The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

INTEGRATED ALGEBRA

Tuesday, June 17, 2008 – 9:15 a.m. to 12:15 p.m., only

Print Your Name:

Print Your School's Name:

Print your name and the name of your school in the boxes above.

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.

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.

This examination has four parts, with a total of 39 questions. You must answer all questions in this examination. Record your answers to the Part I multiple-choice questions, using a #2 pencil on the separate answer sheet provided to you. Write your answers to the questions in Parts II, III, and IV directly in this test booklet. All work for Parts II, III, and IV 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.

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.

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

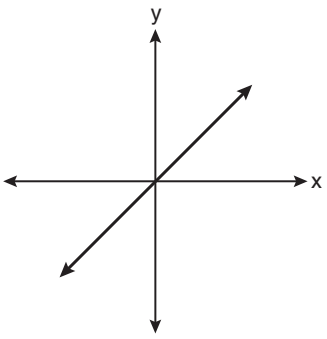
DO NOT OPEN THIS EXAMINATION BOOKLET UNTIL THE SIGNAL IS GIVEN.

Part I

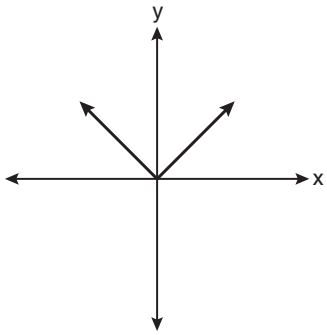
Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, record your answer using a #2 pencil on the separate answer sheet provided to you. [60]

Use this space for computations.

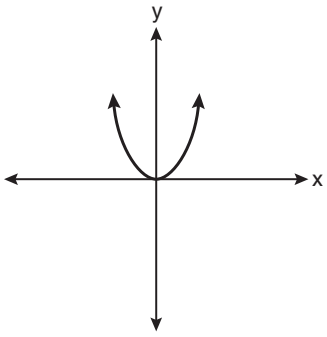
1 Which graph represents a linear function?



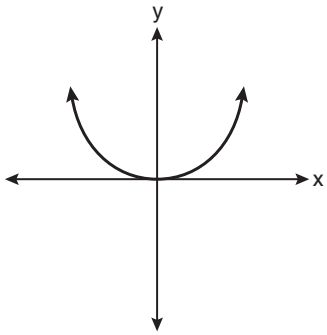
(1)



(3)



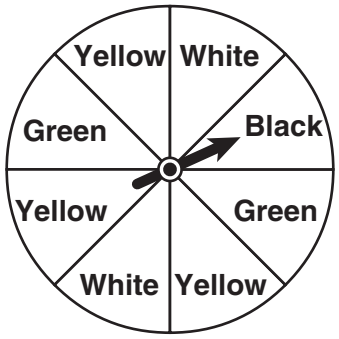
(2)



(4)

Use this space for computations.

2 A spinner is divided into eight equal regions as shown in the diagram below.



Which event is most likely to occur in one spin?

(1) The arrow will land in a green or white area.

(2) The arrow will land in a green or black area.

(3) The arrow will land in a yellow or black area.

(4) The arrow will land in a yellow or green area.

3 A school wants to add a coed soccer program. To determine student interest in the program, a survey will be taken. In order to get an unbiased sample, which group should the school survey?

(1) every third student entering the building

(2) every member of the varsity football team

(3) every member in Ms. Zimmer's drama classes

(4) every student having a second-period French class

4 Factored, the expression $16x^2 - 25y^2$ is equivalent to

(1) $(4x - 5y)(4x + 5y)$

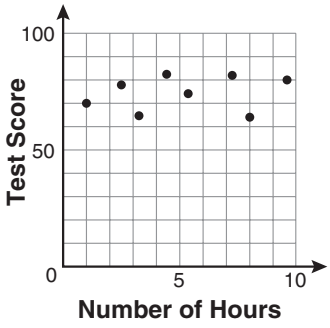
(2) $(4x - 5y)(4x - 5y)$

(3) $(8x - 5y)(8x + 5y)$

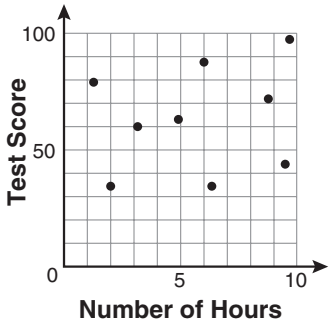
(4) $(8x - 5y)(8x - 5y)$

Use this space for computations.

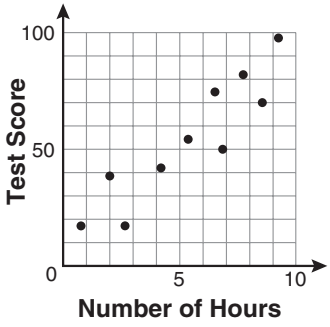
5 There is a negative correlation between the number of hours a student watches television and his or her social studies test score. Which scatter plot below displays this correlation?



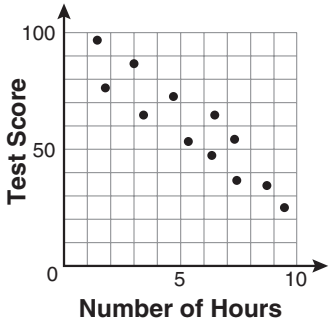
(1)



(3)



(2)



(4)

6 Jack bought 3 slices of cheese pizza and 4 slices of mushroom pizza for a total cost of $12.50. Grace bought 3 slices of cheese pizza and 2 slices of mushroom pizza for a total cost of $8.50. What is the cost of one slice of mushroom pizza?

(1) $1.50

(2) $2.00

(3) $3.00

(4) $3.50

Use this space for computations.

7 What is the product of $-3x^2y$ and $(5xy^2 + xy)$?

(1) $-15x^3y^3 - 3x^3y^2$

(2) $-15x^3y^3 - 3x^3y$

(3) $-15x^2y^2 - 3x^2y$

(4) $-15x^3y^3 + xy$

8 The bowling team at Lincoln High School must choose a president, vice president, and secretary. If the team has 10 members, which expression could be used to determine the number of ways the officers could be chosen?

(1) ${}_3P_{10}$

(2) ${}_7P_3$

(3) ${}_{10}P_3$

(4) ${}_{10}P_7$

9 Lenny made a cube in technology class. Each edge measured 1.5 cm. What is the volume of the cube in cubic centimeters?

(1) 2.25

(2) 3.375

(3) 9.0

(4) 13.5

10 Which ordered pair is a solution to the system of equations $y = x$ and $y = x^2 - 2$?

(1) (–2,–2)

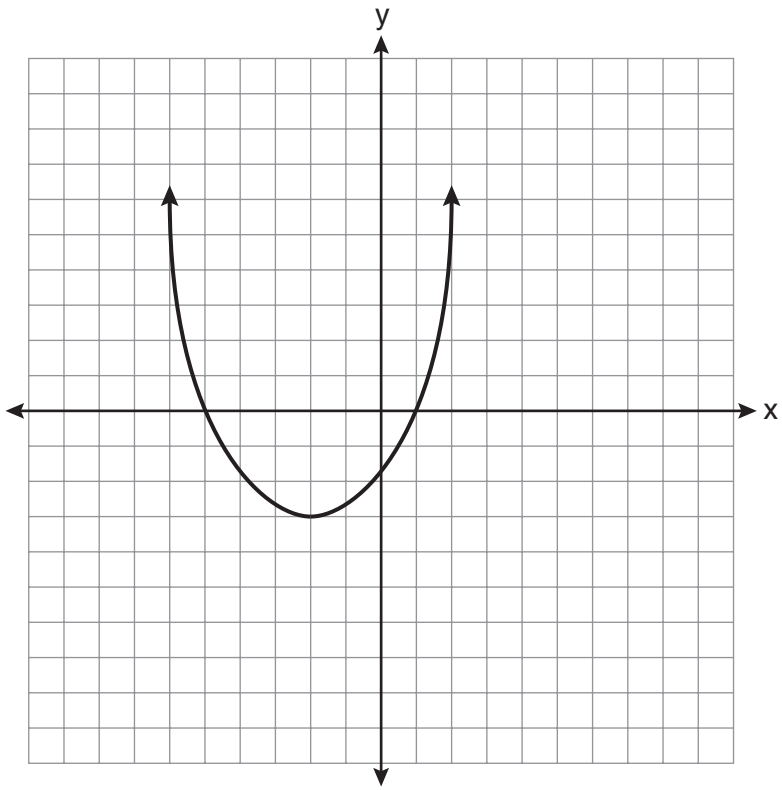
(2) (–1,1)

(3) (0,0)

(4) (2,2)

Use this space for computations.

11 What are the vertex and the axis of symmetry of the parabola shown in the diagram below?



(1) The vertex is (–2,–3), and the axis of symmetry is $x = -2$.

(2) The vertex is (–2,–3), and the axis of symmetry is $y = -2$.

(3) The vertex is (–3,–2), and the axis of symmetry is $y = -2$.

(4) The vertex is (–3,–2), and the axis of symmetry is $x = -2$.

12 Pam is playing with red and black marbles. The number of red marbles she has is three more than twice the number of black marbles she has. She has 42 marbles in all. How many red marbles does Pam have?

(1) 13

(2) 15

(3) 29

(4) 33

Use this space for computations.

13 What is half of 2^6?

(1) 1^3 (3) 2^3

(2) 1^6 (4) 2^5

14 Which equation represents a line that is parallel to the line $y = -4x + 5$?

(1) $y = -4x + 3$ (3) $y = \frac{1}{4}x + 3$

(2) $y = -\frac{1}{4}x + 5$ (4) $y = 4x + 5$

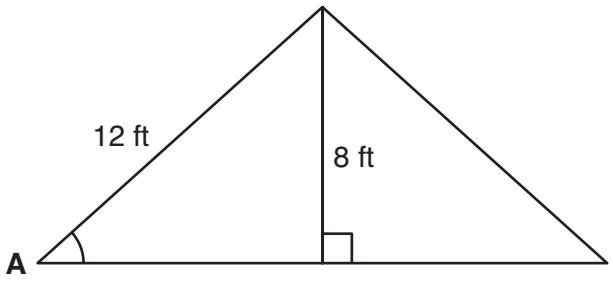
15 What is the product of $\frac{x^2-1}{x+1}$ and $\frac{x+3}{3x-3}$ expressed in simplest form?

(1) x (3) $x + 3$

(2) $\frac{x}{3}$ (4) $\frac{x+3}{3}$

Use this space for computations.

16 The center pole of a tent is 8 feet long, and a side of the tent is 12 feet long as shown in the diagram below.



If a right angle is formed where the center pole meets the ground, what is the measure of angle *A* to the *nearest degree*?

(1) 34
(2) 42
(3) 48
(4) 56

17 Which value of x makes the expression $\frac{x+4}{x-3}$ undefined?

(1) –4
(2) –3
(3) 3
(4) 0

18 Consider the set of integers greater than –2 and less than 6. A subset of this set is the positive factors of 5. What is the complement of this subset?

(1) {0, 2, 3, 4}
(2) {–1, 0, 2, 3, 4}
(3) {–2, –1, 0, 2, 3, 4, 6}
(4) {–2, –1, 0, 1, 2, 3, 4, 5, 6}

Use this space for computations.

19 Which data set describes a situation that could be classified as qualitative?

(1) the elevations of the five highest mountains in the world

(2) the ages of presidents at the time of their inauguration

(3) the opinions of students regarding school lunches

(4) the shoe sizes of players on the basketball team

20 What is the slope of the line that passes through the points (–6,1) and (4,–4)?

(1) –2

(2) 2

(3) $-\frac{1}{2}$

(4) $\frac{1}{2}$

21 Students in a ninth grade class measured their heights, h, in centimeters. The height of the shortest student was 155 cm, and the height of the tallest student was 190 cm. Which inequality represents the range of heights?

(1) $155 < h < 190$

(2) $155 \leq h \leq 190$

(3) $h \geq 155$ or $h \leq 190$

(4) $h > 155$ or $h < 190$

Use this space for computations.

22 The table below shows a cumulative frequency distribution of runners' ages.

Cumulative Frequency Distribution of Runners' Ages

Age Group	Total
20–29	8
20–39	18
20–49	25
20–59	31
20–69	35

According to the table, how many runners are in their forties?

(1) 25
(2) 10
(3) 7
(4) 6

23 Mr. Turner bought x boxes of pencils. Each box holds 25 pencils. He left 3 boxes of pencils at home and took the rest to school. Which expression represents the total number of pencils he took to school?

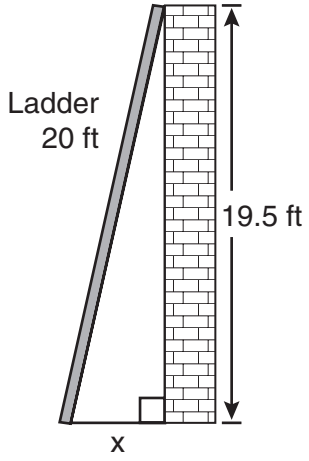
(1) $22x$
(2) $25x - 3$
(3) $25 - 3x$
(4) $25x - 75$

24 Which expression represents $\frac{2x^2 - 12x}{x - 6}$ in simplest form?

(1) 0
(2) $2x$
(3) $4x$
(4) $2x + 2$

Use this space for computations.

25 Don placed a ladder against the side of his house as shown in the diagram below.



Which equation could be used to find the distance, x, from the foot of the ladder to the base of the house?

(1) $x = 20 - 19.5$

(2) $x = 20^2 - 19.5^2$

(3) $x = \sqrt{20^2 - 19.5^2}$

(4) $x = \sqrt{20^2 + 19.5^2}$

26 Which value of x is a solution of $\frac{5}{x} = \frac{x+13}{6}$?

(1) –2

(2) –3

(3) –10

(4) –15

27 Mrs. Ayer is painting the outside of her son's toy box, including the top and bottom. The toy box measures 3 feet long, 1.5 feet wide, and 2 feet high. What is the total surface area she will paint?

(1) 9.0 ft^2

(2) 13.5 ft^2

(3) 22.5 ft^2

(4) 27.0 ft^2

Use this space for computations.

28 What is $\frac{\sqrt{32}}{4}$ expressed in simplest radical form?

(1) $\sqrt{2}$

(2) $4\sqrt{2}$

(3) $\sqrt{8}$

(4) $\frac{\sqrt{8}}{2}$

29 Consider the graph of the equation $y = ax^2 + bx + c$, when $a \neq 0$. If a is multiplied by 3, what is true of the graph of the resulting parabola?

(1) The vertex is 3 units above the vertex of the original parabola.

(2) The new parabola is 3 units to the right of the original parabola.

(3) The new parabola is wider than the original parabola.

(4) The new parabola is narrower than the original parabola.

30 Kathy plans to purchase a car that depreciates (loses value) at a rate of 14% per year. The initial cost of the car is \$21,000. Which equation represents the value, v, of the car after 3 years?

(1) $v = 21{,}000(0.14)^3$

(2) $v = 21{,}000(0.86)^3$

(3) $v = 21{,}000(1.14)^3$

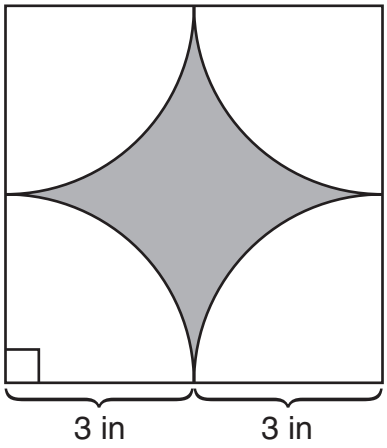
(4) $v = 21{,}000(0.86)(3)$

Part II

Answer all questions in this part. Each correct answer will receive 2 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. 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. [6]

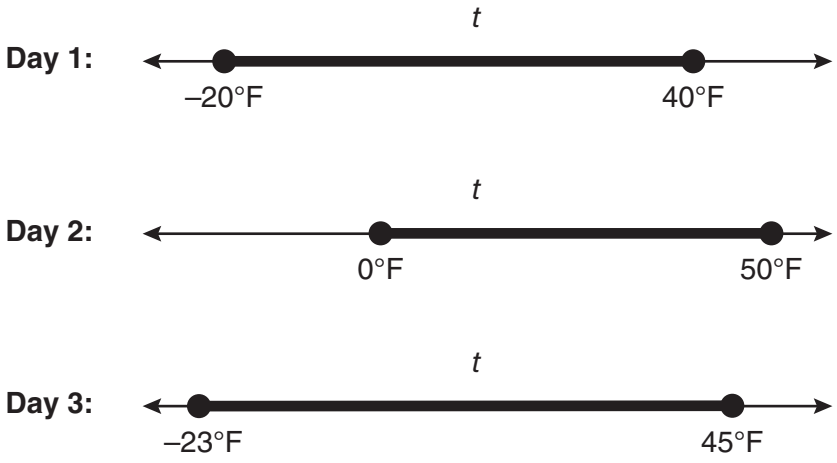
31 Tom drove 290 miles from his college to home and used 23.2 gallons of gasoline. His sister, Ann, drove 225 miles from her college to home and used 15 gallons of gasoline. Whose vehicle had better gas mileage? Justify your answer.

32 A designer created the logo shown below. The logo consists of a square and four quarter-circles of equal size.



Express, in terms of π, the exact area, in square inches, of the shaded region.

33 Maureen tracks the range of outdoor temperatures over three days. She records the following information.



Express the intersection of the three sets as an inequality in terms of temperature, t.

Part III

Answer all questions in this part. Each correct answer will receive 3 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. 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. [9]

34 Peter begins his kindergarten year able to spell 10 words. He is going to learn to spell 2 new words every day.

Write an inequality that can be used to determine how many days, d, it takes Peter to be able to spell *at least* 75 words.

Use this inequality to determine the minimum number of whole days it will take for him to be able to spell *at least* 75 words.

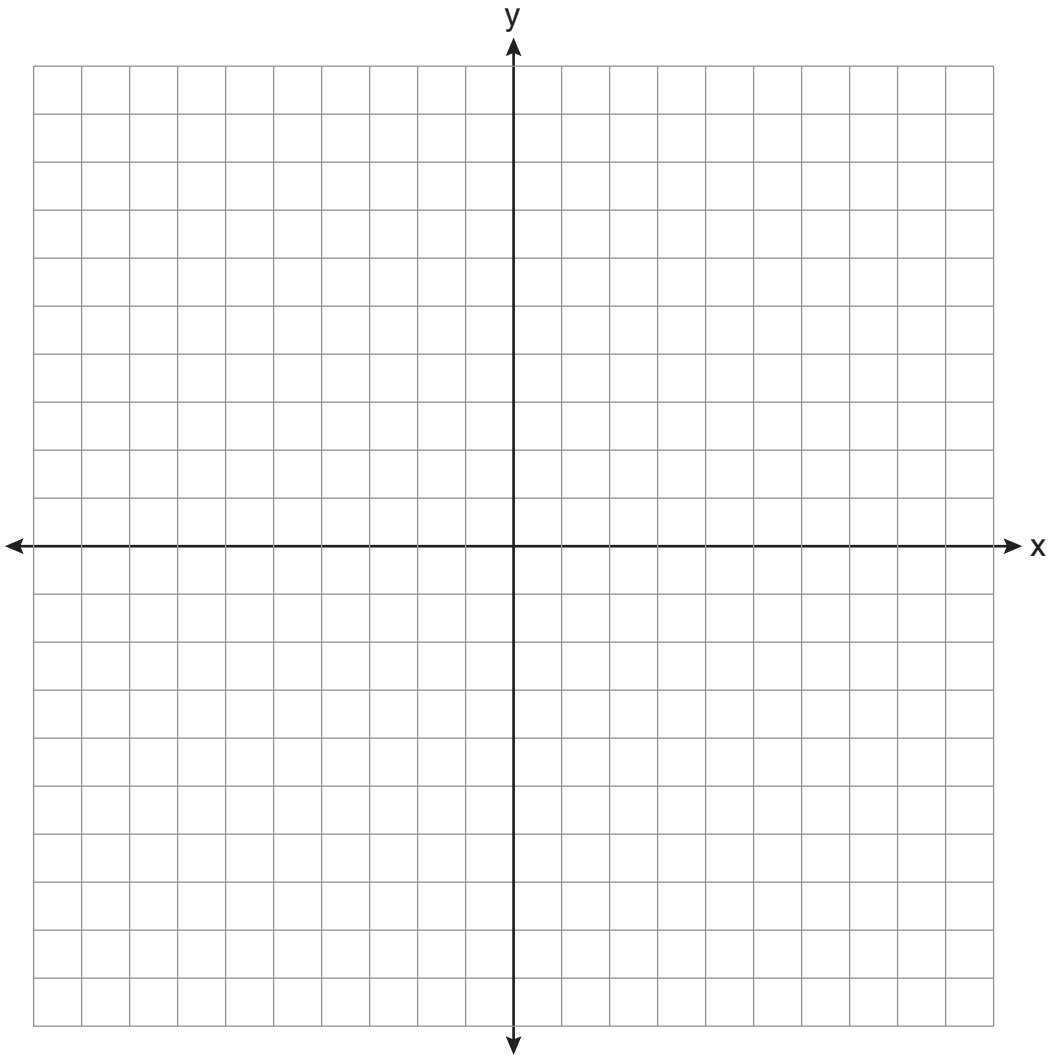
35 The Hudson Record Store is having a going-out-of-business sale. CDs normally sell for $18.00. During the first week of the sale, all CDs will sell for $15.00.

Written as a fraction, what is the rate of discount?

What is this rate expressed as a percent? Round your answer to the *nearest hundredth of a percent.*

During the second week of the sale, the same CDs will be on sale for 25% off the *original* price. What is the price of a CD during the second week of the sale?

36 Graph the equation $y = x^2 - 2x - 3$ on the accompanying set of axes.
Using the graph, determine the roots of the equation $x^2 - 2x - 3 = 0$.



Part IV

Answer all questions in this part. Each correct answer will receive 4 credits. Clearly indicate the necessary steps, including appropriate formula substitutions, diagrams, graphs, charts, etc. 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. [12]

37 A contractor needs 54 square feet of brick to construct a rectangular walkway. The length of the walkway is 15 feet more than the width.

Write an equation that could be used to determine the dimensions of the walkway. Solve this equation to find the length and width, in feet, of the walkway.

38 Sophie measured a piece of paper to be 21.7 cm by 28.5 cm. The piece of paper is actually 21.6 cm by 28.4 cm.

Determine the number of square centimeters in the area of the piece of paper using Sophie's measurements.

Determine the number of square centimeters in the actual area of the piece of paper.

Determine the relative error in calculating the area. Express your answer as a decimal to the *nearest thousandth*.

Sophie does not think there is a significant amount of error. Do you agree or disagree? Justify your answer.

39 The prices of seven race cars sold last week are listed in the table below.

Price per Race Car	Number of Race Cars
$126,000	1
$140,000	2
$180,000	1
$400,000	2
$819,000	1

What is the mean value of these race cars, in dollars?

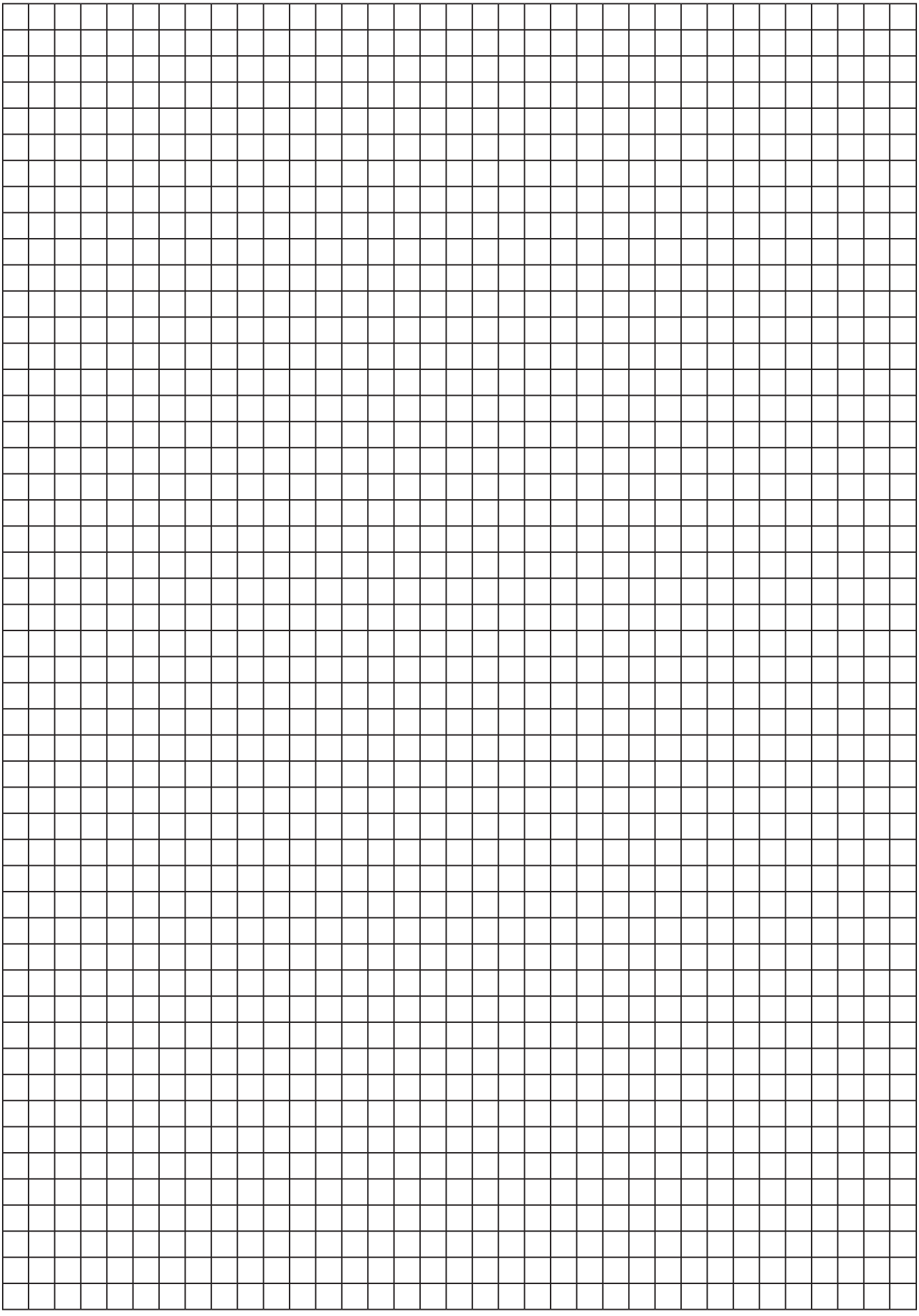
What is the median value of these race cars, in dollars?

State which of these measures of central tendency best represents the value of the seven race cars. Justify your answer.

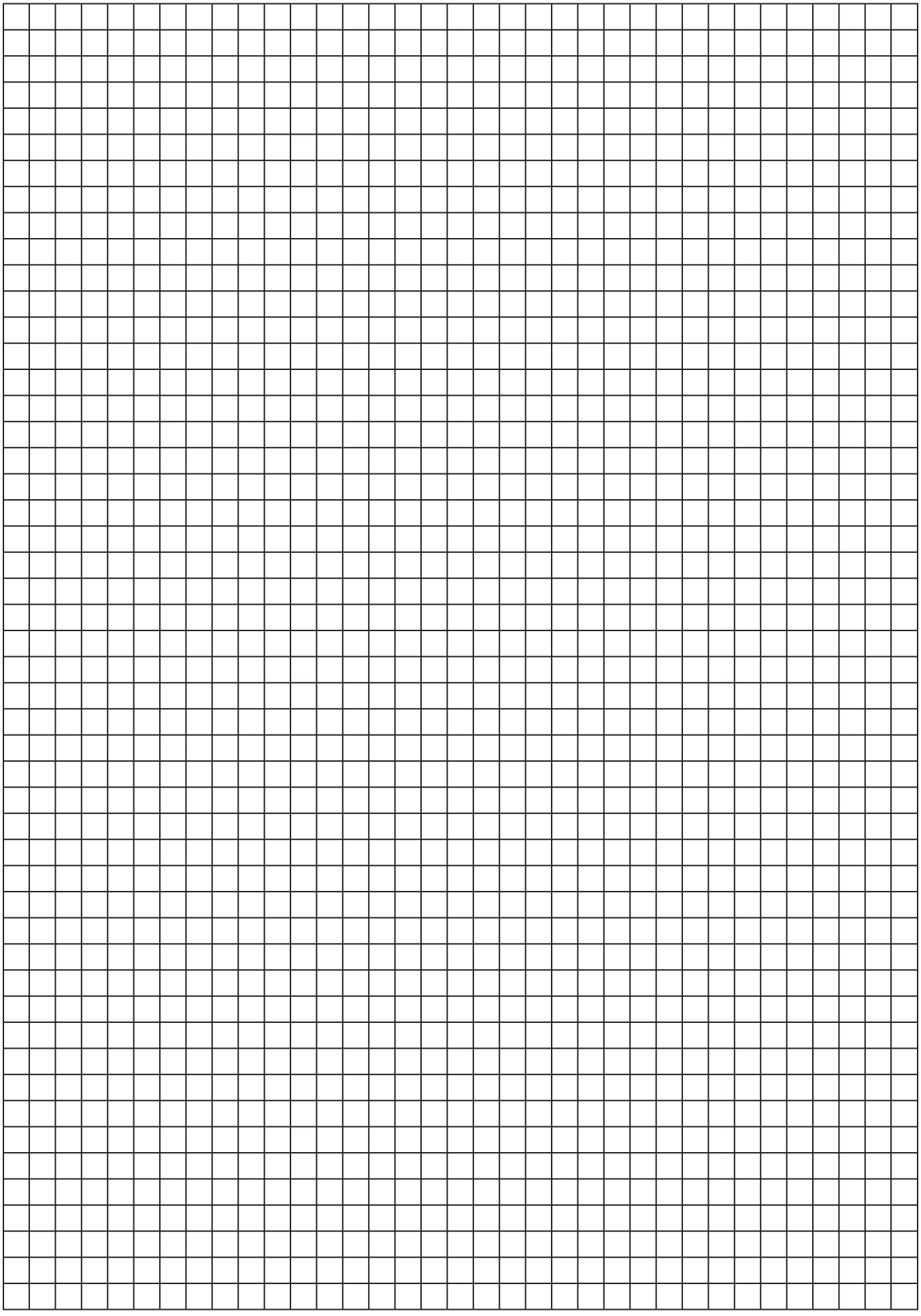
Tear Here

Tear Here

Scrap Graph Paper — This sheet will *not* be scored.



Scrap Graph Paper — This sheet will *not* be scored.



Tear Here

Tear Here

Tear Here

Reference Sheet

Trigonometric Ratios	$\sin A = \frac{opposite}{hypotenuse}$ $\cos A = \frac{adjacent}{hypotenuse}$ $\tan A = \frac{opposite}{adjacent}$
Area	trapezoid $A = \frac{1}{2}h(b_1 + b_2)$
Volume	cylinder $V = \pi r^2 h$
Surface Area	rectangular prism $SA = 2lw + 2hw + 2lh$ cylinder $SA = 2\pi r^2 + 2\pi rh$
Coordinate Geometry	$m = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1}$

Tear Here

INTEGRATED ALGEBRA

Tear Here

Tear Here

INTEGRATED ALGEBRA