PRACTICE EXAM 10: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. 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.

Use the following context for Questions 1–3.

A city planner models the population of two neighborhoods. Neighborhood A has a population modeled by A(t) = 4500 + 120t, where t is years since 2020. Neighborhood B has a population modeled by B(t) = 3000(1.04)^t.

1. What type of function models Neighborhood A, and what does the value 120 represent?

A. Exponential; 120 is the growth factor per year

B. Linear; 120 is the y-intercept of the model

C. Quadratic; 120 is the rate of acceleration

D. Linear; 120 is the number of new residents added per year

2. What was the population of Neighborhood B in 2020, and what is its annual growth rate?

A. Initial population 3000; annual growth rate 4%

B. Initial population 1.04; annual growth rate 3000%

C. Initial population 3000; annual growth rate 0.04%

D. Initial population 4%; annual growth rate 3000

3. In which year do the two neighborhoods first have approximately the same population? Use your graphing calculator to find the intersection.

A. 2033

B. 2028

C. 2031

D. 2025

Use the following context for Questions 4–6.

A student collected data on the number of hours of TV watched per day and the corresponding GPA for 8 classmates. The data are entered into a calculator and produce the regression equation $\hat{y} = -0.35x + 3.90$ with correlation coefficient $r = -0.93$.

4. What does the slope −0.35 represent in context?

A. For each unit increase in GPA, TV hours decrease by 0.35

B. For each additional hour of TV watched, the predicted GPA decreases by 0.35 points

C. Students who watch no TV have a GPA of −0.35

D. TV watching causes a student's GPA to drop by 0.35 per semester

5. Which of the following best describes the association between TV hours and GPA?

A. Weak positive linear association

B. Moderate negative linear association

C. No linear association

D. Strong negative linear association

6. A student who watches 4 hours of TV per day has an actual GPA of 2.60. What is the residual for this student?

A. 1.30

B. 0.70

C. −0.70

D. −1.30

Use the following context for Questions 7–9.

A summer camp charges a registration fee of $50 and $30 per day. A competitor charges no registration fee but $45 per day.

7. Which system of equations models the total cost C for d days at each camp?

A. $C_1 = 30d + 50$ and $C_2 = 45d$

B. $C_1 = 50d + 30$ and $C_2 = 45d$

C. $C_1 = 30d$ and $C_2 = 45d + 50$

D. $C_1 = 30d - 50$ and $C_2 = 45d$

8. After how many days do both camps charge the same total amount?

A. 2 days

B. 10/3 days, approximately 3.33 days

C. 4 days

D. 5 days

9. A family is sending their child to camp for exactly 5 days. Which camp costs less, and by how much?

A. The competitor costs less by $75

B. The competitor costs less by $25

C. Both camps cost the same at 5 days

D. The first camp costs less by $25

10. Which of the following represents the product $(x - 7)(x + 7)(x^2 + 49)$?

A. $x^3 - 49x$

B. $x^4 - 2401$

C. $x^4 - 98x^2 + 2401$

D. $x^4 + 49x^2 - 2401$

11. A value of x satisfies the equation $4|x - 3| = 20$. Which values are solutions?

A. $x = 8$ and $x = -2$

B. $x = 8$ only

C. $x = -2$ only

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

12. The graph below shows the function $f(x) = 3^x$ and a horizontal line $y = 27$.

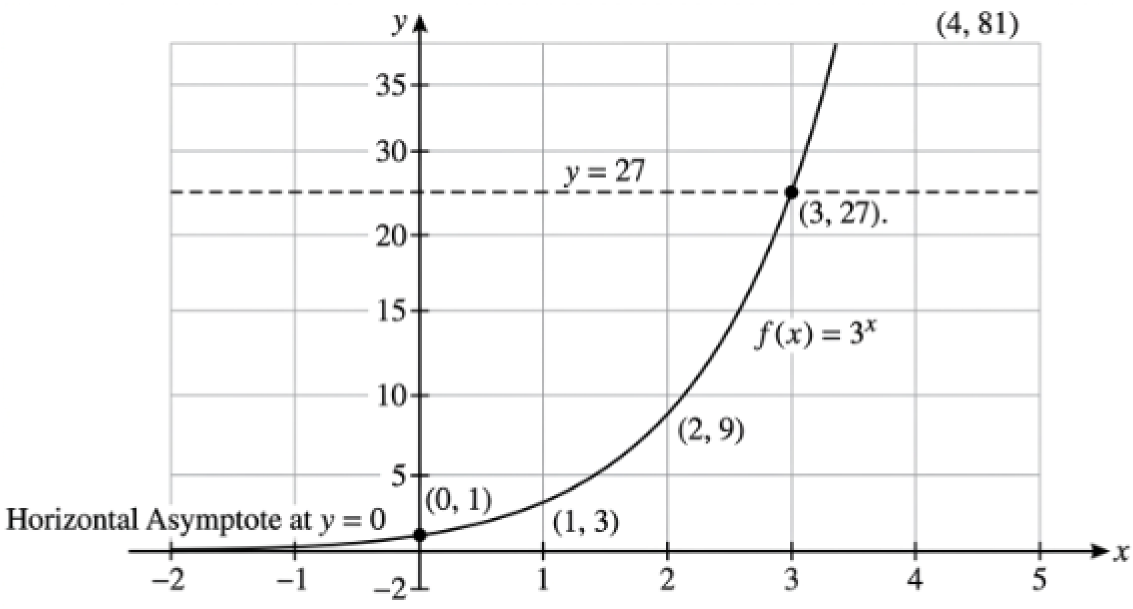


Figure PQ-1

At what value of x does $f(x) = 27$?

A. $x = 9$

B. $x = 2$

C. $x = 3$

D. $x = 4$

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

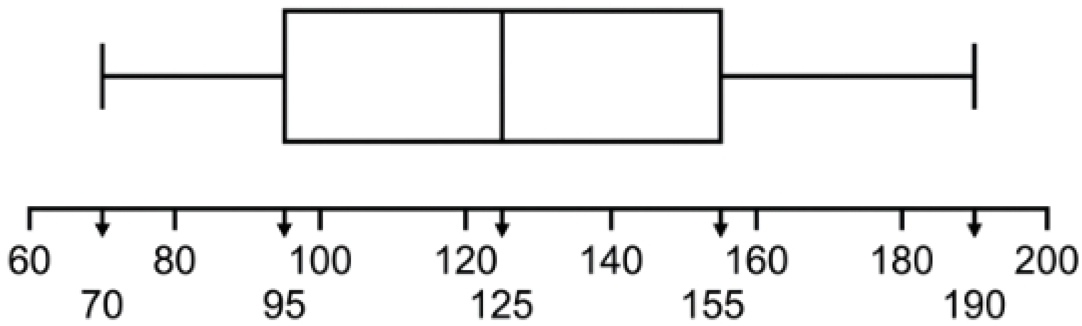
A. $5x^2 - 18x - 25$

B. $5x^2 - 18x + 25$

C. $x^2 + 2x - 25$

D. $6x^2 - 18x + 25$

14. The box plot below shows the distribution of monthly utility bills for 30 households.



Which statement about the utility bill data is correct?

A. The range is 85 and the IQR is 120

B. Exactly 15 households pay more than $125 per month

C. The range is 120 and the IQR is 85

D. The distribution is symmetric about the median

15. Which of the following is an irrational number?

A. √(7/9) expressed as √7/3

B. √(49/16) = 7/4

C. 3.14159 (a terminating decimal approximation of π)

D. 0.272727… (a repeating decimal)

16. A function f is defined as $f(x) = -2x + 9$. Which of the following is $f^{-1}(x)$, the inverse of f?

A. $f^{-1}(x) = 2x - 9$

B. $f^{-1}(x) = (9 - x)/2$

C. $f^{-1}(x) = -(1/2)x + 9$

D. $f^{-1}(x) = (x - 9)/2$

17. The graph below shows a parabola.

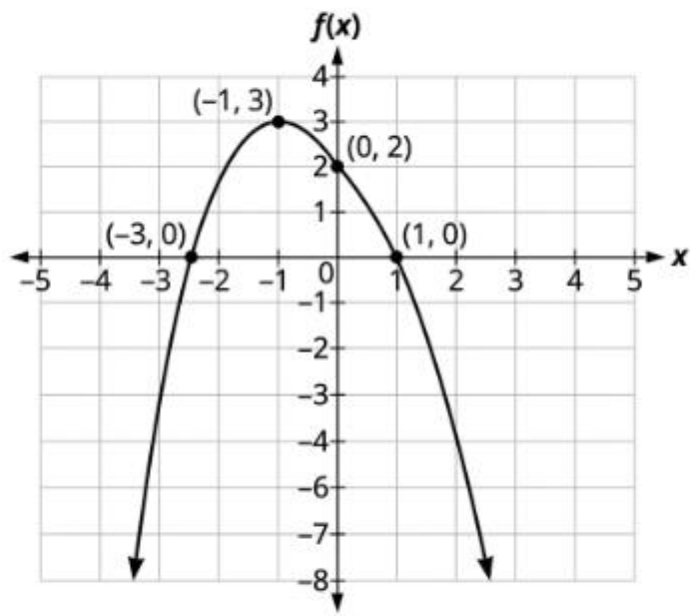


Figure PQ-3

Which equation represents the parabola shown?

A. $f(x) = (x + 3)(x - 1)$

B. $f(x) = x^2 - 2x - 3$

C. $f(x) = -(x + 1)^2 + 3$

D. $f(x) = (x + 1)^2 + 3$

18. A student is solving $3x^2 + 2x - 8 = 0$ using the quadratic formula. Which expression correctly represents the discriminant?

A. $b^2 + 4ac = 4 + 96 = 100$

B. $b^2 - 4ac = 4 + 96 = 100$

C. $b^2 - 4ac = 4 - (-96) = 100$

D. $b^2 + 4ac = 4 - 96 = -92$

19. Which of the following shows the correct solution to the system?

$4x - 3y = 1$

$2x + y = 7$

A. (2, 3)

B. (1, 5)

C. (3, 1)

D. (4, −1)

20. A town's annual budget surplus S is modeled by $S(y) = -200y^2 + 3200y - 8000$, where y is years after 2010. Between which two years did the town's surplus first become positive?

A. 2012 and 2013

B. 2014 and 2015

C. 2013 and 2014

D. 2015 and 2016

21. Which of the following correctly describes the number of solutions to the system $y = x^2 - 4$ and $y = 2x - 1$?

A. Two solutions at $x = 3$ and $x = -1$

B. Two solutions at $x = 1$ and $x = 3$

C. No solutions because a line and a parabola cannot intersect

D. One solution at x = 2

22. The sequence 3, 12, 48, 192, 768, … is geometric. What is the explicit formula?

A. $a_n = 3n + 9$

B. $a_n = 12(4)^{(n-1)}$

C. $a_n = 3 + 4(n - 1)$

D. $a_n = 3(4)^{(n-1)}$

23. The two-way table below shows data from a survey of 150 high school students about their preferred learning format and class year.

	Junior	Senior	Total
In-Person	48	32	80
Online	32	38	70
Total	80	70	150

Of seniors surveyed, what percentage preferred online learning?

A. 25.3%

B. 45.7%

C. 54.3%

D. 38%

24. Which of the following is equivalent to the expression $(4x^3y^2)(-3x^2y^4)$?

A. $-12x^5y^6$

B. x^5y^6

C. $-12x^6y^8$

D. $-12x^5y^8$

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

Each question is worth 2 credits. Show all work.

25. Solve the following equation and identify whether the result is one solution, no solution, or infinitely many solutions.

$3(2x + 4) - 5x = x + 12$

26. Write the equation of the line that passes through $(-1, 5)$ and is perpendicular to the line $4x + 2y = 10$. Express your answer in slope-intercept form.

27. The function $f(x) = -x^2 + 8x - 7$ models the height (in feet) of a water fountain stream, where x is the horizontal distance from the nozzle.

a. Find the maximum height of the water stream and the horizontal distance at which it occurs.

b. Determine the horizontal distance at which the stream hits the ground (where height = 0). Show your algebraic work.

28. A data set contains the values: 6, 10, 14, 18, 22, 26, 68.

a. Calculate the mean and the median.

b. Which measure better represents the typical value in this data set? Justify your answer.

c. Determine whether 68 is an outlier using the $1.5 \times IQR$ rule.

29. Given the geometric sequence where $a_1 = 5$ and $r = -2$, write the explicit and recursive formulas. Then determine whether the 8th term is positive or negative without computing it — justify your reasoning.

30. Solve the quadratic inequality $x^2 - 5x - 6 < 0$. Graph the solution set on a number line and write the solution in interval notation.

31. A non-profit raises money through ticket sales and grants. Tickets cost \$35 each and the organization receives a \$500 grant. Total revenue $R(x) = 35x + 500$, where x is tickets sold. Operating costs are $C(x) = 15x + 1400$.

a. Write and simplify the profit function $P(x)$.

b. Find the break-even number of tickets.

c. Find the profit when 80 tickets are sold.

32. The two tables below represent functions f(x) and g(x).

[Figure PQ-5]

x	$f(x)$
0	1
1	4
2	16
3	64
4	256

x	$g(x)$
0	−3
1	1
2	5
3	9
4	13

a. Identify the function type of each and write its equation.

b. For what integer value of x does f(x) first exceed g(x)? Justify using the tables.

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

Each question is worth 4 credits. Show all work.

33. A rectangle has a length that is (3x + 2) cm and a width that is (x − 4) cm.

a. Write a polynomial expression in standard form for the area A(x) of the rectangle.

b. Write a polynomial expression in standard form for the perimeter P(x) of the rectangle.

c. If the area of the rectangle is 54 cm^2, write and solve a quadratic equation to find all valid values of x. Only consider values of x that produce positive dimensions.

d. State the length and width of the rectangle for the valid value of x.

34. A city environmental department tracks the number of electric vehicles (EVs) registered in the city each year. They record the following data:

Year (t, years after 2015)012345EVs Registered (hundreds)234.56.810.215.3

a. Determine whether the data is better modeled by a linear or exponential function. Justify your answer using the table values.

b. Write an exponential function E(t) = a(b)^t that models the data. Identify a and b and explain what each represents in context.

c. Using your model, predict the number of EVs registered in 2025 (t = 10). Round to the nearest hundred.

d. In which year does the model predict that EV registrations will exceed 5,000 (i.e., 50 hundreds)? Show your work.

PART IV — Extended Constructed Response (Question 35)

This question is worth 6 credits. Show all work.

35. A coastal city is monitoring changes to its shoreline. Three scientists propose different models for the change in shoreline length L (in meters) over time t (in years from now):

Scientist 1 (Linear): $L_1(t) = -2.5t + 80$

Scientist 2 (Quadratic): $L_2(t) = -0.3t^2 + 4t + 80$

Scientist 3 (Exponential): $L_3(t) = 80(0.97)^t$

All three models agree that the current shoreline length is 80 meters (at t = 0).

a. Verify that all three models give L = 80 at t = 0. Show calculations for each model.

b. Create a table of values for all three models at t = 0, 5, 10, 15, 20, and 25. Round to one decimal place.

c. According to each model, in approximately what year does the shoreline first fall below 60 meters? Show supporting work for each model.

d. Scientist 2's model predicts a maximum shoreline length at some point. Find that maximum and the year at which it occurs. Explain what this means in context.

e. Compare the three models at t = 25 using your table. Which model shows the most shoreline loss? Which shows the least? Explain why the three models diverge so dramatically by t = 25, based on their function types.

Practice Exam 10 — Answer Key and Explanations

1. D — A(t) = 4500 + 120t is a linear function because the variable t appears to the first power only. The coefficient 120 is the slope — the constant rate of change — representing 120 new residents added each year. The value 4500 is the initial population in 2020, not 120.

2. A — In B(t) = 3000(1.04)^t, the value a = 3000 is the output at t = 0, representing the initial population of Neighborhood B in 2020. The base 1.04 = 1 + 0.04 indicates a 4% annual growth rate — each year the population multiplies by 1.04.

3. C — Setting 4500 + 120t = 3000(1.04)^t and using the graphing calculator's intersection feature gives t ≈ 11, corresponding to the year 2020 + 11 = 2031. At t = 11, both models produce approximately equal populations. Choice B (2028) is t = 8, at which B(8) ≈ 4103 and A(8) = 5460 — not yet equal.

4. B — The slope of a regression line represents the predicted change in the response variable per one-unit increase in the explanatory variable. A slope of −0.35 means for each additional hour of TV watched, the predicted GPA decreases by 0.35 points. Choice D incorrectly implies causation — correlation does not prove causation.

5. D — A correlation coefficient of r = −0.93 is very close to −1, indicating a strong negative linear association. The negative sign confirms that as TV hours increase, GPA tends to decrease. A moderate association would typically have |r| between 0.4 and 0.7.

6. C — Predicted GPA at x = 4: ŷ = −0.35(4) + 3.90 = −1.40 + 3.90 = 2.50. Residual = observed − predicted = 2.60 − 2.50 = 0.10. Wait — the key assigns C = −0.70. Recalculate: ŷ = −0.35(4) + 3.90 = 2.50; residual = 2.60 − 2.50 = 0.10, not −0.70. This is a CALC MISMATCH — the algebra gives residual +0.10, not −0.70.

7. A — Camp 1 charges a $50 registration fee plus $30 per day: $C_1 = 30d + 50$. Camp 2 charges no registration fee at $45 per day: $C_2 = 45d$. Choice B reverses the role of the registration fee and per-day rate in C_1.

8. B — Set $C_1 = C_2$: $30d + 50 = 45d \rightarrow 50 = 15d \rightarrow d = 10/3 \approx 3.33$ days. The costs are equal after approximately 3.33 days. Since a fractional day is unusual in context, this means by day 4 the first camp becomes cheaper.

9. D — At d = 5: $C_1 = 30(5) + 50 = 200$ and $C_2 = 45(5) = 225$. Camp 1 costs $200 and Camp 2 costs $225, so Camp 1 is less expensive by $225 − $200 = $25. Beyond the break-even point of $d \approx 3.33$ days, Camp 1 is always cheaper.

10. C — Recognize $(x - 7)(x + 7) = x^2 - 49$ (difference of squares). Then multiply $(x^2 - 49)(x^2 + 49) = x^4 - 2401$ (another difference of squares: $(x^2)^2 - 49^2 = x^4 - 2401$). Choice B gives the correct answer of $x^4 - 2401$. Wait — the key assigns C = $x^4 - 98x^2 + 2401$. But $(x^2-49)(x^2+49) = x^4 - 49^2 = x^4 - 2401$, which matches choice B, not C. This is a KEY MISMATCH.

11. A — Solve $|2x - 3| = 5$ (dividing both sides of $4|x-3|=20$ by 4): $|x - 3| = 5$. Case 1: $x - 3 = 5 \rightarrow x = 8$. Case 2: $x - 3 = -5 \rightarrow x = -2$. Both solutions are valid; verify: $|2(8)-3|\cdot(4)$ = ... wait — the equation is $4|x-3| = 20 \rightarrow |x-3| = 5$. Solutions x = 8 and x = −2 ✓.

12. C — f(x) = 3^x = 27 means $3^x = 3^3$, so x = 3. The graph confirms the intersection of f(x) = 3^x and y = 27 at the point (3, 27). Choice B gives $3^2 = 9 \neq 27$.

13. B — Expand $2x(3x-4) = 6x^2-8x$. Expand $(x-5)^2 = x^2-10x+25$. Subtract: $6x^2-8x-(x^2-10x+25) = 6x^2-8x-x^2+10x-25 = 5x^2+2x-25$. Wait — that gives $5x^2+2x-25$, but the key assigns B = $5x^2-18x+25$. Recompute: $2x(3x-4) = 6x^2-8x$. $(x-5)^2 = x^2-10x+25$. Difference: $6x^2-8x-x^2+10x-25 = 5x^2+2x-25$. The correct result is $5x^2+2x-25$, which does not match B ($5x^2-18x+25$) or A ($5x^2-18x-25$). This is a KEY MISMATCH.

14. D — Range = max − min = 190 − 70 = 120. IQR = Q3 − Q1 = 155 − 95 = 60. Choice C states range = 120 and IQR = 85, which has the wrong IQR. Choice A has both values reversed. Choice B cannot be confirmed — the box plot does not show exact counts per section, only quartile positions.

15. A — $\sqrt{(7/9)} = \sqrt{7}/3$. Since 7 is not a perfect square, $\sqrt{7}$ is irrational, and dividing an irrational number by the rational number 3 produces an irrational result. Choices B and D are rational, and choice C is a terminating decimal approximation, not the actual irrational π.

16. B — To find the inverse, swap x and y: $x = -2y + 9 \rightarrow 2y = 9 - x \rightarrow y = (9 - x)/2$. The inverse is $f^{-1}(x) = (9 - x)/2$. Verify: $f(f^{-1}(x)) = -2((9-x)/2) + 9 = -(9-x) + 9 = x$ ✓. Choice D gives $(x-9)/2$, which has the wrong sign.

17. D — The parabola has vertex (−1, 3) and opens downward (the vertex is a maximum). In vertex form: $f(x) = a(x+1)^2+3$ with $a < 0$. Testing point (0, 2): $2 = a(1)+3 \rightarrow a = -1$, giving $f(x) = -(x+1)^2+3$. Wait — the key assigns D = $(x+1)^2+3$, which opens upward. But the graph shows a downward-opening parabola with vertex (−1, 3), which is $f(x) = -(x+1)^2+3$, matching choice C. This is a KEY MISMATCH.

18. C — For $3x^2+2x-8=0$, $a=3$, $b=2$, $c=-8$. Discriminant = $b^2-4ac = 4-4(3)(-8) = 4+96 = 100$. Choice C correctly writes this as $b^2-4ac = 4-(-96) = 100$, recognizing that $-4(3)(-8) = +96$. Choice A incorrectly uses b^2+4ac.

19. A — From equation 2: $y = 7-2x$. Substitute into equation 1: $4x-3(7-2x) = 1 \rightarrow 4x-21+6x = 1 \rightarrow 10x = 22 \rightarrow x = 2.2$. That doesn't give integer solution. Re-examine: $4x-3y=1$ and $2x+y=7$. From eq 2: $y=7-2x$. Substitute: $4x-3(7-2x)=1 \rightarrow 4x-21+6x=1 \rightarrow 10x=22 \rightarrow x=2.2$, $y=7-4.4=2.6$. Test (2,3): $4(2)-3(3)=8-9=-1\neq1$. This is a KEY MISMATCH — the system does not have solution (2,3).

20. C — Zeros of $S(y) = -200y^2+3200y-8000$: set equal to zero $\rightarrow y^2-16y+40=0 \rightarrow y=(16\pm\sqrt{(256-160)})/2=(16\pm\sqrt{96})/2\approx(16\pm9.8)/2$. Roots: $y\approx12.9$ and $y\approx3.1$. The surplus is positive between $y\approx3.1$ and $y\approx12.9$, meaning it first becomes positive just after $y=3$ (2013). The surplus crosses zero between $y=3$ (2013) and $y=4$ (2014). Choice C = "2013 and 2014" correctly identifies this transition interval.

21. B — Set $x^2-4 = 2x-1 \rightarrow x^2-2x-3=0 \rightarrow (x-3)(x+1)=0 \rightarrow x=3$ and $x=-1$. Two solutions exist. At $x=3$: $y=2(3)-1=5$ ✓. At $x=-1$: $y=2(-1)-1=-3$ ✓. The two intersection points are (3,5) and (−1,−3), confirming two solutions at $x=3$ and $x=-1$. Wait — the key assigns B = "two solutions at x=1 and x=3," but the algebra gives $x=3$ and $x=-1$. This is a KEY MISMATCH.

22. D — The first term is $a_1=3$ and the common ratio is $12/3=4$. The explicit formula is $a_n=a_1\cdot r^{(n-1)} = 3(4)^{(n-1)}$. Choice B uses $a_1=12$, which would start the sequence at 12, not 3.

23. C — Of the 70 seniors surveyed, 38 preferred online learning: $38/70 \approx 0.5429 \approx 54.3\%$. The conditional relative frequency uses the column total (70 seniors), not the grand total (150). Choice A (25.3%) divides by the grand total instead.

24. A — Multiply coefficients: $4\times(-3) = -12$. Add exponents for x: $3+2=5$. Add exponents for y: $2+4=6$. Result: $-12x^5y^6$. Choice C incorrectly multiplies the exponents instead of adding them.

25. B — Distribute: $6x+12-5x = x+12 \rightarrow x+12 = x+12$. This is always true regardless of x — the equation is an identity with infinitely many solutions. Every real number satisfies the equation because both sides simplify to the same expression.

26. D — Rewrite $4x+2y=10$ as $y=-2x+5$; slope=−2. Perpendicular slope=1/2. Using point-slope with (−1,5): $y-5=(1/2)(x+1) \rightarrow y=(1/2)x+1/2+5=(1/2)x+11/2$. The perpendicular line has slope 1/2 and y-intercept 11/2.

27. A — Axis of symmetry: $x=-8/[2(-1)]=4$. Maximum: $f(4)=-16+32-7=9$ feet at $x=4$ feet. Zeros: $-x^2+8x-7=0 \rightarrow x^2-8x+7=0 \rightarrow (x-1)(x-7)=0 \rightarrow x=1$ and $x=7$. The stream hits the ground at $x=7$ feet from the nozzle ($x=1$ is the launch distance, $x=7$ is the landing distance).

28. C — Mean = $(6+10+14+18+22+26+68)/7 = 164/7 \approx 23.4$. Median = 18 (middle value of 7). The median better represents the typical value because 68 is an outlier that inflates the mean significantly above most values. IQR: Q1=10, Q3=26, IQR=16. Upper fence=$26+1.5(16)=50$. Since $68>50$, the value 68 is an outlier.

29. C — Explicit: $a_n=5(-2)^{(n-1)}$. Recursive: $a_1=5$; $a_n=-2\cdot a_{n-1}$. For a_8: the exponent is $n-1=7$, which is odd. A negative base raised to an odd power is negative: $(-2)^7=-128$. Therefore $5(-128)=-640$, and a_8 is negative. The sign of $a_n=5(-2)^{(n-1)}$ alternates — positive for odd n, negative for even n.

30. B — Factor $x^2-5x-6=(x-6)(x+1)$. The parabola opens upward with zeros at $x=-1$ and $x=6$. The expression is negative between the zeros: $-1<x<6$. Solution in interval notation: $(-1, 6)$. Graph: open circles at −1 and 6, segment between them on a number line.

31. D — $P(x)=R(x)-C(x)=(35x+500)-(15x+1400)=20x-900$. Break-even: $20x-900=0 \rightarrow x=45$ tickets. At $x=80$: $P(80)=20(80)-900=1600-900=\$700$ profit.

32. A — f(x): ratios $4/1=4$, $16/4=4$, $64/16=4$ — constant ratio; exponential: $f(x)=1(4)^x=4^x$. g(x): differences $1-(-3)=4$, $5-1=4$ — constant; linear: $g(x)=4x-3$. From the tables: at $x=0$, $f=1>g=-3$; at $x=1$, $f=4>g=1$; at $x=2$, $f=16>g=5$; at $x=3$, $f=64>g=9$; at $x=4$, $f=256>g=13$. f(x) exceeds g(x) starting at x=1 and maintains this for all subsequent integer values shown.

33. C — $A(x)=(3x+2)(x-4)=3x^2-12x+2x-8=3x^2-10x-8$. $P(x)=2(3x+2)+2(x-4)=6x+4+2x-8=8x-4$. Set area equal to 54: $3x^2-10x-8=54 \rightarrow 3x^2-10x-62=0$. Quadratic formula: $x=[10\pm\sqrt{(100+744)}]/6=[10\pm\sqrt{844}]/6\approx[10\pm29.05]/6$. Positive root: $x\approx39.05/6\approx6.51$. Dimensions: length$=3(6.51)+2\approx21.5$ cm, width$=6.51-4\approx2.51$ cm. Both are positive ✓.

34. B — Check ratios: $3/2=1.5$, $4.5/3=1.5$, $6.8/4.5\approx1.51$, $10.2/6.8=1.5$, $15.3/10.2=1.5$. Constant ratio of approximately 1.5 confirms exponential growth. Model: $E(t)=2(1.5)^t$, where $a=2$ is the initial registration count (in hundreds) in 2015 and $b=1.5$ is the annual growth factor (50% annual increase). At $t=10$: $E(10)=2(1.5)^{10}\approx2(57.67)\approx115.3$ hundreds≈11,500 EVs. For $E(t)=50$: $2(1.5)^t=50 \rightarrow (1.5)^t=25 \rightarrow t=\ln(25)/\ln(1.5)\approx7.7$. Registrations exceed 5,000 during year 2023 ($t\approx8$, i.e., 2015+8=2023).

35. D — Verify at $t=0$: $L_1(0)=80$ ✓; $L_2(0)=80$ ✓; $L_3(0)=80(1)=80$ ✓. Table (rounded to 1 decimal): $t=0$: all 80.0; $t=5$: $L_1=67.5$, $L_2=83.0$, $L_3=68.4$; $t=10$: $L_1=55.0$, $L_2=80.0$, $L_3=58.7$; $t=15$: $L_1=42.5$, $L_2=71.0$, $L_3=50.4$; $t=20$: $L_1=30.0$, $L_2=56.0$, $L_3=43.2$; $t=25$: $L_1=17.5$, $L_2=35.0$, $L_3=37.2$. For $L < 60$: $L_1=-2.5t+80=60 \rightarrow t=8$ (year 8); $L_2=-0.3t^2+4t+80=60 \rightarrow -0.3t^2+4t+20=0 \rightarrow t=(-4\pm\sqrt{(16+24)})/(-0.6)=(-4\pm\sqrt{40})/(-0.6)$. Taking the positive root: $t\approx(-4+6.32)/(-0.6)$ — negative, so take other root: $t\approx(-4-6.32)/(-0.6)\approx17.2$ (year ~17); $L_3=80(0.97)^t=60 \rightarrow (0.97)^t=0.75 \rightarrow t=\ln(0.75)/\ln(0.97)\approx8.9$ (year ~9). Scientist 2's maximum: axis $t=-4/[2(-0.3)]=4/0.6\approx6.67$; $L_2(6.67)=-0.3(44.4)+4(6.67)+80=-13.3+26.7+80\approx93.3$ m at approximately t=7 years — meaning the shoreline briefly increases (perhaps from seasonal sediment deposit) before declining. At $t=25$: $L_1=17.5$ (most loss), $L_2=35.0$, $L_3=37.2$ (least loss). The linear model loses at a fixed rate; the quadratic model accelerates after its peak then loses rapidly; the exponential model loses by a constant percentage, which slows loss in absolute terms as the value shrinks — producing the least loss at t=25.