# PRACTICE EXAM 51:NY REGENTS ALGEBRA I SIMULATION — 35 QUESTIONS

**Recommended Time: 90 Minutes**

**Required Tools: Graphing Calculator, Straightedge**

Directions: This exam consists of 35 multiple-choice questions. Each question is worth equal credit. Select the single best answer for each question. No penalty for guessing.

1. A car rental costs a flat $25 fee plus $0.15 per mile. Which equation models the total cost C for driving m miles?

A. C = 25m + 0.15

B. C = 25 + 0.15

C. C = 0.15m + 25

D. C = 25/(0.15m)

2. Which expression is equivalent to 3(2x − 4) + 5?

A. 6x − 7

B. 6x + 1

C. 6x − 17

D. $5x - 9$

3. What are the zeros of the function $f(x) = x^2 - 9$?

A. $x = 3$ only

B. $x = -3$ only

C. $x = \pm 9$

D. $x = \pm 3$

4. Solve for x: $-2(x + 3) = 10$.

A. $x = 8$

B. $x = -8$

C. $x = 2$

D. $x = -2$

5. A function is defined by $f(x) = 2x^2 + 1$. What is the value of $f(-3)$?

A. 19

B. −19

C. −17

D. 13

6. A line is written in standard form as $3x + 2y = 12$. What is the y-intercept of this line?

A. (0, 12)

B. (12, 0)

C. (0, 6)

D. (6, 0)

7. Which equation represents an exponential function with a y-intercept of 4 and a base of 3?

A. $f(x) = 3(4)^x$

B. $f(x) = 4(3)^x$

C. $f(x) = 4x + 3$

D. $f(x) = 3x + 4$

8. A box contains 6 white, 4 black, and 2 red balls. What is the probability of drawing a black ball at random?

A. 1/2

B. 1/6

C. 1/4

D. 1/3

9. What is the slope of the line passing through the points (−3, 4) and (5, −2)?

A. $-3/4$

B. $3/4$

C. $-4/3$

D. $4/3$

10. Solve the system of equations $y = 2x + 1$ and $y = -x + 7$.

A. (1, 3)

B. (3, 7)

C. (2, 5)

D. (5, 11)

11. Which expression is the completely factored form of $2x^2 - 18$?

A. $(2x - 3)(x + 6)$

B. $2(x - 3)(x + 3)$

C. $2(x^2 - 9)$

D. $(2x - 6)(x + 3)$

12. A function is defined by $f(x) = x^3$. What is the value of $f(2)$?

A. 4

B. 6

C. 16

D. 8

13. The fifth term of an arithmetic sequence is 14, and the common difference is 3. What is the first term?

A. 2

B. 5

C. 8

D. 11

14. What value of k makes the equation $4x + k = 4(x + 3)$ true for all values of x?

A. 0

B. 3

C. 12

D. Infinitely many values

15. Which inequality represents the statement "a number x is more than −2 and at most 5"?

A. $-2 \leq x \leq 5$

B. $-2 \leq x < 5$

C. $-2 < x < 5$

D. $-2 < x \leq 5$

16. What is the value of $(-2)^4$?

A. −16

B. 16

C. 8

D. −8

17. A linear function passes through (0, −6) and has a slope of 2. What is the x-intercept of this function?

A. (3, 0)

B. (−3, 0)

C. (−6, 0)

D. (6, 0)

18. Which description best represents the graph of a linear decreasing function?

A. A curve that falls and approaches a horizontal line

B. A parabola that opens downward

C. A straight line falling from upper-left to lower-right

D. A straight line rising from lower-left to upper-right

19. Two numbers have a sum of 15 and a product of 56. What are the two numbers?

A. 4 and 11

B. 5 and 10

C. 6 and 9

D. 7 and 8

20. Which expression is equivalent to $(x + 3)^2$?

A. $x^2 + 9$

B. $x^2 + 6x + 9$

C. $x^2 + 3x + 9$

D. $x^2 + 6x + 3$

21. A scatter plot has 10 data points all falling close to a straight line with positive slope. Which value of the correlation coefficient is most likely?

A. $r = 0$

B. $r = -1$

C. $r = 0.95$

D. $r = -0.95$

22. Solve for x: $5/(x - 2) = 1$.

A. $x = 7$

B. $x = 3$

C. $x = -3$

D. $x = 5$

23. A 24-meter rope is cut into two pieces such that one piece is twice as long as the other. How long is the longer piece?

A. 8 meters

B. 10 meters

C. 12 meters

D. 16 meters

24. Convert $y = 2x - 4$ to standard form with a positive leading coefficient.

A. $2x + y = 4$

B. $2x - y = 4$

C. $-2x + y = 4$

D. $2x - y = -4$

25. Which statement best describes the function $f(x) = -3x^2 + 1$?

A. Linear and decreasing

B. Exponential and decreasing

C. Quadratic and opens downward

D. Quadratic and opens upward

26. A line of best fit has the equation $\hat{y} = 1.8x + 4$. What does the model predict for y when x = 10?

A. y = 22

B. y = 18

C. y = 4

D. y = 24

27. If 2^x = 32, what is the value of x?

A. x = 4

B. x = 5

C. x = 6

D. x = 16

28. Which set of side lengths could form a right triangle?

A. 4, 5, 6

B. 6, 8, 12

C. 5, 12, 14

D. 7, 24, 25

29. Solve for x: $6 - 2x = 8 - 3x$.

A. $x = -2$

B. $x = 0$

C. $x = 2$

D. $x = 14$

30. What is the maximum value of the function $f(x) = -2(x - 3)^2 + 8$?

A. 8

B. −8

C. 3

D. −2

31. What is the median of the data set 4, 8, 10, 12, 15?

A. 8

B. 10

C. 9.8

D. 12

32. What is the slope of the line represented by the equation $y = -7$?

A. $-7$

B. 7

C. 0

D. Undefined

33. A quadratic function has zeros at $x = 2$ and $x = -5$ and a leading coefficient of 1. Which expression represents the function in standard form?

A. $x^2 - 3x + 10$

B. $x^2 - 3x - 10$

C. $x^2 + 3x + 10$

D. $x^2 + 3x - 10$

34. Which of the following is a polynomial of degree 3?

A. $x^3 - 2x + 5$

B. $x^2 + 3x - 1$

C. $2x^4 + x$

D. $4x + 7$

35. A bag contains 3 quarters, 4 dimes, and 5 nickels. If a coin is drawn at random, what is the probability that it is a dime?

A. 1/4

B. 1/3

C. 5/12

D. 3/12

# ANSWER KEY WITH EXPLANATIONS – PRACTICE EXAM 51

1. C — $C = 0.15m + 25$. The total cost is the per-mile rate multiplied by miles driven plus the fixed fee. Modeling a per-unit cost as a coefficient on the variable and a flat fee as a constant produces the linear cost equation.
2. A — $6x - 7$. Distributing gives $6x - 12 + 5$, and combining the constants yields $6x - 7$. Multiplying every term inside the parentheses by 3 before combining like terms ensures accuracy.
3. D — $x = \pm 3$. Setting $x^2 - 9 = 0$ gives $x^2 = 9$, so $x = \pm\sqrt{9} = \pm 3$. A quadratic of this form always has two real solutions equal in magnitude but opposite in sign.
4. B — $x = -8$. Distributing gives $-2x - 6 = 10$, so $-2x = 16$ and $x = -8$. Dividing by a negative coefficient produces a negative solution from a positive right-hand value.
5. A — 19. Substituting $x = -3$ gives $2(-3)^2 + 1 = 2(9) + 1 = 19$. Squaring the negative input before applying the coefficient prevents the sign error behind the −17 distractor.
6. C — (0, 6). Isolating y in $3x + 2y = 12$ gives $2y = -3x + 12$, so $y = -(3/2)x + 6$, revealing a y-intercept of 6. The y-intercept is the constant term once the equation is in slope-intercept form.
7. B — $f(x) = 4(3)^x$. The general form $a(b)^x$ has y-intercept a (the value when $x = 0$) and base b, so $a = 4$ and $b = 3$ produces $4(3)^x$. The coefficient sets the starting value and the base controls the growth rate.
8. D — 1/3. The probability is favorable outcomes over total outcomes: 4 black out of 12 total, simplifying to 1/3. Reducing by the greatest common factor expresses the probability in lowest terms.

9. A — −3/4. The slope is $(-2 - 4)/(5 - (-3)) = -6/8 = -3/4$. Reducing the fraction by the greatest common factor produces the simplest form.
10. C — (2, 5). Setting $2x + 1 = -x + 7$ gives $3x = 6$, so $x = 2$, and substituting yields $y = 5$. Two expressions for y can be set equal to each other when both equations are solved for the same variable.
11. B — $2(x - 3)(x + 3)$. Factoring out the GCF 2 leaves $x^2 - 9$, a difference of squares that factors as $(x - 3)(x + 3)$. Removing the GCF first ensures the expression is in completely factored form.
12. D — 8. Substituting gives $f(2) = 2^3 = 8$. Cubing the input multiplies it by itself three times, producing the function's output.
13. A — 2. Using $a_5 = a_1 + 4d$, the equation $14 = a_1 + 4(3)$ gives $a_1 = 14 - 12 = 2$. Working backward from a known term and the common difference recovers the first term.
14. C — 12. For the equation to hold for all x, the constants must match: $4x + k = 4x + 12$ requires $k = 12$. An identity true for all values of x demands equal coefficients and equal constant terms on both sides.
15. D — $-2 < x \leq 5$. "More than −2" uses a strict inequality (>), and "at most 5" uses ≤. Each verbal phrase maps to a specific inequality symbol, with "more than" excluding the boundary and "at most" including it.
16. B — 16. Raising −2 to an even power gives a positive result: $(-2)^4 = 16$. Negative bases produce positive outputs at even exponents and negative outputs at odd exponents.
17. A — (3, 0). Using $y = 2x - 6$ and setting $y = 0$ gives $0 = 2x - 6$, so $x = 3$. The x-intercept occurs where the function output equals zero.
18. C — A straight line falling from upper-left to lower-right. A linear function has a constant rate of change shown as a straight line, and "decreasing" means a negative slope. A negative slope produces a graph that drops as x increases.
19. D — 7 and 8. Verifying directly: $7 + 8 = 15$ and $7 \times 8 = 56$, which satisfies both conditions. Setting up a system or testing each option confirms the unique pair.
20. B — $x^2 + 6x + 9$. Squaring a binomial follows $(a + b)^2 = a^2 + 2ab + b^2$, giving $x^2 + 2(x)(3) + 9$. The middle term comes from twice the product of the two terms, which the missing-middle distractor omits.
21. C — $r = 0.95$. Points falling close to a positive-sloped line indicate a strong positive linear relationship, producing a correlation coefficient close to +1. Magnitude near 1 reflects tight clustering, and the positive sign reflects the upward direction.
22. A — $x = 7$. Multiplying both sides by $(x - 2)$ gives $5 = x - 2$, so $x = 7$. Clearing the denominator first turns a rational equation into a linear one for straightforward solving.
23. D — 16 meters. Letting the shorter piece be x and the longer 2x, the equation $3x = 24$ gives $x = 8$, so the longer piece is 16. Defining the unknown clearly and writing one equation in one variable solves a two-part division problem efficiently.
24. B — $2x - y = 4$. Subtracting y from both sides of $y = 2x - 4$ and rearranging gives $2x - y = 4$. Standard form requires a positive leading coefficient, which is achieved by writing the x-term first.
25. C — Quadratic and opens downward. The presence of an $x^2$ term identifies a quadratic, and the negative leading coefficient causes the parabola to open downward. The sign of the leading coefficient controls the direction of opening.
26. A — $y = 22$. Substituting $x = 10$ into $\hat{y} = 1.8x + 4$ gives $1.8(10) + 4 = 22$. A line of best fit is used to predict output values by plugging in the input.

27. B — $x = 5$. Rewriting 32 as $2^5$ gives $2^x = 2^5$, so $x = 5$. When the bases are equal, the exponents must be equal.
28. D — 7, 24, 25. The Pythagorean check gives $7^2 + 24^2 = 49 + 576 = 625 = 25^2$, so these lengths form a right triangle. Three positive lengths form a right triangle when the sum of the squares of the two smaller equals the square of the largest.
29. C — $x = 2$. Adding $3x$ to both sides gives $6 + x = 8$, so $x = 2$. Collecting variable terms on one side reveals the value directly.
30. A — 8. In vertex form $a(x - h)^2 + k$, the value k is the maximum when $a < 0$, giving $k = 8$ here. A downward-opening parabola attains its maximum at the vertex.
31. B — 10. With five ordered values 4, 8, 10, 12, 15, the middle value is 10. The median of an odd-sized data set is the single value at the center.
32. C — 0. The equation $y = -7$ represents a horizontal line, where y stays constant for any value of x, so the rise is 0. A horizontal line has zero slope, distinct from a vertical line whose slope is undefined.
33. D — $x^2 + 3x - 10$. Zeros of 2 and −5 give factors $(x - 2)(x + 5)$, and expanding yields $x^2 + 3x - 10$. Each root r contributes a factor $(x - r)$, and the leading coefficient of 1 leaves the product unscaled.
34. A — $x^3 - 2x + 5$. The highest power of x in this expression is 3, defining the degree of the polynomial. The degree of a polynomial is determined by the largest exponent on the variable.
35. B — 1/3. The probability is 4 dimes out of 12 total coins, which simplifies to 1/3. Reducing the fraction by the greatest common factor expresses the probability in lowest terms.