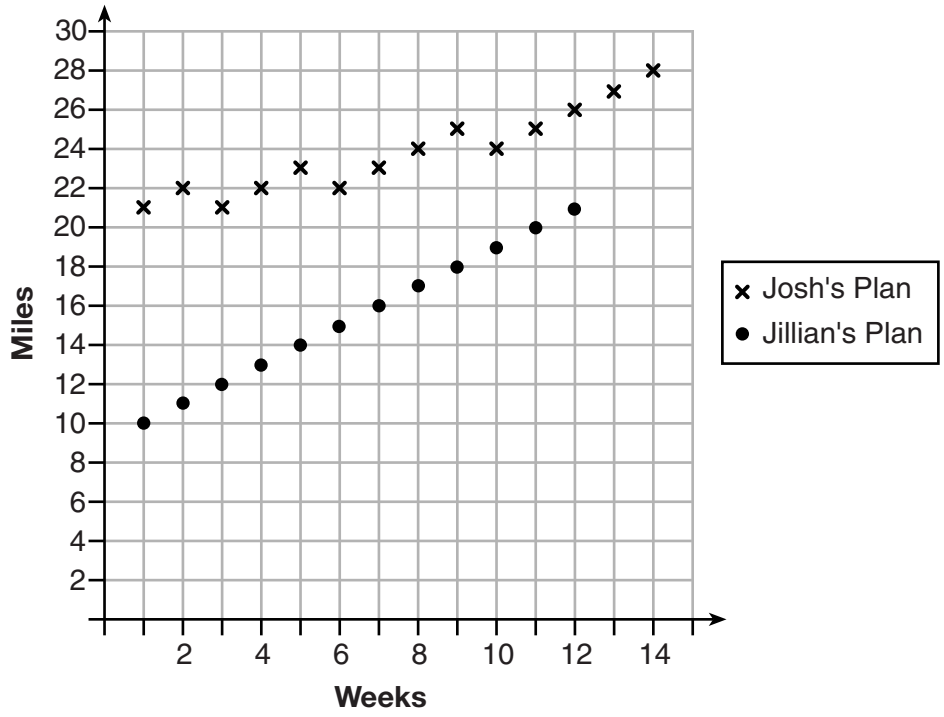
$a_n = a_{n-1} + 1$

Jillian's plan has an alternative if Elaina wanted to train instead for a full 26-mile marathon. Week one would start at 13 miles and follow the same pattern for the half-marathon, but it would continue for 14 weeks. Write an explicit formula, in *simplest form*, to represent the number of miles run each week for the full-marathon training plan.

Score 2: The student did not complete the third part.

Question 34

34 Elaina has decided to run the Buffalo half-marathon in May. She researched training plans on the Internet and is looking at two possible plans: Jillian's 12-week plan and Josh's 14-week plan. The number of miles run per week for each plan is plotted below.



Which one of the plans follows an arithmetic pattern? Explain how you arrived at your answer.

Jillian because she steadily increases her plan.

Write a recursive definition to represent the number of miles run each week for the duration of the plan you chose.

$A_n = A_1 + (n-1)$ $\quad A_1 = 10$

(A_n: week number; A_1: original value)

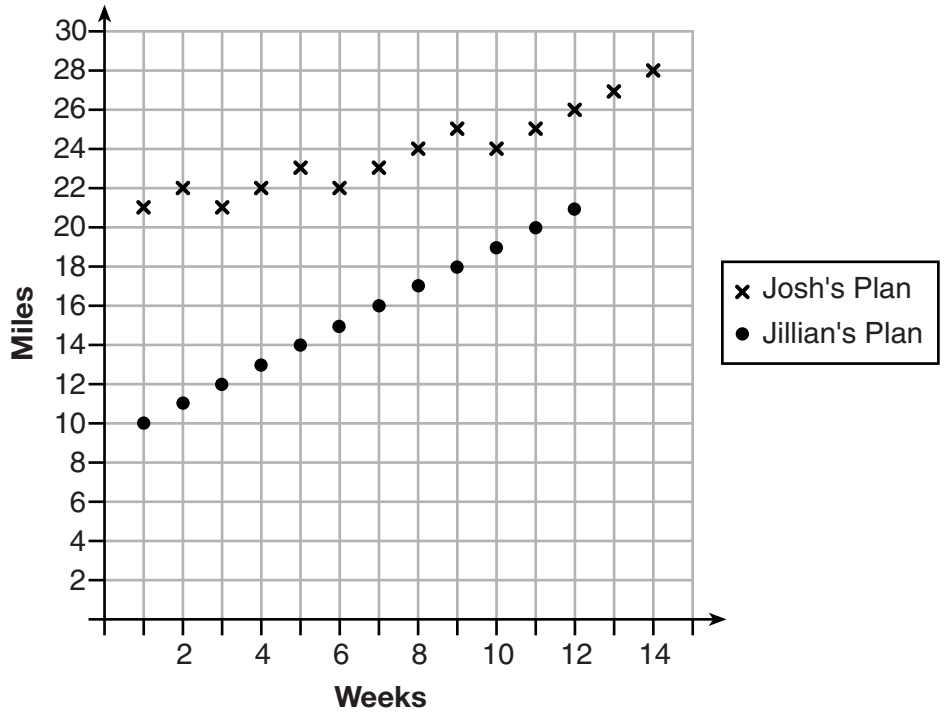
Jillian's plan has an alternative if Elaina wanted to train instead for a full 26-mile marathon. Week one would start at 13 miles and follow the same pattern for the half-marathon, but it would continue for 14 weeks. Write an explicit formula, in *simplest form*, to represent the number of miles run each week for the full-marathon training plan.

$A_n = 13 + (n-1)$

Score 1: The student gave an incorrect explanation and recursive definition, and did not simplify the explicit definition.

Question 34

34 Elaina has decided to run the Buffalo half-marathon in May. She researched training plans on the Internet and is looking at two possible plans: Jillian's 12-week plan and Josh's 14-week plan. The number of miles run per week for each plan is plotted below.



Which one of the plans follows an arithmetic pattern? Explain how you arrived at your answer.

Jillian's plan follows an arithmetic pattern because the common difference is 1.

Write a recursive definition to represent the number of miles run each week for the duration of the plan you chose.

$a_n = a_{n-1} + 1$

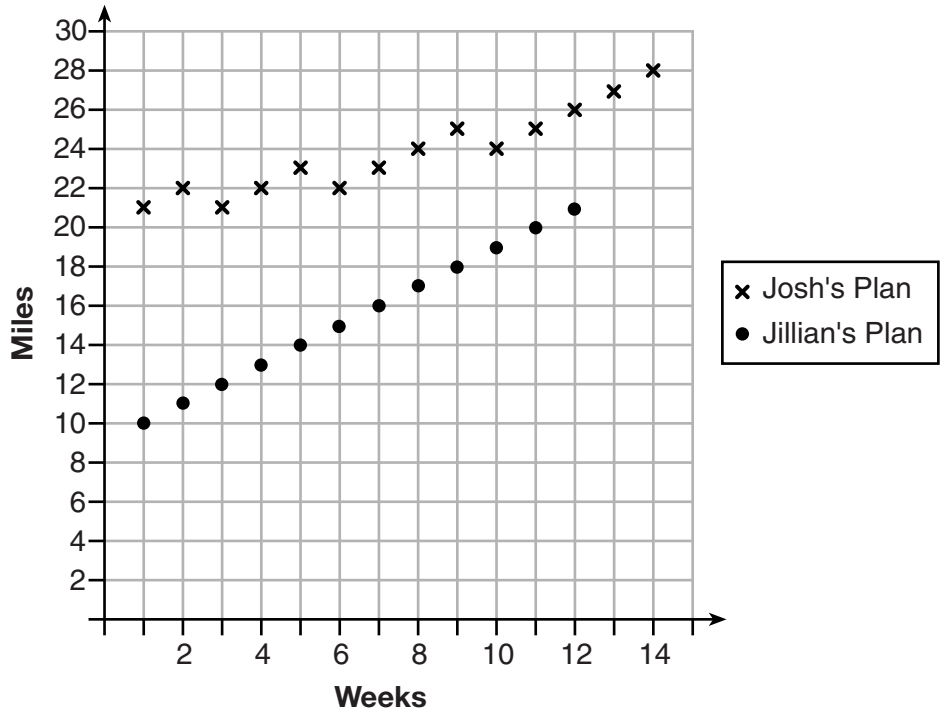
Jillian's plan has an alternative if Elaina wanted to train instead for a full 26-mile marathon. Week one would start at 13 miles and follow the same pattern for the half-marathon, but it would continue for 14 weeks. Write an explicit formula, in *simplest form*, to represent the number of miles run each week for the full-marathon training plan.

$a_n =$

Score 1: The student did not state a recursive or explicit definition correctly.

Question 34

34 Elaina has decided to run the Buffalo half-marathon in May. She researched training plans on the Internet and is looking at two possible plans: Jillian's 12-week plan and Josh's 14-week plan. The number of miles run per week for each plan is plotted below.



Which one of the plans follows an arithmetic pattern? Explain how you arrived at your answer.

Josh's, it has a pattern of dropping one after going up n+1 each time

Write a recursive definition to represent the number of miles run each week for the duration of the plan you chose.

Jillian's plan: $y = x + 9$

Jillian's plan has an alternative if Elaina wanted to train instead for a full 26-mile marathon. Week one would start at 13 miles and follow the same pattern for the half-marathon, but it would continue for 14 weeks. Write an explicit formula, in *simplest form*, to represent the number of miles run each week for the full-marathon training plan.

$y = x + 12$

Score 0: The student made multiple errors.

Question 35

35 The guidance department has reported that of the senior class, 2.3% are members of key club, *K*, 8.6% are enrolled in AP Physics, *P*, and 1.9% are in both.

Determine the probability of *P* given *K*, to the *nearest tenth of a percent*.

$$P(P/K) = \frac{P(P \cap K)}{P(K)} = \frac{1.9}{2.3} \approx 82.6\ \%$$

The principal would like a basic interpretation of these results. Write a statement relating your calculated probabilities to student enrollment in the given situation.

If we choose a student who is a member of key club, they have an 82.6% probability of being in AP Physics

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

Question 35

35 The guidance department has reported that of the senior class, 2.3% are members of key club, *K*, 8.6% are enrolled in AP Physics, *P*, and 1.9% are in both.

Determine the probability of *P* given *K*, to the *nearest tenth of a percent*.

1.9/2.3 ×100 ≈ 82.6%

The principal would like a basic interpretation of these results. Write a statement relating your calculated probabilities to student enrollment in the given situation.

Score 3: The student did not provide a statement.

Question 35

35 The guidance department has reported that of the senior class, 2.3% are members of key club, *K*, 8.6% are enrolled in AP Physics, *P*, and 1.9% are in both.

Determine the probability of *P* given *K*, to the *nearest tenth of a percent*.

$$P(K|P) = \frac{P(K \cap P))}{P(P)} = \frac{.019}{.086} = .2209$$

22.1%

The principal would like a basic interpretation of these results. Write a statement relating your calculated probabilities to student enrollment in the given situation.

The probability that a student is a member of the key club is 22.1% given that the student is enrolled in AP Physics.

Score 2: The student found 22.1% and wrote an appropriate statement.

Question 35

35 The guidance department has reported that of the senior class, 2.3% are members of key club, *K*, 8.6% are enrolled in AP Physics, *P*, and 1.9% are in both.

Determine the probability of *P* given *K*, to the *nearest tenth of a percent*.

$\frac{.086X}{.086} = \frac{.019}{.086}$

$X = 22.1\%$

The principal would like a basic interpretation of these results. Write a statement relating your calculated probabilities to student enrollment in the given situation.

If a student is enrolled in key club, then there is a 1.9% that he will also be enrolled in AP Physics.

Score 1: The student made a conceptual error and did not base the statement on the calculation.

Question 35

35 The guidance department has reported that of the senior class, 2.3% are members of key club, K, 8.6% are enrolled in AP Physics, P, and 1.9% are in both.

Determine the probability of P given K, to the *nearest tenth of a percent*.

$(P)(K) =$

$(2.3)(8.6) = 19.78$

The principal would like a basic interpretation of these results. Write a statement relating your calculated probabilities to student enrollment in the given situation.

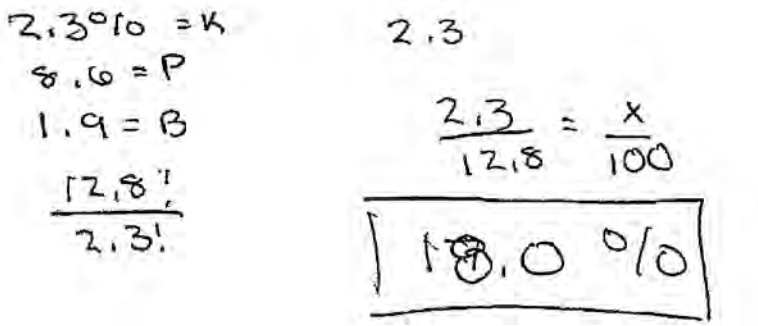
Of the students who are taking AP physics and are members of the key club, 19.78% of them will be enrolled in both.

Score 0: The student made multiple conceptual errors.

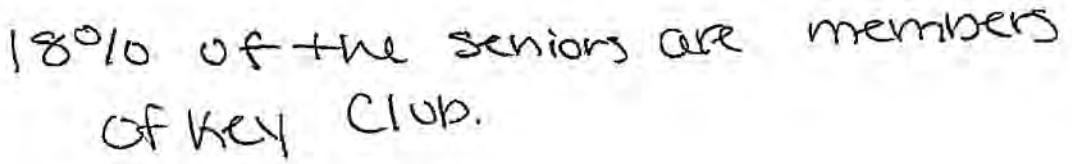
Question 35

35 The guidance department has reported that of the senior class, 2.3% are members of key club, *K*, 8.6% are enrolled in AP Physics, *P*, and 1.9% are in both.

Determine the probability of *P* given *K*, to the *nearest tenth of a percent*.



The principal would like a basic interpretation of these results. Write a statement relating your calculated probabilities to student enrollment in the given situation.



Score 0: The student made multiple errors.

Question 36

36 Using the formula below, determine the monthly payment on a 5-year car loan with a monthly percentage rate of 0.625% for a car with an original cost of $21,000 and a $1000 down payment, to the *nearest cent*.

$$P_n = PMT\left(\frac{1-(1+i)^{-n}}{i}\right)$$

P_n = present amount borrowed

n = number of monthly pay periods

PMT = monthly payment

i = interest rate per month

$20000 = PMT\left[\frac{1-(1+.00625)^{-60}}{.00625}\right]$

$PMT = 400.7589719$

$PMT = 400.76$

The affordable monthly payment is $300 for the same time period. Determine an appropriate down payment, to the *nearest dollar*.

$21{,}000 - x = 300\left[\frac{1-(1+.00625)^{-60}}{.00625}\right]$

$-x = -6028.407545$

$x = 6028$

$6028

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

Question 36

36 Using the formula below, determine the monthly payment on a 5-year car loan with a monthly percentage rate of 0.625% for a car with an original cost of $21,000 and a $1000 down payment, to the *nearest cent*.

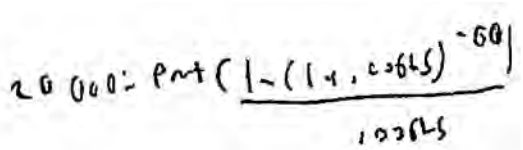
$$P_n = PMT\left(\frac{1-(1+i)^{-n}}{i}\right)$$

P_n = present amount borrowed

n = number of monthly pay periods

PMT = monthly payment

i = interest rate per month



$400.78

The affordable monthly payment is $300 for the same time period. Determine an appropriate down payment, to the *nearest dollar*.

$6028

Score 3: The student did not show work to find $6028.

Question 36

36 Using the formula below, determine the monthly payment on a 5-year car loan with a monthly percentage rate of 0.625% for a car with an original cost of $21,000 and a $1000 down payment, to the *nearest cent*.

$$P_n = PMT\left(\frac{1-(1+i)^{-n}}{i}\right)$$

P_n = present amount borrowed

n = number of monthly pay periods

PMT = monthly payment

i = interest rate per month

$20000 = PMT\left(\frac{1-(1+0.00625)^{-60}}{0.00625}\right)$

$20000 = PMT(49.90530818)$

$PMT = 400.76$

The affordable monthly payment is $300 for the same time period. Determine an appropriate down payment, to the *nearest dollar*.

Score 2: The student found $400.76 correctly.

Question 36

36 Using the formula below, determine the monthly payment on a 5-year car loan with a monthly percentage rate of 0.625% for a car with an original cost of $21,000 and a $1000 down payment, to the *nearest cent*.

$$P_n = PMT\left(\frac{1-(1+i)^{-n}}{i}\right)$$

P_n = present amount borrowed

n = number of monthly pay periods

PMT = monthly payment

i = interest rate per month

$P_n = PMT\left(\frac{1-(1+i)^{-n}}{i}\right)$

$20000 = x\left(\frac{1-(1+.00625)^{-60}}{.00625}\right)$

$20000 = 49.9053x$

$x = \$400.8$

$i = .00625$

$PMT = x$

$n = 60$ months

$P_n = 20000$

The affordable monthly payment is $300 for the same time period. Determine an appropriate down payment, to the *nearest dollar*.

$n = 60$

$PMT = 300$

$i = .00625$

$P_n = PMT\left(\frac{1-(1+i)^{-n}}{i}\right)$

$P_n = 300\left(\frac{1-(1+.00625)^{-60}}{.00625}\right)$

$P_n \approx \$14972$

Score 2: The student made a rounding error and did not subtract from $21,000.

Question 36

36 Using the formula below, determine the monthly payment on a 5-year car loan with a monthly percentage rate of 0.625% for a car with an original cost of $21,000 and a $1000 down payment, to the *nearest cent*.

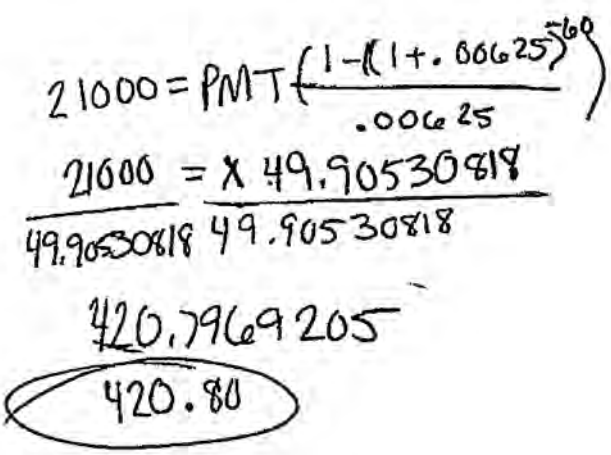
$$P_n = PMT\left(\frac{1-(1+i)^{-n}}{i}\right)$$

P_n = present amount borrowed

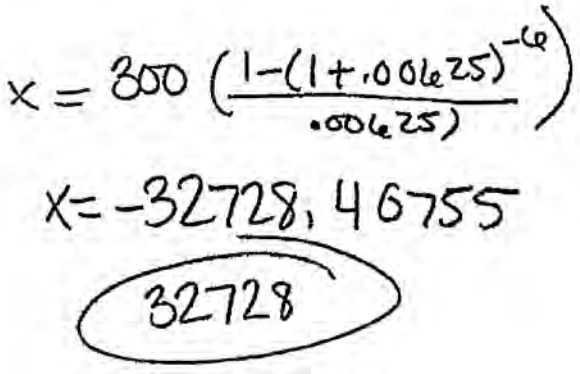
n = number of monthly pay periods

PMT = monthly payment

i = interest rate per month



The affordable monthly payment is $300 for the same time period. Determine an appropriate down payment, to the *nearest dollar*.



Score 1: The student did not take off the original down payment and showed no further correct work.

Question 36

36 Using the formula below, determine the monthly payment on a 5-year car loan with a monthly percentage rate of 0.625% for a car with an original cost of $21,000 and a $1000 down payment, to the *nearest cent*.

$$P_n = PMT\left(\frac{1-(1+i)^{-n}}{i}\right)$$

P_n = present amount borrowed

n = number of monthly pay periods

PMT = monthly payment

i = interest rate per month

$21{,}000 = PMT\left(\frac{1-(1+.625\%)^{-60}}{6.25\%}\right)$

$\frac{21000}{.016} = \frac{PMT(.016)}{.016}$

$PMT = \$1,312.5$

The affordable monthly payment is $300 for the same time period. Determine an appropriate down payment, to the *nearest dollar*.

$21000 = 300\left(\frac{1-(1+62.5\%)^{-60}}{62.5}\right)$

$21000 = 300 \times .016$

$21000 = 4.8$

$-4.8 \quad -4.8$

$\$ 1,995.2$

Score 0: The student made multiple errors.

Question 37

37 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.

$0 = \sqrt{t} - 2t + 6$

$(2t-6)^2 = (\sqrt{t})^2$

$4t^2 - 24t + 36 = t$

$4t^2 - 25t + 36 = 0$

$(4t-9)(t-4) = 0$

$t = \frac{9}{4}$ $t = 4$

reject

orignal time is 4hrs

How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.

$S = \sqrt{1} - 2(1) + 6 = 5$

$S = \sqrt{3} - 2(3) + 6 = 1.732050809$

500.

$-\ 173.732050809$

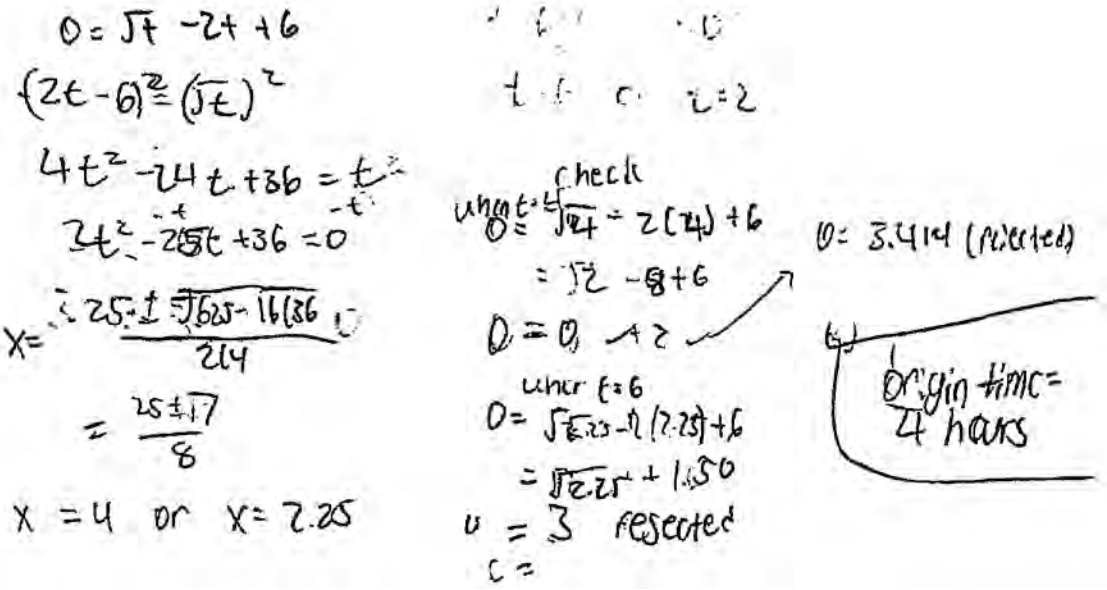
326.7949192

327

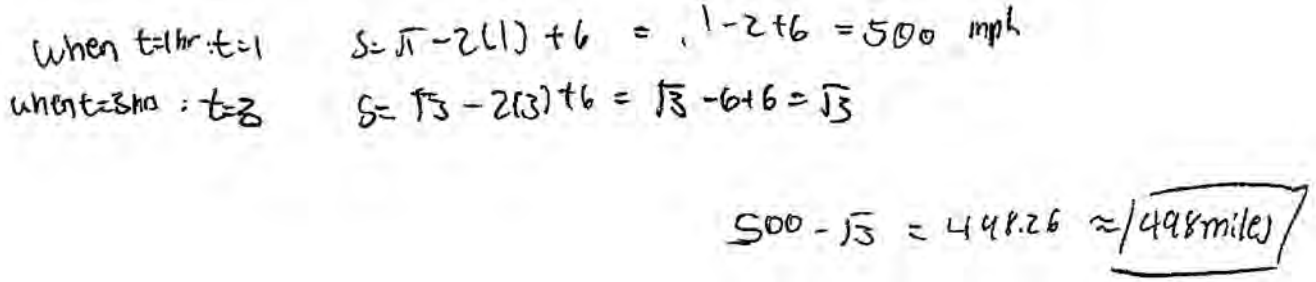
Score 6: The student gave a comple and correct response.

Question 37

37 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.



How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.



Score 5: The student did not convert $\sqrt{3}$ to miles.

Question 37

37 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.

$\sqrt{t} - 2t + 6 = 0$

$-6 \quad -6$

$\sqrt{t} - 2t = -6$

$+2t \quad +2t$

$(\sqrt{t})^2 = (2t - 6)^2$

$t = (2t - 6)(2t - 6)$

$4t^2 - 12t - 12t + 36$

$4t^2 - 24t + 36$

$t = 4t^2 - 24t + 36$

$-t \quad -t$

$0 = 4t^2 - 25t + 36$

$t = 4, 2.25$

How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.

$s = \sqrt{1} - 2(1) + 6$

$s = 5$

500 mph

$s = \sqrt{3} - 2(3) + 6$

$s = \sqrt{3}$

$\sqrt{3} \approx 1.73$

173 mph

$500 - 173 =$ 327 mph

Score 4: The student found a correct quadratic equation in standard form and 327.

Question 37

37 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.

$\sqrt{t} - 2t + 6 = 0$

$(\sqrt{t})^2 = (2t + 6)^2$

$t = 4t^2 - 24t + 36$

$4t^2 - 25t + 36 = 0$

4

$4t^2 - 24t + 36$

$x = \frac{25 \pm \sqrt{49}}{8}$

$x = \frac{25 \pm 7}{8}$

$x = 4 \quad x = 2.25$

How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.

2x faster b/c of the coefficient 2 being used.

Score 4: The student found 4 correctly.

Question 37

37 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.

$0 = \sqrt{t} - 2t + 6$

$(-\sqrt{t})^2 = (-2t + 6)^2$

$t = 4t^2 - 24t + 36$

$0 = 4t^2 - 25t + 36$

$t = 4$

How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.

$\sqrt{1} - 2(1) + 6$

$1 - 2 + 6$

5

$\sqrt{3} - 2(3) + 6$

$\sqrt{3}$

$5 - \sqrt{3}$

3 miles / hour

Score 3: The student found a correct quadratic equation, but did not convert to miles.

Question 37

37 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.

$0 - \sqrt{t} - 2t + 6$

$(2t-6)(2t-6)$ $(2t-6)^2 = (\sqrt{t})^2$

$4t^2 - 12t - 12t + 36$

$4t^2 - 24t + 36 = t$

$4t^2 - 25t + 36 = 0$

$\frac{25 \pm \sqrt{-25^2 - 4(4)(36)}}{2(4)}$

$\frac{25 \pm \sqrt{49}}{8}$ $\frac{25 \pm 7}{8}$

How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.

$s = \sqrt{1} - 2(1) + 6$ $s = \sqrt{3} - 2(3) + 6$

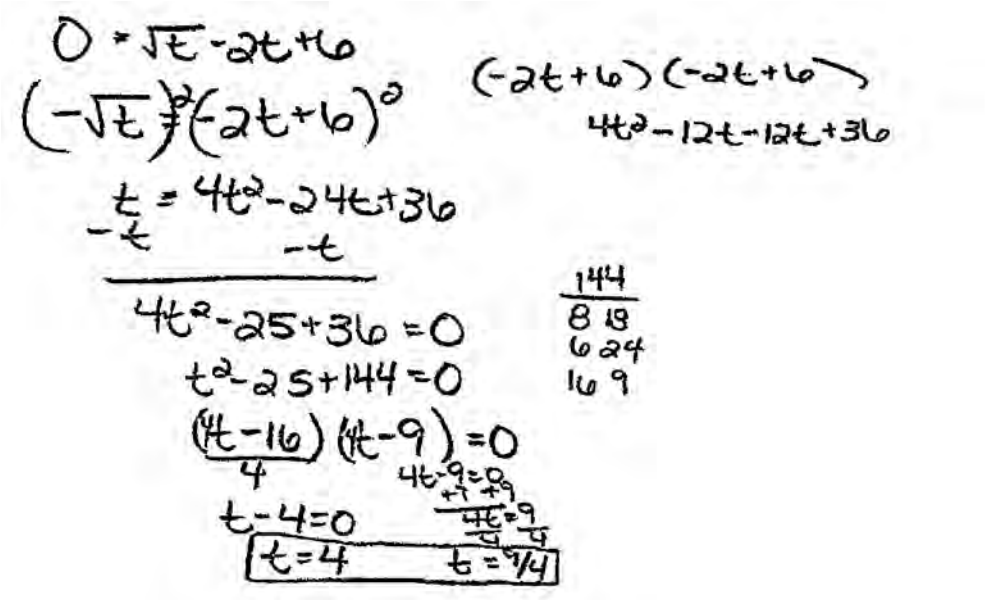
$s = 5$ $s = 1.7$

3.3 hundreds of miles per hour

Score 3: The student made more than two mechanical errors.

Question 37

37 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.



How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.

several miles

Score 3: The student didn't reject $\frac{9}{4}$.

Question 37

37 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.

$0 = \sqrt{t} - 2t + 6$
$-6 \quad\quad -6$
$-6^2 = \sqrt{t}^2 - 2t$
$36 = 2t - t$
$36 = t$

How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.

$s = \sqrt{1} - 2(1) + 6$
$s = 1 - 2 + 6$
$s = 500$ mph

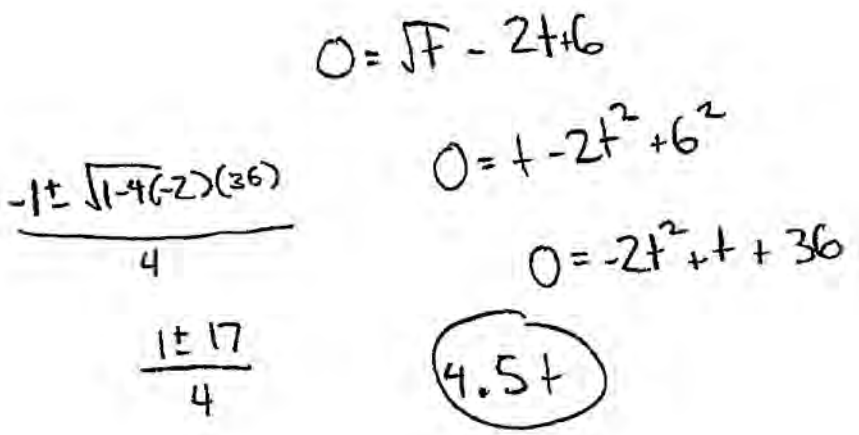
$s = \sqrt{3} - 2(3) + 6$
$s = \sqrt{3} - 6 + 6$
$s = 173$ mph

$500 - 173 = 327$
327 mph

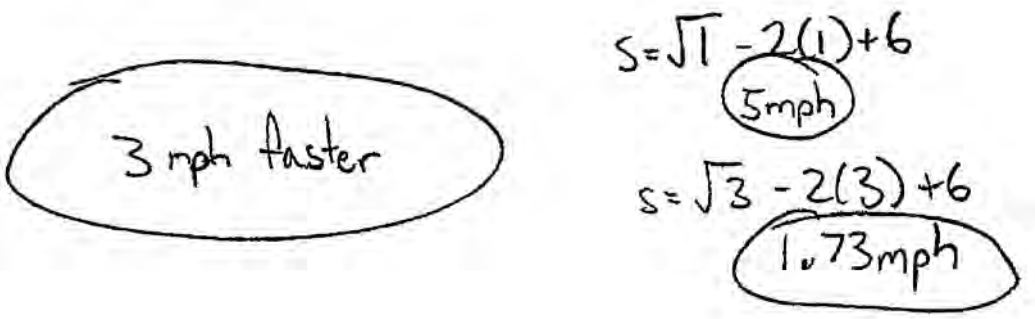
Score 2: The student found 327.

Question 37

37 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.



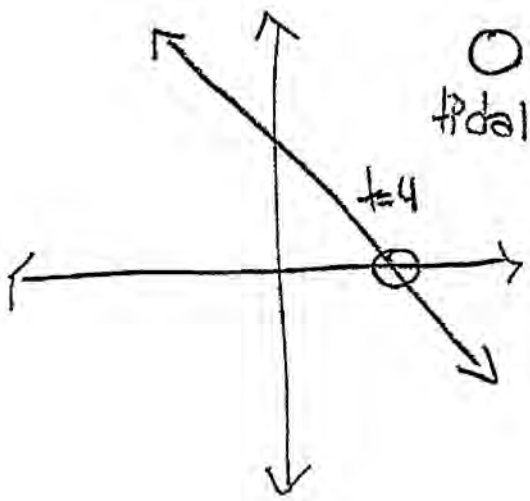
How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.



Score 1: The student did not convert to miles.

Question 37

37 The speed of a tidal wave, s, in hundreds of miles per hour, can be modeled by the equation $s = \sqrt{t} - 2t + 6$, where t represents the time from its origin in hours. Algebraically determine the time when $s = 0$.



0 is the origin time of the tidal wave when s=0

$0 = \sqrt{4} - 2(4) + 6$

$= 0$

extraneous solution

How much faster was the tidal wave traveling after 1 hour than 3 hours, to the *nearest mile per hour*? Justify your answer.

$3 = \sqrt{t} - 2(t) + 6$

$t = 2.5$

$3 = \sqrt{2.5} - 2(2.5) + 6$

$3 = 3$

$1 = \sqrt{t} - 2(t) + 6$

$1 = 3$

$1 = \sqrt{3} - 2(3) + 6$

$1 = 2$

1 mile

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

Regents Examination in Algebra II (Common Core) – January 2017

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

(Use for the January 2017 exam only.)

Raw Score	Scale Score	Performance Level
86	**100**	5
85	**99**	5
84	**98**	5
83	**97**	5
82	**96**	5
81	**95**	5
80	**95**	5
79	**94**	5
78	**93**	5
77	**92**	5
76	**92**	5
75	**91**	5
74	**90**	5
73	**90**	5
72	**89**	5
71	**88**	5
70	**88**	5
69	**87**	5
68	**87**	5
67	**86**	5
66	**86**	5
65	**86**	5
64	**85**	5
63	**84**	4
62	**84**	4
61	**84**	4
60	**83**	4
59	**83**	4
58	**82**	4

Raw Score	Scale Score	Performance Level
57	**82**	4
56	**82**	4
55	**81**	4
54	**81**	4
53	**81**	4
52	**80**	4
51	**80**	4
50	**80**	4
49	**79**	4
48	**79**	4
47	**79**	4
46	**78**	4
45	**78**	4
44	**77**	3
43	**77**	3
42	**77**	3
41	**76**	3
40	**76**	3
39	**75**	3
38	**75**	3
37	**74**	3
36	**74**	3
35	**73**	3
34	**72**	3
33	**71**	3
32	**71**	3
31	**70**	3
30	**69**	3
29	**68**	3

Raw Score	Scale Score	Performance Level
28	**67**	3
27	**66**	3
26	**65**	3
25	**63**	2
24	**62**	2
23	**61**	2
22	**59**	2
21	**57**	2
20	**55**	2
19	**54**	1
18	**53**	1
17	**51**	1
16	**49**	1
15	**47**	1
14	**44**	1
13	**42**	1
12	**40**	1
11	**37**	1
10	**35**	1
9	**32**	1
8	**29**	1
7	**26**	1
6	**23**	1
5	**19**	1
4	**16**	1
3	**12**	1
2	**8**	1
1	**4**	1
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 II (Common Core).