PRACTICE EXAM 56: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. Solve for x: $4 - x = 2x + 13$.

A. $x = 3$

B. $x = 9$

C. $x = -9$

D. $x = -3$

2. A line passes through the points (2, 1) and (5, 7). What is the slope of the line?

A. 2

B. −2

C. 1/2

D. 3

3. A geometric sequence has a first term of 5 and a common ratio of 2. What is the fifth term?

A. 40

B. 60

C. 80

D. 100

4. What is the value of $3^0 + 4^0$?

A. 0

B. 2

C. 7

D. 12

5. Which expression is equivalent to $2x(3x - 4)$?

A. $6x - 8$

B. $6x^2 + 8x$

C. $6x^2 - 4$

D. $6x^2 - 8x$

6. A function is defined by $f(x) = 2x - 5$. What is the value of $f(4)$?

A. -3

B. 8

C. 3

D. 13

7. Which expression is the completely factored form of $2x^2 - 8$?

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

B. $(x - 2)(2x + 4)$

C. $(2x - 2)(x + 4)$

D. $2(x^2 - 4)$

8. What are the roots of the equation $x^2 - 8x + 16 = 0$?

A. $x = 4$ and $x = -4$

B. $x = 4$ only, as a repeated root

C. $x = 16$ and $x = 0$

D. $x = 2$ and $x = 8$

9. Solve for x: $3(x + 2) - 2x = 11$.

A. $x = 1$

B. $x = 11$

C. $x = 8$

D. $x = 5$

10. A scatter plot shows a strong negative linear correlation. Which value of the correlation coefficient is most likely?

A. $r = 1$

B. $r = 0.85$

C. $r = -0.91$

D. $r = 0.10$

11. What is the y-intercept of the line represented by $2x + 3y = 18$?

A. $(0, 6)$

B. $(0, 18)$

C. $(6, 0)$

D. $(0, -6)$

12. A right triangle has legs of length 12 and 16. What is the length of the hypotenuse?

A. 18

B. 20

C. 22

D. 28

13. What is the vertex of the parabola $y = x^2 - 6x + 7$?

A. $(-3, -2)$

B. $(3, 2)$

C. $(3, -2)$

D. $(-3, 2)$

14. What is the slope of a line parallel to the line $y = -3x + 4$?

A. 3

B. $-1/3$

C. $1/3$

D. -3

15. A bag contains 5 red, 4 blue, and 6 green marbles. What is the probability of drawing a green marble?

A. 6/15

B. 2/5

C. 1/3

D. 1/2

16. Which sequence is arithmetic?

A. 2, 5, 8, 11, …

B. 2, 4, 8, 16, …

C. 1, 4, 9, 16, …

D. 1, 1, 2, 3, 5, …

17. Solve for x: $6x - 9 = 3x + 6$.

A. $x = 1$

B. $x = 3$

C. $x = 5$

D. $x = 9$

18. A function is defined by $f(x) = \sqrt{x} + 2$. What is the domain of the function?

A. All real numbers

B. $x > 2$

C. $x \geq -2$

D. $x \geq 0$

19. Which equation represents a quadratic function?

A. $y = x^2 + 1$

B. $y = 2x + 5$

C. y = 3^x

D. $y = 5/x$

20. What is the median of the data set 4, 6, 8, 10, 12, 14, 16?

A. 8

B. 10

C. 11

D. 12

21. A line is written in slope-intercept form as $y = -2x + 5$. What is the x-intercept of this line?

A. (5, 0)

B. (−5, 0)

C. (5/2, 0)

D. (0, 5/2)

22. A function is defined by $g(x) = 2x^2 - x$. What is the value of $g(-2)$?

A. −10

B. −6

C. 6

D. 10

23. What is the value of the expression $(-3)^2 + (-2)^3$?

A. 1

B. −1

C. 17

D. −17

24. A function is defined by $f(x) = 3x$. What is the value of $f^{-1}(12)$?

A. 36

B. 4

C. 12

D. 1/4

25. Which equation represents $2x - 3y = 9$ in slope-intercept form?

A. $y = -(2/3)x + 3$

B. $y = (3/2)x - 3$

C. $y = (2/3)x - 3$

D. $y = (2/3)x + 3$

26. A geometric sequence has the first four terms 3, 12, 48, 192. What is the common ratio?

A. 3

B. 9

C. 16

D. 4

27. What are the solutions to the equation $2x^2 + 7x - 4 = 0$?

A. $x = 1/2$ and $x = 4$

B. $x = 1/2$ and $x = -4$

C. $x = -1/2$ and $x = -4$

D. $x = -1/2$ and $x = 4$

28. A linear function passes through the point (1, 3) and has a slope of −2. What is the y-intercept of the function?

A. (0, 5)

B. (0, 1)

C. (0, −5)

D. (0, 3)

29. Which expression is the completely factored form of $x^2 - 11x + 28$?

A. $(x + 4)(x + 7)$

B. $(x - 2)(x - 14)$

C. $(x - 4)(x - 7)$

D. $(x - 1)(x - 28)$

30. Solve the inequality $-2(x - 5) > 4$.

A. $x > -3$

B. $x < -3$

C. $x > 3$

D. $x < 3$

31. The width of a rectangle is 3 less than its length. If the perimeter of the rectangle is 26 units, what is the length?

A. 8 units

B. 11 units

C. 5 units

D. 7 units

32. A car's value depreciates by 6% per year. Which multiplier represents the fraction of value the car retains each year?

A. 0.06

B. 0.94

C. 1.06

D. 0.6

33. What is the simplest radical form of $\sqrt{72}$?

A. $8\sqrt{2}$

B. $36\sqrt{2}$

C. $12\sqrt{2}$

D. $6\sqrt{2}$

34. The cost of n textbooks is given by $C(n) = 45n + 12$. What does the constant 12 represent in this context?

A. The total number of textbooks ordered

B. The cost per individual textbook ordered

C. A fixed cost added regardless of the number of books

D. The total cost when n equals zero textbooks

35. Combine the expressions $(3x^2 - 4x + 1) + (2x^2 + 6x - 5)$.

A. $5x^2 + 2x - 4$

B. $5x^2 + 2x + 4$

C. $5x^2 - 2x - 4$

D. $6x^2 + 2x – 4$

ANSWER KEY WITH EXPLANATIONS – PRACTICE EXAM 56

1. D — $x = -3$. Subtracting 13 and adding x to both sides gives $-9 = 3x$, so $x = -3$. Collecting variables on one side and constants on the other is the standard procedure for linear equations.
2. A — 2. The slope is $(7 - 1)/(5 - 2) = 6/3 = 2$. Keeping the coordinates in matching order in numerator and denominator yields the correct rate of change.
3. C — 80. Multiplying each term by 2 produces 5, 10, 20, 40, 80, with 80 being the fifth term. Each term in a geometric sequence multiplies the previous by the common ratio.
4. B — 2. Any nonzero base raised to the zero power equals 1, so $3^0 + 4^0 = 1 + 1 = 2$. The zero-exponent rule simplifies the expression before addition.
5. D — $6x^2 - 8x$. Distributing $2x$ across $(3x - 4)$ gives $(2x)(3x) + (2x)(-4) = 6x^2 - 8x$. Multiplying like bases adds the exponents, producing x^2 from $x \cdot x$.
6. C — 3. Substituting $x = 4$ gives $2(4) - 5 = 8 - 5 = 3$. Following the order of operations carefully prevents the 8 distractor that omits the subtraction.
7. A — $2(x - 2)(x + 2)$. Factoring out the GCF 2 leaves $x^2 - 4$, a difference of squares that factors into $(x - 2)(x + 2)$. Removing the GCF first ensures the expression is in completely factored form.
8. B — $x = 4$ only, as a repeated root. The equation factors as $(x - 4)^2 = 0$, producing a single solution $x = 4$ counted twice. A perfect-square quadratic has one repeated real root where the parabola just touches the x-axis.
9. D — $x = 5$. Distributing gives $3x + 6 - 2x = 11$, which simplifies to $x + 6 = 11$, so $x = 5$. Collecting like terms before isolating the variable produces the answer.
10. C — $r = -0.91$. A strong negative correlation has a coefficient with absolute value close to 1 and a negative sign. The negative sign indicates the downward trend, while the magnitude near 1 indicates tight clustering.
11. A — (0, 6). Solving $2x + 3y = 18$ for y gives $3y = -2x + 18$, so $y = -(2/3)x + 6$, revealing a y-intercept of 6. The y-intercept is the constant term once the equation is in slope-intercept form.
12. B — 20. The Pythagorean theorem gives $c^2 = 12^2 + 16^2 = 144 + 256 = 400$, so $c = 20$. The set 12-16-20 is the 3-4-5 Pythagorean triple scaled by 4.
13. C — (3, −2). The vertex x-coordinate is $-b/(2a) = 6/2 = 3$, and substituting gives $9 - 18 + 7 = -2$. The vertex marks the minimum of an upward-opening parabola.
14. D — −3. Parallel lines share the same slope, so any line parallel to $y = -3x + 4$ also has slope −3. Two lines are parallel exactly when their slopes are equal but their intercepts differ.
15. B — 2/5. The probability is 6 green marbles out of 15 total, which simplifies to 2/5. Reducing the fraction by the greatest common factor expresses the probability in lowest terms.
16. A — 2, 5, 8, 11, … An arithmetic sequence adds a constant difference between successive terms, here 3 each time. The other options grow by multiplication, by squaring, or by the Fibonacci rule.
17. C — $x = 5$. Subtracting $3x$ and adding 9 give $3x = 15$, so $x = 5$. Collecting variables on one side and constants on the other isolates the variable.
18. D — $x \geq 0$. The square-root function requires a non-negative argument, so $x \geq 0$ is required for $\sqrt{x}$ to be defined. The "+ 2" outside the radical does not affect the input restriction.
19. A — $y = x^2 + 1$. A quadratic function contains an x^2 term as its highest power. The other options represent linear, exponential, and rational functions.
20. B — 10. With seven ordered values, the median is the 4th value, which is 10. The median of an odd-sized data set is the single value at the center.
21. C — (5/2, 0). Setting $y = 0$ in $y = -2x + 5$ gives $0 = -2x + 5$, so $x = 5/2$. The x-intercept occurs where the function output equals zero.

22. D — 10. Substituting gives $g(-2) = 2(-2)^2 - (-2) = 2(4) + 2 = 10$. Squaring the negative input before applying the coefficient, and subtracting a negative correctly, prevent sign errors.
23. A — 1. Evaluating each term gives $(-3)^2 = 9$ and $(-2)^3 = -8$, so $9 + (-8) = 1$. Even exponents produce positive results while odd exponents preserve the sign of the base.
24. B — 4. Setting $3x = 12$ gives $x = 4$, so $f^{-1}(12) = 4$. The inverse function returns the input that produced a given output in the original function.
25. C — $y = (2/3)x - 3$. Isolating y gives $-3y = -2x + 9$, and dividing by -3 yields $y = (2/3)x - 3$. The slope is the coefficient of x and the constant is the y-intercept.
26. D — 4. Each term is four times the previous: $12/3 = 4$ and $48/12 = 4$. A consistent ratio between successive terms defines a geometric sequence.
27. B — $x = 1/2$ and $x = -4$. Factoring gives $(2x - 1)(x + 4) = 0$, so $2x - 1 = 0$ or $x + 4 = 0$, yielding $x = 1/2$ or $x = -4$. Setting each factor to zero applies the zero-product property.
28. A — (0, 5). Substituting (1, 3) into $y = -2x + b$ gives $3 = -2 + b$, so $b = 5$. The y-intercept is the constant value once the slope and a point are known.
29. C — $(x - 4)(x - 7)$. The factors must multiply to 28 and add to -11, which -4 and -7 satisfy. Both factors carry negative signs because the product is positive while the sum is negative.
30. D — $x < 3$. Distributing gives $-2x + 10 > 4$; subtracting 10 gives $-2x > -6$, and dividing by -2 reverses the inequality to $x < 3$. Dividing by a negative number always flips the direction of the inequality.
31. A — 8 units. Letting the length be L and width $L - 3$, the perimeter equation $2L + 2(L - 3) = 26$ simplifies to $4L - 6 = 26$, so $L = 8$. The perimeter formula for a rectangle is $2L + 2W$, and substituting the width expression in terms of L allows a one-variable solution.
32. B — 0.94. A 6% loss leaves $100\% - 6\% = 94\%$ retained each year, expressed as the decimal 0.94. The retention factor is $1 - r$, while the loss rate is r itself.
33. D — $6\sqrt{2}$. Factoring 72 as 36×2 gives $\sqrt{72} = \sqrt{36} \cdot \sqrt{2} = 6\sqrt{2}$. Pulling out the largest perfect-square factor reduces the radical to its simplest form.
34. C — A fixed cost added regardless of the number of books. In $C(n) = 45n + 12$, the constant 12 is the y-intercept, the cost incurred even when $n = 0$. The coefficient 45 represents the per-book cost, while 12 is the unchanging base charge.
35. A — $5x^2 + 2x - 4$. Combining like terms gives $(3 + 2)x^2 + (-4 + 6)x + (1 - 5) = 5x^2 + 2x - 4$. Adding the corresponding terms of two polynomials produces a single polynomial of the same form.