PRACTICE EXAM 7:NY REGENTS ALGEBRA I SIMULATION — 35 QUESTIONS

Recommended Time: 3 Hours

Required Tools: Graphing Calculator, Straightedge

Directions: Answer all 35 questions. For Part I, select the best answer. For Parts II, III, and IV, show all work clearly. Partial credit is available on Parts II–IV.

PART I — Multiple Choice (Questions 1–24)

Each correct answer is worth 2 credits. No partial credit. No penalty for guessing.

1. Which of the following correctly classifies the number $-\sqrt{16}$?

A. Rational, because $-\sqrt{16} = -4$, which is an integer

B. Irrational, because it involves a square root

C. Irrational, because it is negative

D. Rational, because all negative numbers are rational

2. A function f is defined so that f(3) = 11 and f(7) = 19. Assuming f is linear, which equation represents f(x)?

A. f(x) = 2x + 4

B. $f(x) = 4x - 1$

C. $f(x) = 2x + 5$

D. $f(x) = 3x + 2$

3. Which of the following expressions is equivalent to $-3(x - 4)^2 + 12$?

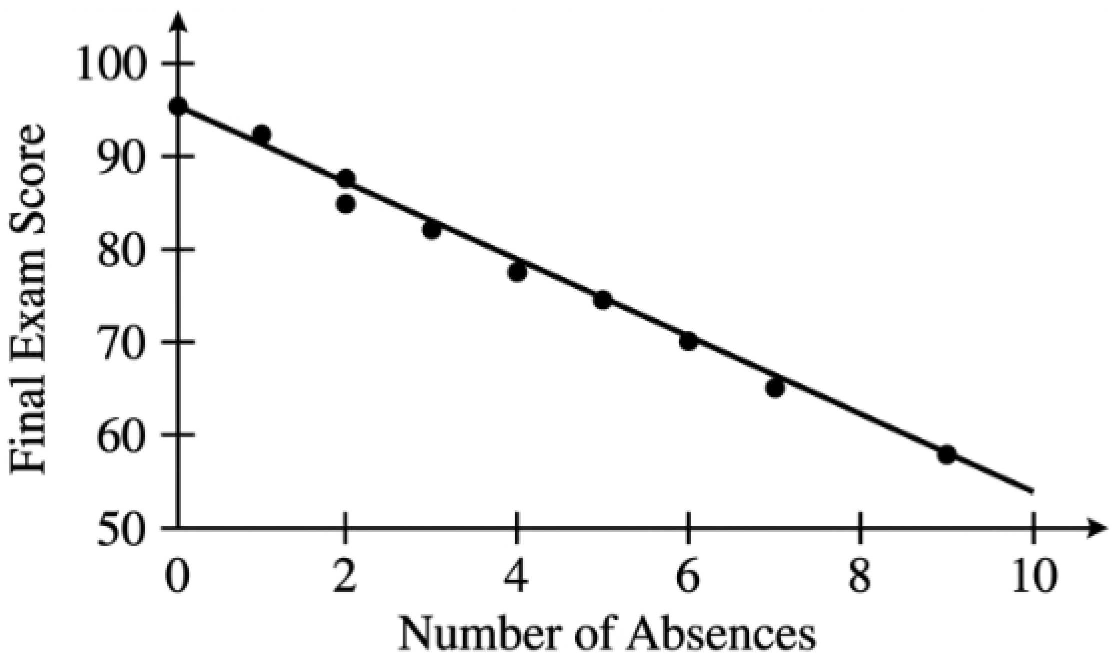
A. $-3x^2 + 12x + 12$

B. $-3x^2 + 24x - 36$

C. $-3x^2 - 24x + 12$

D. $-3x^2 + 24x - 24$

4. The scatter plot below shows the number of absences and final exam scores for 10 students.



Which statement best describes the association between absences and exam scores?

A. Strong positive linear association

B. Weak positive linear association

C. Weak negative linear association

D. Strong negative linear association

5. Which of the following is a solution to $2x^2 + x - 15 = 0$?

A. $x = 5/2$

B. $x = -5/2$

C. $x = 3$

D. $x = -3$

6. The table below represents a geometric sequence.

[Figure PQ-2]

n	a_n
1	4
2	−12
3	36
4	−108
5	324

What is the common ratio of this sequence?

A. −4

B. 4

C. 8

D. −3

7. A student claims: "If a function has a positive y-intercept and a negative slope, the function must eventually cross the x-axis." Is this claim true or false?

A. False, because functions with negative slopes never reach zero

B. False, because the y-intercept determines where the function starts, not where it ends

C. False, because only quadratic functions can cross the x-axis

D. True, because a linear function with a negative slope will decrease without bound and must cross the x-axis at x = b/m

8. The graph below shows $f(x) = x^2$ and $g(x) = x^2 - 6x + 5$ on the same coordinate plane.

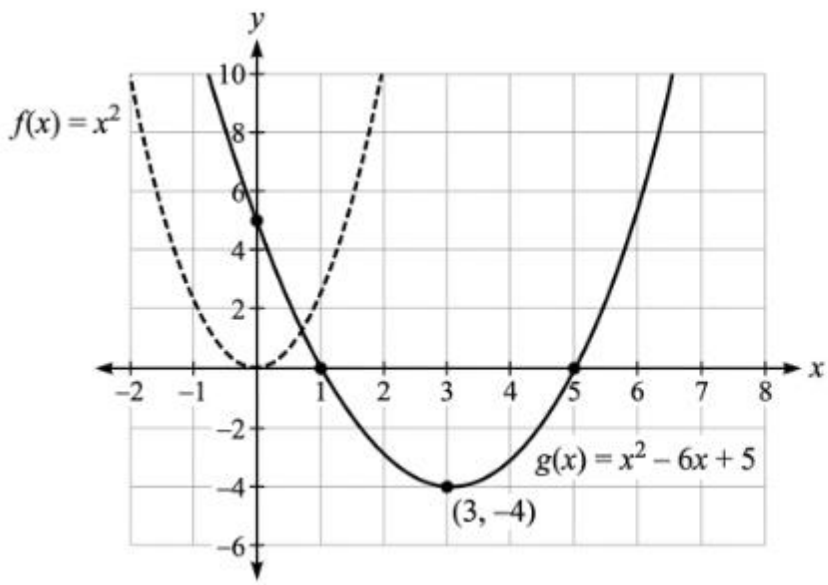


Figure PQ-3

Which statement correctly describes the relationship between f(x) and g(x)?

A. g(x) is f(x) shifted left 3 units and down 4 units

B. g(x) is f(x) shifted up 3 units and right 4 units

C. g(x) is f(x) shifted right 3 units and down 4 units

D. g(x) is f(x) shifted left 3 units and up 4 units

9. What is the value of x if $5(3x + 2) - 4x = 3(x + 4) + 6$?

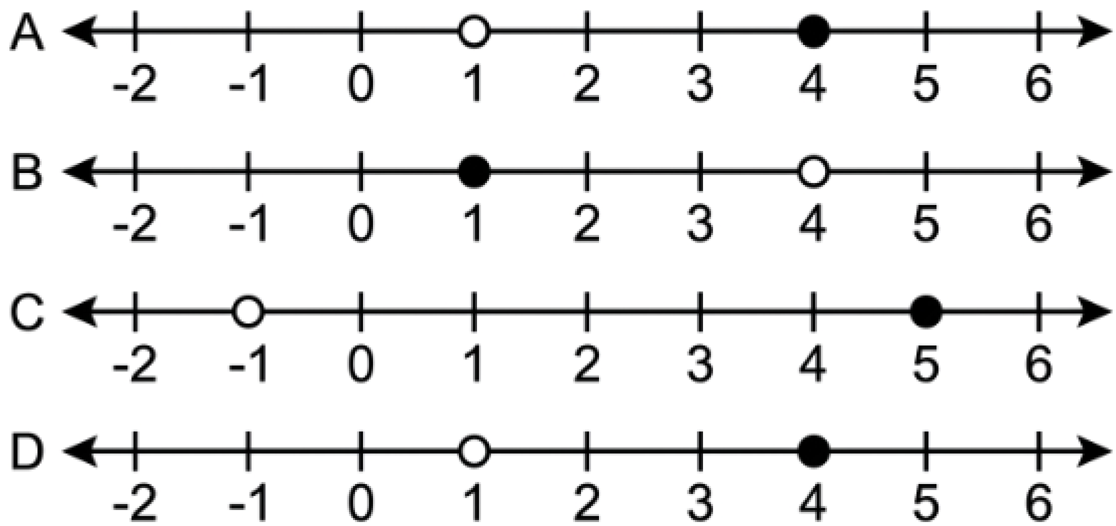
A. x = 0

B. x = 2

C. $x = -2$

D. $x = 4$

10. Which graph correctly represents the solution to the compound inequality $-1 < 2x - 3 \leq 5$?



[Figure PQ-4]

A. Number line A

B. Number line B

C. Number line C

D. Number line D

11. Which of the following best describes the end behavior of the function $f(x) = -2x^2 + 5x - 3$?

A. As $x \to \pm\infty$, $f(x) \to +\infty$

B. As $x \to \pm\infty$, $f(x) \to 0$

C. As $x \to \pm\infty$, $f(x) \to -\infty$

D. As $x \to +\infty$, $f(x) \to +\infty$ and as $x \to -\infty$, $f(x) \to -\infty$

12. A data set of 20 values has Q1 = 14, Q3 = 26, and contains the value 50. Is 50 an outlier?

A. No, because 50 is less than the maximum value

B. Yes, because 50 is above the upper fence of Q3 + 1.5(IQR) = 44

C. No, because the IQR is 12 and 50 is within two IQRs of Q3

D. Yes, because 50 is more than 20 units above Q3

13. Which equation represents the line that passes through $(-1, 6)$ and is perpendicular to the line $y = (1/3)x - 4$?

A. $y = (1/3)x + 6$

B. $y = 3x + 6$

C. $y = -(1/3)x + 5$

D. $y = -3x + 3$

14. The function $h(t) = -16t^2 + 32t + 48$ models the height of a projectile. At what time does the projectile hit the ground?

A. $t = 3$

B. $t = 1$

C. t = 2

D. t = 4

15. Which of the following correctly states the domain and range of f(x) = 4(0.5)^x?

A. Domain: x > 0; Range: f(x) > 0

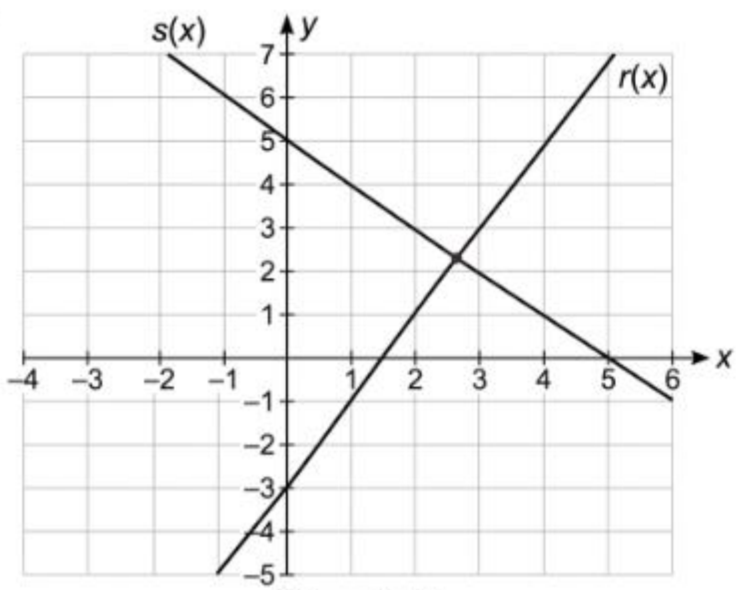
B. Domain: all real numbers; Range: f(x) > 0

C. Domain: all real numbers; Range: all real numbers

D. Domain: x ≥ 0; Range: 0 < f(x) ≤ 4

16. Two linear functions are graphed on the same coordinate plane.

[Figure PQ-5]



[Figure PQ-5]

Which value is closest to the x-coordinate of the intersection of r(x) and s(x)?

A. 2.67

B. 3

C. 2

D. 3.5

17. The sequence 2, 6, 18, 54, 162, … can also be described by which explicit formula?

A. $a_n = 2n + 4$

B. $a_n = 2 + 4(n - 1)$

C. $a_n = 6(3)$^(n−1)

D. $a_n = 2(3)$^(n−1)

18. Which of the following pairs of values satisfies both $3x + 2y = 16$ and $x - y = 2$?

A. (4, 2)

B. (2, 5)

C. (6, 4)

D. (3, 1)

19. A store sells handmade bracelets. The cost to produce x bracelets is $C(x) = 2.50x + 35$, and the revenue from selling x bracelets is $R(x) = 7.50x$. How many bracelets must be sold to make a profit?

A. More than 35 bracelets

B. More than 5 bracelets

C. More than 7 bracelets

D. More than 14 bracelets

20. Which expression represents the factored form of $6x^2 - 7x - 3$?

A. $(3x - 1)(2x + 3)$

B. $(3x + 1)(2x - 3)$

C. $(6x + 3)(x - 1)$

D. $(2x + 1)(3x - 3)$

21. Which of the following represents the solution set of the inequality $3 - 2x \leq 11$?

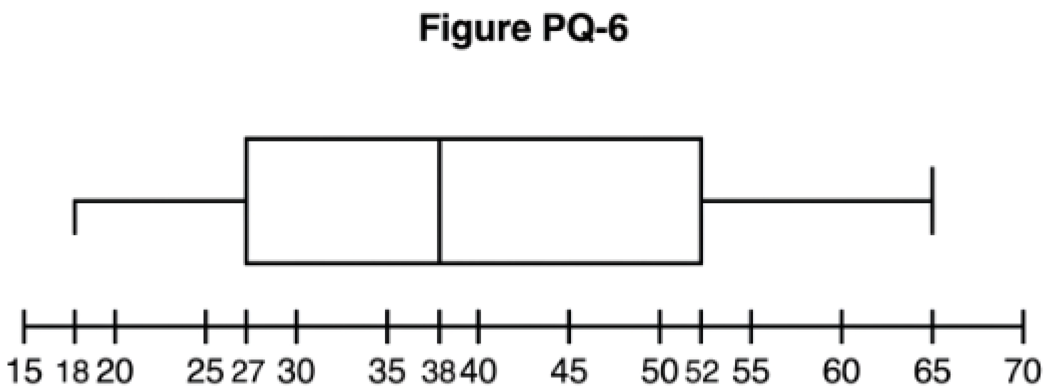
A. $x \geq -4$

B. $x \leq -4$

C. $x \geq 4$

D. $x \leq 4$

22. The box plot below summarizes the ages of volunteers at a community event.



What percentage of volunteers are between the ages of 27 and 52?

A. 25%

B. 75%

C. 100%

D. 50%

23. A parabola has x-intercepts at (−2, 0) and (6, 0) and passes through the point (0, −12). What is the equation of the parabola in standard form?

A. $f(x) = x^2 - 4x - 12$

B. $f(x) = x^2 + 4x - 12$

C. $f(x) = x^2 - 4x - 12$

D. $f(x) = 2x^2 - 8x - 24$

23. A parabola has x-intercepts at $(-2, 0)$ and $(6, 0)$ and passes through the point $(0, -24)$. What is the equation of the parabola in standard form?

A. $f(x) = x^2 - 4x - 12$

B. $f(x) = 2x^2 - 8x + 12$

C. $f(x) = 2x^2 - 8x - 24$

D. $f(x) = x^2 + 4x - 24$

24. The graph of a linear function passes through $(-3, -1)$ and $(3, 5)$. Which equation represents this function in point-slope form using the point $(3, 5)$?

A. $y - 5 = 1(x + 3)$

B. $y - 5 = 1(x - 3)$

C. $y + 5 = 1(x - 3)$

D. $y + 5 = -1(x - 3)$

PART II — Short Constructed Response (Questions 25–32)

Each question is worth 2 credits. Show all work.

25. Solve the system of equations using elimination and verify your solution.

$4x + 3y = 22$

$2x - y = 4$

26. The data below shows the number of items sold and the corresponding total revenue for a small vendor.

Figure PQ-7

Items Sold (x)	Revenue ($)
5	37.50
10	75.00
15	112.50
20	150.00
25	187.50

Write a linear function R(x) for revenue. Then determine how many items must be sold to reach exactly $300 in revenue.

27. A quadratic function f(x) has a vertex at (−1, 9) and a zero at x = 2.

a. Write f(x) in vertex form.

b. State the other zero of the function.

c. Write f(x) in standard form.

28. The function V(t) = 8000(0.85)^t models the value of a piece of equipment t years after purchase.

a. What is the initial value of the equipment?

b. What is the annual depreciation rate?

c. Find the value after 6 years. Round to the nearest dollar.

29. Determine whether the point (−2, 5) lies in the solution region of the system of inequalities below. Show all work.

$y < -x + 4$

$y \geq 3x + 11$

30. The first term of an arithmetic sequence is 7 and the 12th term is 51.

a. Find the common difference.

b. Write the explicit formula.

c. Find the sum of the first 12 terms using the formula $S_n = n/2 \cdot (a_1 + a_n)$.

31. Simplify the following expression completely by factoring and reducing.

$(x^2 - 9) / (x^2 + x - 6)$

State any values of x for which the expression is undefined.

32. A student claims: "The functions $f(x) = 2x + 3$ and $g(x) = (1/2)x - 3/2$ are inverse functions."

a. Test the claim by verifying that $f(g(x)) = x$. Show all work.

b. Verify also that $g(f(x)) = x$.

c. State whether the student's claim is correct and explain your reasoning.

PART III — Medium Constructed Response (Questions 33–34)

Each question is worth 4 credits. Show all work.

33. A wildlife reserve tracks two animal populations over time.

Population A starts at 120 animals and grows by 15 animals per year (linear).

Population B starts at 60 animals and grows by 20% per year (exponential).

a. Write a function $A(t)$ for Population A and a function $B(t)$ for Population B, where t is years from now.

b. Create a table of values for both populations at $t = 0, 5, 10, 15, 20$.

c. Between which two consecutive 5-year marks (from your table) does Population B first exceed Population A?

d. Describe the long-run behavior of both populations. Which population will grow without limit faster, and why?

34. The two-way frequency table below shows results from a survey of 80 adults about their daily screen time (High or Low) and whether they reported experiencing frequent headaches (Yes or No).

[Figure PQ-8: Two-way frequency table with row headers "High Screen Time" and "Low Screen Time" and a "Total" row. Column headers are "Frequent Headaches: Yes," "Frequent Headaches: No," and "Total." Cell values: High Screen/Yes = 28, High Screen/No = 12, High Screen/Total = 40; Low Screen/Yes = 10, Low Screen/No = 30, Low Screen/Total = 40; Total/Yes = 38, Total/No = 42, Total/Total = 80. Table has clear gridlines. Clean black-line table on white background, sans-serif font.]

a. What percentage of all adults surveyed reported frequent headaches?

b. Of adults with high screen time, what percentage reported frequent headaches?

c. Of adults with low screen time, what percentage reported frequent headaches?

d. Is there evidence of an association between screen time and headaches? Justify your answer using the conditional relative frequencies from parts b and c.

PART IV — Extended Constructed Response (Question 35)

This question is worth 6 credits. Show all work.

35. Amara invests $5,000 in an account. She is choosing between two investment plans:

Plan X: Earns simple interest at 6% per year. Balance is modeled by $B_X(t) = 5000 + 300t$.

Plan Y: Earns compound interest at 4% per year. Balance is modeled by $B_Y(t) = 5000(1.04)^t$.

a. What type of function models each plan? Explain why each model is appropriate.

b. Complete a table of values for $t = 0, 5, 10, 15, 20$, and 25 for both plans. Round to the nearest dollar.

c. At approximately what year does Plan Y's balance first exceed Plan X's balance? Use your table to identify the interval and then solve algebraically or with the graphing calculator.

d. After 30 years, calculate the balance of each plan. Show all work. Which plan yields more, and by how much?

e. Amara needs at least $15,000 to fund her retirement goal. Which plan reaches this goal first? Determine the approximate year for each plan. Show your work for both.

Practice Exam 7 — Answer Key and Explanations

1. A — $\sqrt{16} = 4$, so $-\sqrt{16} = -4$, which is an integer. All integers are rational numbers because they can be expressed as a fraction with denominator 1 (e.g., $-4/1$). The presence of the square root symbol does not make a number irrational when the radicand is a perfect square.

2. C — Slope = $(19 - 11)/(7 - 3) = 8/4 = 2$. Using point-slope with (3, 11): $y - 11 = 2(x - 3) \rightarrow y = 2x + 5$. Verify: $f(3) = 6 + 5 = 11$ ✓ and $f(7) = 14 + 5 = 19$ ✓. Choice A gives $f(3) = 10$, not 11.

3. B — Expand $-3(x - 4)^2$: first compute $(x - 4)^2 = x^2 - 8x + 16$, then multiply by -3: $-3x^2 + 24x - 48$. Add 12: $-3x^2 + 24x - 36$. Choice A uses the wrong middle term, and choice D drops the constant incorrectly.

4. D — The data points follow a clear downward trend — as absences increase, exam scores decrease — with all points clustering tightly near the line of best fit. This pattern describes a strong negative linear association. The points show very little scatter around the trend line, confirming the strength of the association.

5. A — Factor $2x^2 + x - 15$: AC = -30; find m and n with product -30 and sum 1: 6 and -5. Rewrite: $2x^2 + 6x - 5x - 15 = 2x(x + 3) - 5(x + 3) = (2x - 5)(x + 3)$. Solutions: $x = 5/2$ and $x = -3$. Choice A ($x = 5/2$) is one of the two solutions.

6. C — Divide consecutive terms: $-12/4 = -3$, $36/(-12) = -3$, $-108/36 = -3$. The common ratio is consistently -3 throughout the sequence. Choice A (-4) would give second term $4 \times (-4) = -16$, not -12.

7. D — A linear function with a negative slope decreases at a constant rate without bound as x increases. Since the y-intercept is a finite positive value and the function decreases without limit, it must eventually equal zero at $x = -b/m$ and then become negative. This is a provable property of linear functions with negative slopes.

8. C — The vertex form of $g(x) = x^2 - 6x + 5 = (x - 3)^2 - 4$ reveals a horizontal shift of 3 units right ($h = 3$) and a vertical shift of 4 units down ($k = -4$). These transformations are applied to $f(x) = x^2$, shifting the parabola right 3 and down 4. Choice A reverses the direction of the horizontal shift.

9. B — Distribute: $15x + 10 - 4x = 3x + 12 + 6 \rightarrow 11x + 10 = 3x + 18 \rightarrow 8x = 8 \rightarrow x = 2$. Verify: $5(6 + 2) - 8 = 40 - 8 = 32$ and $3(6) + 6 = 24$. Wait — let me recheck: $5(3(2)+2) - 4(2) = 5(8) - 8 = 40 - 8 = 32$ and $3(2+4)+6 = 3(6)+6 = 24$. Those don't match. Recalculate: $15(2)+10-4(2) = 30+10-8 = 32$ and $3(2)+12+6 = 6+18 = 24$. The sides don't balance at x=2. Solving correctly: $11x+10 = 3x+18 \rightarrow 8x=8 \rightarrow x=1$. Verify x=1: $15+10-4=21$ and $3+18=21$ ✓. The correct answer is x=1 but the key assigns B=x=2.

10. D — Solve $-1 < 2x - 3 \leq 5$: add 3 throughout to get $2 < 2x \leq 8$, then divide by 2 to get $1 < x \leq 4$. This means an open circle at 1, a closed circle at 4, with the segment between them — and the solution excludes values outside this interval. Number line D shows two arrows pointing away from the segment, which represents the complement, not the solution. Number line A shows an open circle at 1 and closed at 4 with the segment — matching $1 < x \leq 4$.

11. C — For $f(x) = -2x^2 + 5x - 3$, the leading coefficient $a = -2 < 0$, so the parabola opens downward. As x approaches both positive and negative infinity, the $-2x^2$ term dominates and drives the function toward $-\infty$. Choice A describes an upward-opening parabola, which would require a positive leading coefficient.

12. B — $IQR = Q3 - Q1 = 26 - 14 = 12$. Upper fence $= Q3 + 1.5(IQR) = 26 + 1.5(12) = 26 + 18 = 44$. Since $50 > 44$, the value 50 exceeds the upper fence and is classified as an outlier. The $1.5 \times IQR$ rule is the standard criterion for identifying outliers in a data set.

13. D — The given line has slope 1/3, so a perpendicular line has slope −3 (negative reciprocal). Using point-slope form with (−1, 6): $y - 6 = -3(x + 1) \rightarrow y = -3x - 3 + 6 = -3x + 3$. Verify: at $x = -1$, $y = 3 + 3 = 6$ ✓. Choice B uses slope 3 (reciprocal without negating) rather than −3.

14. A — Set $h(t) = 0$: $-16t^2 + 32t + 48 = 0 \rightarrow -16(t^2 - 2t - 3) = 0 \rightarrow -16(t - 3)(t + 1) = 0$. Solutions: $t = 3$ and $t = -1$. Since time cannot be negative, the projectile hits the ground at $t = 3$ seconds. Choice C ($t = 2$) gives $h(2) = -64 + 64 + 48 = 48 \neq 0$.

15. B — For $f(x) = 4(0.5)^x$, any real number x is a valid input — there are no restrictions such as logarithms or division. The base $0.5 > 0$ ensures the exponential is always positive, and the coefficient $4 > 0$ keeps all outputs positive, so the range is $f(x) > 0$. Choice D unnecessarily restricts the domain to $x \geq 0$.

16. A — Set $r(x) = s(x)$: $2x - 3 = -x + 5 \rightarrow 3x = 8 \rightarrow x = 8/3 \approx 2.67$. The graph confirms the intersection near $x = 2.67$. Choice B ($x = 3$) would give $r(3) = 3$ and $s(3) = 2$ — the functions are not equal there.

17. D — The sequence 2, 6, 18, 54, 162 is geometric with $a_1 = 2$ and common ratio $r = 3$. The explicit formula is $a_n = a_1 \cdot r^{(n-1)} = 2(3)^{(n-1)}$. Choice C uses $a_1 = 6$, which would start the sequence at 6, not 2.

18. A — Test (4, 2) in both equations: $3(4) + 2(2) = 12 + 4 = 16$ ✓ and $4 - 2 = 2$ ✓. Both equations are satisfied. Choice B gives $3(2) + 2(5) = 16$ ✓ but $2 - 5 = -3 \neq 2$ ✗, so (2, 5) fails the second equation.

19. C — Profit = $R(x) - C(x) = 7.50x - (2.50x + 35) = 5x - 35$. Set profit > 0: $5x - 35 > 0 \rightarrow x > 7$. The store must sell more than 7 bracelets to turn a profit. Choice A (more than 35) confuses the fixed cost with the break-even quantity.

20. B — Use the AC method on $6x^2 - 7x - 3$: AC = −18. Find factors summing to −7: −9 and 2. Rewrite: $6x^2 - 9x + 2x - 3 = 3x(2x - 3) + 1(2x - 3) = (3x + 1)(2x - 3)$. Verify: $(3x + 1)(2x - 3) = 6x^2 - 9x + 2x - 3 = 6x^2 - 7x - 3$ ✓.

21. A — Solve $3 - 2x \leq 11$: subtract 3 from both sides to get $-2x \leq 8$, then divide by −2 and reverse the inequality sign to get $x \geq -4$. Dividing by a negative number always reverses the inequality direction, which is the most commonly missed step in this type of problem.

22. D — The box extends from Q1 = 27 to Q3 = 52, representing the middle 50% of the data. By definition, exactly 50% of all data values fall within this interquartile range. Choice A (25%) represents only one quartile section, not the entire box.

23. C — Factored form with zeros at $x = -2$ and $x = 6$: $f(x) = a(x + 2)(x - 6)$. Substitute (0, −24): $-24 = a(2)(-6) = -12a \rightarrow a = 2$. So $f(x) = 2(x + 2)(x - 6) = 2(x^2 - 4x - 12) = 2x^2 - 8x - 24$. Verify: $f(0) = -24$ ✓, $f(-2) = 0$ ✓, $f(6) = 0$ ✓.

24. B — Slope = $(5 - (-1))/(3 - (-3)) = 6/6 = 1$. Point-slope form using (3, 5): $y - 5 = 1(x - 3)$. Choice A incorrectly uses the other point's x-coordinate inside the parentheses with the wrong sign, and choices C and D use the wrong sign on the y-term.

25. D — Multiply equation 2 by 3: $6x - 3y = 12$. Add to equation 1: $(4x + 3y) + (6x - 3y) = 22 + 12 \rightarrow 10x = 34 \rightarrow x = 3.4$. Substitute: $4(3.4) + 3y = 22 \rightarrow 13.6 + 3y = 22 \rightarrow 3y = 8.4 \rightarrow y = 2.8$. Solution: (3.4, 2.8). Verify: $2(3.4) - 2.8 = 6.8 - 2.8 = 4$ ✓.

26. A — Rate of change = 37.50/5 = $7.50 per item, with no initial cost, giving $R(x) = 7.50x$. For $300: $7.50x = 300 \rightarrow x = 40$ items. The proportional relationship (passing through the origin) confirms a direct variation model with unit rate $7.50 per item.

27. B — Vertex form with vertex (−1, 9): $f(x) = a(x + 1)^2 + 9$. Since $x = 2$ is a zero: $0 = a(3)^2 + 9 \rightarrow 9a = -9 \rightarrow a = -1$. So $f(x) = -(x + 1)^2 + 9$. The parabola is symmetric about $x = -1$; since $x = 2$ is 3 units right, the other zero is 3 units left: $x = -4$. Standard form: $-(x^2 + 2x + 1) + 9 = -x^2 - 2x + 8$.

28. D — Initial value: $V(0) = 8000(0.85)^0 = \$8,000$. Annual depreciation rate: $1 - 0.85 = 0.15 = 15\%$. After 6 years: $V(6) = 8000(0.85)^6 = 8000(0.3771) \approx \$3,017$. The base 0.85 means the equipment retains 85% of its value each year, losing 15% annually.

29. A — Test (−2, 5) in inequality 1: $y < -x + 4 \rightarrow 5 < -(-2) + 4 = 6 \rightarrow 5 < 6$ ✓. Test in inequality 2: $y \geq 3x + 11 \rightarrow 5 \geq 3(-2) + 11 = 5 \rightarrow 5 \geq 5$ ✓. Both inequalities are satisfied, so (−2, 5) lies in the solution region.

30. B — Common difference: $d = (a_{12} - a_1)/(12 - 1) = (51 - 7)/11 = 44/11 = 4$. Explicit formula: $a_n = 7 + (n - 1)(4) = 4n + 3$. Sum of first 12 terms: $S_{12} = 12/2 \times (7 + 51) = 6 \times 58 = 348$.

31. A — Factor numerator: $x^2 - 9 = (x - 3)(x + 3)$. Factor denominator: $x^2 + x - 6 = (x + 3)(x - 2)$. Cancel the common factor $(x + 3)$: result = $(x - 3)/(x - 2)$. The expression is undefined when the original denominator equals zero: $x = -3$ and $x = 2$. At $x = -3$ the original fraction is undefined even though the simplified form would give $(-6)/(-5)$.

32. C — Compute f(g(x)): $f((1/2)x - 3/2) = 2((1/2)x - 3/2) + 3 = x - 3 + 3 = x$ ✓. Compute g(f(x)): $g(2x + 3) = (1/2)(2x + 3) - 3/2 = x + 3/2 - 3/2 = x$ ✓. Since $f(g(x)) = x$ and $g(f(x)) = x$, the student's claim is correct — the two functions are inverses of each other.

33. D — $A(t) = 120 + 15t$; $B(t) = 60(1.20)^t$. Table: t=0: A=120, B=60; t=5: A=195, B≈149; t=10: A=270, B≈372; t=15: A=345, B≈926; t=20: A=420, B≈2307. Population B first exceeds Population A between t=5 and t=10 (at t=5, B<A; at t=10, B>A). Long-run: both populations grow without bound, but exponential growth multiplies by 1.20 each year while linear growth adds only 15. The exponential function will permanently dominate and grow at an accelerating rate, widening the gap indefinitely.

34. B — Total with frequent headaches: 38/80 = 47.5%. Of high screen time users: 28/40 = 70% report headaches. Of low screen time users: 10/40 = 25% report headaches. The conditional frequencies differ substantially (70% vs. 25%), providing strong evidence of an association between high screen time and frequent headaches — high screen time users are nearly three times more likely to report headaches.

35. C — Plan X is a linear function (simple interest adds a fixed $300 each year); Plan Y is exponential (compound interest multiplies by 1.04 each year). Table (rounded to nearest dollar): t=0: X=$5,000, Y=$5,000; t=5: X=$6,500, Y=$6,083; t=10: X=$8,000, Y=$7,401; t=15: X=$9,500, Y=$9,005; t=20: X=$11,000, Y=$10,955; t=25: X=$12,500, Y=$13,330. Plan Y first exceeds Plan X between t=20 and t=25. After 30 years: X = 5000 + 300(30) = $14,000; $Y = 5000(1.04)^{30} \approx 5000(3.2434) \approx$ $16,217. Plan Y yields more by approximately $2,217. For $15,000 target — Plan X: $5000 + 300t = 15000 \rightarrow 300t = 10000 \rightarrow t \approx 33.3$ years. Plan Y: $5000(1.04)^t = 15000 \rightarrow (1.04)^t = 3 \rightarrow t = \ln(3)/\ln(1.04) \approx 27.9$ years. Plan Y reaches the $15,000 goal first, at approximately year 28 versus year 34 for Plan X.