Part I

Answer all questions in this part. Each correct answer will receive 2 credits. No partial credit will be allowed. For each question, write on the separate answer sheet the numeral preceding the word or expression that best completes the statement or answers the question. [60]

1 What is the value of \( x \) in the equation \( 5(2x - 7) = 15x - 10 \)?

(1) 1  
(2) 0.6  
(3) -5  
(4) -9  

Use this space for computations.

2 Ms. Brewer’s art class is drawing reflected images. She wants her students to draw images reflected in a line. Which diagram represents a correctly drawn image?

(1)  
(2)  
(3)  
(4)  

3 The lengths of the sides of home plate in a baseball field are represented by the expressions in the accompanying figure.

Which expression represents the perimeter of the figure?

(1) \( 5xyz \)  
(2) \( x^2 + y^3z \)  
(3) \( 2x + 3yz \)  
(4) \( 2x + 2y + yz \)
4 Which expression represents “5 less than the product of 7 and x”?
(1) \(7(x - 5)\)  \(\)  (3) \(7 + x - 5\)
(2) \(7x - 5\)  \(\)  (4) \(5 - 7x\)

5 What is the \(y\)-intercept of the graph of the line whose equation is \(y = -\frac{2}{5}x + 4\)?
(1) \(-\frac{5}{2}\)  \(\)  (3) \(0\)
(2) \(-\frac{2}{5}\)  \(\)  (4) \(4\)

6 Which is an equation of the line of symmetry for the parabola in the accompanying diagram?

\[\text{Diagram of a parabola with points and lines indicating symmetry} \]
(1) \(x = 2\)  \(\)  (3) \(x = 3\)
(2) \(x = 4\)  \(\)  (4) \(y = 3\)
7 For which value of $x$ will the fraction $\frac{3}{2x + 4}$ be undefined?

(1) –2  (3) 0
(2) 2    (4) –4

8 The equation $A = \frac{1}{2}(12)(3 + 7)$ is used to find the area of a trapezoid. Which calculation would not result in the correct area?

(1) $\frac{12(3 + 7)}{2}$  (3) 0.5(12)(10)
(2) 6(3 + 7)    (4) $\frac{12}{2} \times \frac{10}{2}$

9 The size of a certain type of molecule is 0.00009078 inch. If this number is expressed as $9.078 \times 10^n$, what is the value of $n$?

(1) –5  (3) –8
(2) 5    (4) 8

10 In order to be admitted for a certain ride at an amusement park, a child must be greater than or equal to 36 inches tall and less than 48 inches tall. Which graph represents these conditions?

(1)  
(2)  
(3)  
(4)  

Use this space for computations.
11 The accompanying circle graph shows how Shannon earned $600 during her summer vacation.

What is the measure of the central angle of the section labeled “Chores”?
(1) 30° (2) 60° (3) 90° (4) 120°

12 Robin has 8 blouses, 6 skirts, and 5 scarves. Which expression can be used to calculate the number of different outfits she can choose, if an outfit consists of a blouse, a skirt, and a scarf?
(1) 8 + 6 + 5 (2) 8 • 6 • 5 (3) 8!6!5! (4) \( _{19}C_3 \)

13 In the accompanying diagram of \( \triangle ABC \), \( \overline{AB} \) is extended through \( D \), \( m\angle CBD = 30 \), and \( \overline{AB} \parallel \overline{BC} \).

What is the measure of \( \angle A \)?
(1) 15° (2) 30° (3) 75° (4) 150°
14 The image of point (–2,3) under translation \( T \) is (3,–1). What is the image of point (4,2) under the same translation?

(1) (–1,6)  (3) (5,4)
(2) (0,7)  (4) (9,–2)

15 A builder is building a rectangular deck with dimensions of 16 feet by 30 feet. To ensure that the sides form 90° angles, what should each diagonal measure?

(1) 16 ft  (3) 34 ft
(2) 30 ft  (4) 46 ft

16 Which statement is the inverse of “If the waves are small, I do not go surfing”?

(1) If the waves are not small, I do not go surfing.
(2) If I do not go surfing, the waves are small.
(3) If I go surfing, the waves are not small.
(4) If the waves are not small, I go surfing.

17 A dog is tied with a rope to a stake in the ground. The length of the rope is 5 yards. What is the area, in square yards, in which the dog can roam?

(1) \( 25\pi \)  (3) 25
(2) \( 10\pi \)  (4) 20

18 Melissa’s test scores are 75, 83, and 75. Which statement is true about this set of data?

(1) mean < mode  (3) mode = median
(2) mode < median  (4) mean = median
19 When \(3a^2 - 7a + 6\) is subtracted from \(4a^2 - 3a + 4\), the result is

(1) \(a^2 + 4a - 2\)  
(2) \(a^2 - 10a - 2\)  
(3) \(-a^2 - 4a + 2\)  
(4) \(7a^2 - 10a + 10\)

Use this space for computations.

20 In the equation \(A = p + prt\), \(t\) is equivalent to

(1) \(\frac{A - pr}{p}\)  
(2) \(\frac{A - p}{pr}\)  
(3) \(\frac{A}{pr} - p\)  
(4) \(\frac{A}{p} - pr\)

21 The accompanying Venn diagram shows the results of a survey asking 100 people if they get news by reading newspapers or by watching television.

What is the probability that a person selected at random from this survey does not claim television as a source of getting the news?

(1) \(\frac{15}{100}\)  
(2) \(\frac{35}{100}\)  
(3) \(\frac{55}{100}\)  
(4) \(\frac{75}{100}\)

22 The expression \(\frac{6\sqrt{20}}{3\sqrt{5}}\) is equivalent to

(1) \(3\sqrt{15}\)  
(2) \(2\sqrt{15}\)  
(3) \(8\)  
(4) \(4\)
23 In the accompanying diagram, point $P$ lies 3 centimeters from line $\ell$.

![Diagram of point P lying 3 cm from line l]

How many points are both 2 centimeters from line $\ell$ and 1 centimeter from point $P$?

(1) 1
(2) 2
(3) 0
(4) 4

24 The ratio of two supplementary angles is 3:6. What is the measure of the smaller angle?

(1) 10°
(2) 20°
(3) 30°
(4) 60°

25 Which point is on the circle whose equation is $x^2 + y^2 = 289$?

(1) $(-12, 12)$
(2) $(7, -10)$
(3) $(-1, -16)$
(4) $(8, -15)$

26 The Edison Lightbulb Company tests 5% of their daily production of lightbulbs. If 500 bulbs were tested on Tuesday, what was the total number of bulbs produced that day?

(1) 25
(2) 1,000
(3) 10,000
(4) 100,000
27 Which statement is expressed as a biconditional?
   (1) Two angles are congruent if they have the same measure.
   (2) If two angles are both right angles, then they are congruent.
   (3) Two angles are congruent if and only if they have the same measure.
   (4) If two angles are congruent, then they are both right angles.

28 A committee of five members is to be randomly selected from a group of nine freshmen and seven sophomores. Which expression represents the number of different committees of three freshmen and two sophomores that can be chosen?
   (1) \( \binom{9}{3} + \binom{7}{2} \)
   (2) \( \binom{9}{3} \cdot \binom{7}{2} \)
   (3) \( \binom{16}{3} \cdot \binom{16}{2} \)
   (4) \( \binom{9}{3} \cdot \binom{7}{2} \)

29 Which inequality is represented by the accompanying graph?

![Graph](image)

   (1) \( y < 3 \)
   (2) \( y > 3 \)
   (3) \( y \leq 3 \)
   (4) \( y \geq 3 \)

30 Which equation illustrates the multiplicative inverse property?
   (1) \( 1 \cdot x = x \)
   (2) \( x \cdot \frac{1}{x} = 1 \)
   (3) \( 1 \cdot 0 = 0 \)
   (4) \( -1 \cdot x = -x \)
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. [10]

31 Simplify: \[ \frac{x^2 + 6x + 5}{x^3 - 25}\]

32 Write an irrational number and explain why it is irrational.
33 In a circle whose center is (2,3), one endpoint of a diameter is (–1,5).
Find the coordinates of the other endpoint of that diameter. [The use of the accompanying grid is optional.]
34 The accompanying diagram shows a square dartboard. The side of the dartboard measures 30 inches. The square shaded region at the center has a side that measures 10 inches. If darts thrown at the board are equally likely to land anywhere on the board, what is the theoretical probability that a dart does not land in the shaded region?
A candy store sells 8-pound bags of mixed hazelnuts and cashews. If $c$ pounds of cashews are in a bag, the price $p$ of the bag can be found using the formula $p = 2.59c + 1.72(8 - c)$. If one bag is priced at $18.11, how many pounds of cashews does it contain?
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. [6]

36 Solve for \( x \): \( \frac{1}{16} x + \frac{1}{4} = \frac{1}{2} \)

37 Solve for \( x \): \( x^2 + 2x - 24 = 0 \)
38 As shown in the accompanying diagram, a ladder is leaning against a vertical wall, making an angle of $70^\circ$ with the ground and reaching a height of 10.39 feet on the wall.

Find, to the nearest foot, the length of the ladder.

Find, to the nearest foot, the distance from the base of the ladder to the wall.
In the accompanying diagram, \( \overrightarrow{CD} \parallel \overrightarrow{EF} \), \( \overrightarrow{AB} \) is a transversal, \( m\angle DGH = 2x \), and \( m\angle FHB = 5x - 51 \). Find the measure, in degrees, of \( \angle BHE \).
Scrap Graph Paper — This sheet will *not* be scored.
The University of the State of New York

REGENTS HIGH SCHOOL EXAMINATION

MATHEMATICS A

Thursday, January 26, 2006 — 1:15 to 4:15 p.m., only

ANSWER SHEET

Student .............................................. Sex: □ Male □ Female Grade .............
Teacher .............................................. School ..............................................

Your answers to Part I should be recorded on this answer sheet.

Part I

Answer all 30 questions in this part.

1 .......................... 9 .......................... 17 .......................... 25 ..........................
2 .......................... 10 .......................... 18 .......................... 26 ..........................
3 .......................... 11 .......................... 19 .......................... 27 ..........................
4 .......................... 12 .......................... 20 .......................... 28 ..........................
5 .......................... 13 .......................... 21 .......................... 29 ..........................
6 .......................... 14 .......................... 22 .......................... 30 ..........................
7 .......................... 15 .......................... 23 ..........................
8 .......................... 16 .......................... 24 ..........................

Your answers for Parts II, III, and IV should be written in the test booklet.

The declaration below should be signed when you have completed the examination.

I do hereby affirm, at the close of this examination, that I had no unlawful knowledge of the questions or answers prior to the examination and that I have neither given nor received assistance in answering any of the questions during the examination.

________________________________________
Signature
### MATHEMATICS A

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**Total Raw Score**

**Checked by**

**Scaled Score**
(from conversion chart)

**Rater’s/Scorer’s Name** (minimum of three)