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ALGEBRA I

Next Generation Learning Standards

REGENTS EXAM REVIEW MANUAL

WITH 8 REGENTS EXAMS, 6 TOPICALLY ORGANIZED

Each Question Linked to a Solution Video QR Coded for One to One Initiative



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Algebra I Table of Contents

POLYNOMIALS	1
PROPERTIES OF ALGEBRA	6
FUNCTIONS	. 10
CREATING AND INTERPRETING EQUATIONS	26
INEQUALITIES	36
SEQUENCES AND SERIES	44
SYSTEMS OF EQUATIONS	47
QUADRATIC EQUATIONS AND FACTORING	58
REGRESSIONS	67
EXPONENTIAL EQUATIONS	. 72
GRAPHING	.79
STATISTICS	95

NUMBER PROPERTIES 103
Next Generation Learning Standards ADDED SECTIONS
IRRATIONAL VALUES108
RADICAL EXPRESSIONS110
RADICAL EQUATIONS113
PYTHAGOREAN EQUATIONS116
LINEAR AND QUADRATIC SYSTEMS118
June 2023 Algebra I Regents Exam 123
August 2023 Algebra I Regents Exam
June 2023 Algebra I Regents Exam- solutions 162
August 2023 Algebra I Regents Exam- solutions 165
Accepted Solutions and Point Allocation168

POLYNOMIALS

- 1. The expression $3(x^2 + 2x 3) 4(4x^2 7x + 5)$ is equivalent to
 - 1) -13x 22x + 11 3) $19x^2 22x + 11$
 - 2) $-13x^2 + 34x 29$ 4) $19x^2 + 34x 29$
- 2. The quadratic equation $x^2 6x = 12$ is rewritten in the form $(x+p)^2 = q$, where q is a constant. What is the value of p?

4)

9

- 1) -12 3) -3

2)

Ι.

II.

-9

3. Mrs. Allard asked her students to identify which of the polynomials below are in standard form and explain why.

III. $2x^5 + 8x^2 + 10x$

 $15x^4 - 6x + 3x^2 - 1$

 $12x^3 + 8x + 4$

Which student's response is correct?





06 2018 12

2

- 1) Tyler said I and II because the coefficients are decreasing.
- 2) Susan said only II because all the numbers are decreasing.
- 3) Fred said II and III because the exponents are decreasing.
- 4) Alyssa said II and III because they each have three terms.
- 4. If $y = 3x^3 + x^2 5$ and $z = x^2 12$, which polynomial is equivalent to 2(y + z)?

(1) $6x^3 + 4x^2 - 34$ (3) $6x^3 + 3x^2 - 22$

(2) $6x^3 + 3x^2 - 17$ (4) $6x^3 + 2x^2 - 17$

5. The length, width, and height of a rectangular box are represented by2*x*, 3x + 1, and 5x - 6, respectively. When the volume is expressed as a polynomial in standard form, what is the coefficient of the 2nd term?

6. Write the expression $5x + 4x^2(2x+7) - 6x^2 - 9x$ as a polynomial in standard form.











7. Wenona sketched the polynomial P(x) as shown on the axes below.





Which equation could represent P(x)?

- 1) $P(x) = (x+1)(x-2)^2$ 3) P(x) = (x+1)(x-2)
- 2) $P(x) = (x-1)(x+2)^2$ 4) P(x) = (x-1)(x+2)
- 8. The function r(x) is defined by the expression $x^2 + 3x 18$. Use factoring to determine the zeros of r(x).

Explain what the zeros represent on the graph of r(x).

9. If $f(x) = x^2$ and g(x) = x, determine the value(s) of x that satisfy the equation f(x) = g(x).

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06 2017 31



Express in simplest form: 10. $(3x^2 + 4x - 8) - (-2x^2 + 4x + 2)$

Which polynomial function has 11. zeros at -3, 0, and 4? $1)f(x) = (x+3)(x^2+4)$ 3) f(x) = x(x+3)(x-4)

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

- 12. Lynn, Jude, and Anne were given the Function $f(x) = -2x^2 + 32$, and they were Jude's answer was 4, and Anne's answer was ±4. Who is correct?
 - asked to find f(3). Lynn's answer was 14,
 - 1) Lynn, only 3) Anne, only
- What is the product of 2x + 313.
 - and $4x^2 5x + 6$?

2) Jude, only

- 1) $8x^3 2x^2 + 3x + 18$
- 2) $8x^3 2x^2 3x + 18$
- 3) $8x^3 + 2x^2 3x + 18$
- 4) $8x^3 + 2x^2 + 3x + 18$







06 2017 05



4) Both Lynn and Jude

- 14. When multiplying polynomials for a Math assignment, Pat found the product to be-4x + 8x² 2x³ + 5. He then had to state the leading coefficient of this polynomial. Pat wrote down -4. Do you agree with Pat's answer? Explain your reasoning.
- 15. The expression $x^4 16$ is equivalent to
 - 1) $(x^2 + 8)(x^2 8)$
 - 2) $(x^2 8)(x^2 8)$
 - 3) $(x^2 + 4)(x^2 4)$
 - 4) $(x^2 4)(x^2 4)$
- 16. An expression of the fifth degree is written with a leading coefficient of seven and a constant of six. Which expression is correctly written for these conditions?
 - 1) $6x^5 + x^4 + 7$
 - 2) $7x^6 6x^4 + 5$
 - 3) $6x^7 x^5 + 5$
 - 4) $7x^5 + 2x^2 + 6$

17. The expression $3(x^2 - 1) - (x^2 - 7x + 10)$ is equivalent to

- 1) $2x^2 7x + 7$
- 2) $2x^2 + 7x 13$
- 3) $2x^2 7x + 9$
- 4) $2x^2 + 7x 11$







06 2016 10



IRRATIONAL VALUES

1. Is the product of $\sqrt{16}$ and $\frac{4}{7}$ rational or irrational? Explain your reasoning.

 A teacher wrote the following set of numbers on the board:

 $a = \sqrt{20} b = 2.5c = \sqrt{225}$

Explain why
$$a + b$$
 is irrational, but $b + c$ is rational.

3. State whether $7 - \sqrt{2}$ is rational or irrational. Explain your answer.





06 2017 27



06 2018 31

08 2017 25

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4. Is the sum of $3\sqrt{2}$ and $4\sqrt{2}$ rational or irrational? Explain your answer.

- 5. Determine if the product of $3\sqrt{2}$ and $8\sqrt{18}$ is rational or irrational. Explain your answer.
 - √18 06 2016 26 wer.



08 2016 29

RADICAL EXPRESSIONS

- 1. Simplify the following radical expressions.
 - a) $\sqrt{144x^2y^{20}c^{14}}$
 - b) $\sqrt{12a^7b^8z^{19}}$

- 2. Simplify the following radical expressions.
 - a) $\sqrt{64a^{16}b^{18}c^6}$
 - b) $\sqrt{54a^{10}b^9z^{11}}$

- 3. Add or subtract the following expressions as indicated.
 - a) $5a\sqrt{14} + 6a\sqrt{14}$
 - b) $2x\sqrt{50x} 3x\sqrt{8x}$







Radicals 01

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- 4. Add or subtract the following expressions as indicated.
 - *a*) $\sqrt{20} + 3\sqrt{5}$
 - b) $2xy\sqrt{12x^5} 5x^3\sqrt{3xy^2}$



5. Multiply the following expressions.

a)
$$\sqrt{6x^2} \cdot x\sqrt{2}$$

b) $\sqrt{5y^2} \cdot \sqrt{6y^3}$

- 6. Multiply the following expressions.
 - a) $\sqrt{10x} \cdot \sqrt{8x^2}$
 - b) $\sqrt{3xy^4} \cdot \sqrt{6xy^3}$



Radicals 06





7. Rationalize the denominator.

a)
$$\frac{5}{\sqrt{2}}$$

b) $\frac{4}{\sqrt{3x}}$

c)
$$\frac{4}{5+\sqrt{3}}$$

8. Rationalize the denominator.



b)
$$\frac{5+\sqrt{2}}{2-\sqrt{3}}$$

9. Rationalize the denominator.

a)
$$\frac{4}{\sqrt{5a}}$$

b)
$$\frac{5}{7-\sqrt{2}}$$





Radicals 09



ALGEBRA I

Wednesday, August 16, 2023 — 8:30 to 11:30 a.m., only

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

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.

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 he 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]

1. A café owner tracks the number of customers during business hours.

The graph below models the data.





Based on the graph, the café owner saw a continual

- 1) increase in customers from 6:00 to 11:00
- 2) increase in customers from 12:00 to 3:00
- 3) decrease in customers from 1:00 to 4:00
- 4) decrease in customers from 11:00 to 2:00

08 2023 01

- 2. The expression $(3x^2 + 4x 8) + 2(11 5x)$ is equivalent to
 - 1) $3x^2 x + 5$ 3) $3x^2 - 6x + 14$ 2) $3x^2 - x + 14$ 4) $3x^2 + 14x + 14$
- 3. Which point is a solution to $y = x^3 2x$? 3) (1,1) 1) (-3, -21)
 - 2) (-2, 10) 4) (4, 2)
- 4. What is the value of *x* in the equation $\frac{5(2x-4)}{3} + 9 = 14?$ 3) 5.3 1) 1.9
 - 2) 3.5 4) 8.9
- 5. The graph of y = f(x) is shown below.

-X Which graph represents y = f(x - 2) + 1?

y



08 2023 03



08 2023 04



08 2023 05



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 I credit. All answers should be written in pen, except for graphs and drawings, which should be done in pencil. [16]

33. The senior class at Hills High School is purchasing sports drinks and bottled water to sell at the school field day. At the local discount store, a case of sports drinks costs \$15.79, and a case of bottled water costs \$5.69. The senior class has \$125 to spend on the drinks.



If x represents the number of cases of sports drinks and y represents the number of cases of bottled water purchased, write an inequality that models this situation.

Nine cases of bottled water are purchased for this year's field day. Use your inequality to determine algebraically the maximum number of full cases of sports drinks that can be purchased.

Explain your answer.

34. The path of a rocket is modeled by the function $h(t) = -4.9t^2 + 49t$, where h is the height, in meters, above the ground and t is the time, in seconds, after the rocket is launched.

08 2023 34

Sketch the graph on the set of axes below.



State the vertex of this function.

Explain what the vertex means in the context of this situation.