ST. MARY'S SCHOOL

Volume 1

Classwork & Homework

Name: _____
Class: _____

Investigate, calculate, sketch, and explain. Use the reference volume alongside these original practice tasks.

CED Unit 1 · Topics 1.1-1.14

Full-color review edition · November 2026

A reference, a place to practice, and a way to explain your reasoning.

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How to use this workbook

Each topic has three class investigations (CW) and six homework tasks (H). A topic may take more than one meeting. Your teacher will select the due dates and the parts to complete each day.

A useful solution has evidence

State the quantity or function you are studying. Show an equation, table, graph, sign argument, or contextual explanation that supports your conclusion. Include units and domain restrictions when they matter.

Work algebraically unless a question requests technology. For a graphing task, make a prediction first, then record the expression, window, and evidence that you used. A screen image alone is not an explanation.

Use the spaces provided; attach a labeled extra sheet when a sketch or explanation needs more room. A final mixed review asks you to choose methods across the unit.

Activity identifiers D1–D6 refer to the teacher's digital lesson guide. Your teacher will provide live session links when available. No login or session code is printed here.

Identifier	Meaning
1.8.CW2	Topic 1.8, class investigation 2
1.8.H2	Topic 1.8, homework task 2
U1.R4	Unit 1 mixed review, task 4

Calculator note

Use enough precision to support your conclusion. Preserve exact values where possible, and keep unrounded regression coefficients for calculations. Round only the final reported quantity.

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1.1 Change in Tandem

CLASS INVESTIGATIONS | Predict • test • explain

1.1.CW1

A tank fills quickly, then more slowly, pauses, and finally drains at a steady rate. Sketch height versus elapsed time. Label where the graph is increasing, constant, and decreasing; identify the concavity during filling.

1.1.CW2

A rule maps $-2 \to 4, 0 \to 1$, and $3 \to 4$. Is it a function? Give its domain, range, the image of -2, and the preimage of 4.

1.1.CW3

Compare $f(x) = x^2$ on all real inputs with $g(x) = x^2$ on $x \geq 0$. Are they equal functions? Explain what changes about the preimage of 9.

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1.1 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.1.H1

For $f(x) = (x-1)^2 - 4$, calculate $f(-2)$, solve $f(x) = 0$, and distinguish the zeros from the x-intercepts.

1.1.H2

For the same f on $[0, 4]$, find its range and intervals of increase/decrease.

1.1.H3

An output is negative and increasing at a decreasing rate. Describe its position, direction, and concavity. Give one possible formula on an interval.

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1.1 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.1.H4

A table gives $f(0) = 2$ and $f(4) = 10$. Must f be increasing throughout $[0, 4]$? Support your answer with a counterexample.

1.1.H5

The model $C(n) = 30 - 4n$ gives money remaining after buying n notebooks. Specify the natural purchasing domain and range if borrowing is not allowed.

1.1.H6

Sketch a graph that is decreasing and concave up on $[0, 3]$. Include two points and explain what happens to its signed rate.

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1.2 Rates of Change

CLASS INVESTIGATIONS | Predict • test • explain

1.2.CW1

A reservoir has volumes 120,96,84 L at 0,3,7 min. Compare both net changes and both average rates. Which interval has faster average draining?

1.2.CW2

Without a calculator, find the secant slope of $f(x) = x^2 + 1$ on $[1, 3]$. Then graph f and its secant in Desmos, keeping both endpoints visible.

1.2.CW3

Estimate the rate of $f(x) = x^3$ near $x = 1$ and $x = 2$ using centered intervals of width 0.2, then 0.02. Compare the estimates.

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1.2 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.2.H1

Find the average rate of $q(x) = x^2 - 2x$ on $[-1, 3]$.

1.2.H2

A temperature falls from $72°\text{F}$ at 1 p.m. to $60°\text{F}$ at 5 p.m. Find and interpret its average rate.

1.2.H3

For $f(x) = 5 - 3x$, find the average rate on $[a, a + h], h > 0$, and explain why a and h disappear.

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1.2 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.2.H4

A position function changes by -18m over 6 s. Find average velocity. Explain why average speed cannot be determined from this alone.

1.2.H5

Use $f(x) = x^2$ and intervals $[2.9, 3.1]$ and $[2.99, 3.01]$ to estimate the rate at 3. Show the two quotients.

1.2.H6

A student says '-7 is less steep than -2 because -7 is the smaller rate.' Identify what is correct and what is incorrect.

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1.3 Rates of Change in Linear and Quadratic Functions

CLASS INVESTIGATIONS | Predict • test • explain

1.3.CW1

For $q(x) = x^2 - 2x + 3$, make a table at $x = 0, 2, 4, 6$. Compute first and second output differences, average rates, and changes between adjacent average rates.

1.3.CW2

Repeat the preceding investigation with step 1 on $x = 0, 1, 2, 3$. Which quantities change with the input spacing, and which remain tied to the quadratic coefficient?

1.3.CW3

A table has input steps $1, 2, 3$ and corresponding output changes $5, 10, 15$. A student calls it quadratic because differences grow. Evaluate that claim.

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1.3 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.3.H1

Find average rates of $L(x) = 7 - 2x$ on $[0, 3]$, $[3, 8]$, and $[-4, 2]$.

1.3.H2

For $q(x) = 3x^2 + x$, make a table at $x = 0, 1, 2, 3, 4$ and compute first and second differences.

1.3.H3

A quadratic has consecutive average rates $-5, 1, 7$ for intervals of width 3. Find its leading coefficient.

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1.3 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.3.H4

A quadratic output is decreasing while equal-step rates are $-12, -9, -6$. Describe concavity and whether the decline is speeding up.

1.3.H5

Show algebraically that for $q(x) = ax^2 + bx + c$, the average rate on $[x, x + h]$, with $h > 0$, is $2ax + ah + b$.

1.3.H6

A sequence has $a(n) = 2n^2 - 3n$ for $n = 0, 1, 2, \ldots$. Find $a(n + 1) - a(n)$ and its change when n increases by 1.

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1.4 Polynomial Functions and Rates of Change

CLASS INVESTIGATIONS | Predict • test • explain

1.4.CW1

Sort these expressions by whether they define polynomial functions on their natural domains: $x^3 - 2x + 1$; 4; $x^{-2} + 1$; $\frac{x^2-4}{x-2}$. For each polynomial give degree.

1.4.CW2

Graph x^2, x^3, and $\left(x^2 - 1\right)^2$. Compare turning points, inflection behavior at the origin, and absolute extrema. Explain one distinction to a partner.

1.4.CW3

For $p(x) = (x - 1)^2$ on $[-1, 4]$, identify local and absolute extrema, using the CED convention for included endpoints.

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1.4 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.4.H1

Find degree and leading coefficient of $-2(x-3)^2(x+1)^3$.

1.4.H2

A polynomial graph has five turning points. What is the minimum possible degree? Is that degree forced?

1.4.H3

For $f(x) = (x+2)^2 - 3$ on $[-4, 1]$, find its absolute extrema.

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1.4 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.4.H4

A nonconstant polynomial has distinct zeros $-3, 1, 5$. Explain why at least two local extrema must occur between these zeros.

1.4.H5

A graph changes from decreasing to increasing at $x = 2$ but stays concave up. Classify the feature.

1.4.H6

Can an odd-degree polynomial have an absolute minimum on all real inputs? Can its restriction to $[0, 1]$ have one?

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1.5 Polynomial Functions and Complex Zeros

CLASS INVESTIGATIONS | Predict • test • explain

1.5.CW1

For $p(x) = (x + 2)(x - 1)^2$, predict zeros, multiplicities, and whether the graph crosses or touches the axis at each zero. Test your prediction in Desmos, then explain the difference using signs.

1.5.CW2

A polynomial sampled at $x = 0, 2, 4, 6$ has outputs $1, 9, 65, 217$. Build a difference table. What least degree fits all four points? What can this finite table fail to establish?

1.5.CW3

A polynomial p has $p(1) = -2$ and $p(4) = 5$. What does continuity guarantee? Must the zero be unique? Construct a counterexample to uniqueness.

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1.5 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.5.H1

For $p(x) = 3(x+1)^3(x-4)^2$, give its degree, leading coefficient, real zeros, and crossing/touching behavior.

1.5.H2

At equally spaced inputs $0, 1, 2, 3$, a least-degree polynomial has outputs $2, 5, 14, 35$. Identify its degree and leading coefficient using differences.

1.5.H3

The third finite differences of a cubic are 96 when the input step is 2. Find its leading coefficient.

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1.5 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.5.H4

A continuous function has $f(-1) = 3$ and $f(2) = 3$. Does the intermediate value theorem force a zero between them? Explain.

1.5.H5

Give two distinct polynomial formulas that agree with $f(x) = x^2$ at $x = 0, 1, 2$. Explain why additional data or assumptions are needed.

1.5.H6

Find a least-degree real-coefficient polynomial with zeros -1 and $2i$ and y-intercept 8. List all complex zeros and identify the real x-intercept.

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1.6 Polynomial Functions and End Behavior

CLASS INVESTIGATIONS | Predict • test • explain

1.6.CW1

Sort the polynomials $x^4 - 8x^2$, $-2x^5 + 100x$, $-3x^6 + 1$, and $4x^3 - x^2$ by their two end behaviors. State both ends with limit notation.

1.6.CW2

Graph $p(x) = x^4 - 1000x^2$ first on $[-10, 10]$, then on $[-50, 50]$. Explain why the first view is misleading about the ends. Estimate where the graph crosses the axis.

1.6.CW3

Build a least-degree polynomial whose ends both fall, with a crossing at -1 and a touch at 2. Can degree 3 work? If not, consider whether another real zero is needed.

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1.6 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.6.H1

State both end limits of $p(x) = -5x^7 + 2x^4 - 1$.

1.6.H2

State both end limits of $q(x) = 2(x - 4)^2(x + 3)^4$ without expanding it.

1.6.H3

A nonconstant even-degree polynomial has negative leading coefficient. Must it have an absolute minimum on all real inputs? Explain.

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1.6 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.6.H4

Compare $p(x) = 3x^4 - 7x$ and $q(x) = 3x^4$ by computing $\frac{p(x)}{q(x)}$ for $x \neq 0$. What does its end limit show?

1.6.H5

Could a polynomial of degree 5 have both ends rising? Could it have four turning points? Explain.

1.6.H6

Construct a polynomial of degree 4 with leading coefficient -2 and zeros -3 and 1, each of even multiplicity. Verify its ends and y-intercept.

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1.7 Rational Functions and End Behavior

CLASS INVESTIGATIONS | Predict • test • explain

1.7.CW1

Compare the end behavior of $\frac{5x}{x^2+1}$, $\frac{3x^2-2}{2x^2+1}$, and $\frac{x^2+1}{x-1}$. Predict first, then use a table at large positive and negative inputs.

1.7.CW2

For $r(x) = \frac{2x^2+3x+1}{x^2+1}$, find its horizontal asymptote and determine whether the graph crosses it. Explain why this is not a contradiction.

1.7.CW3

A cost model is $C(n) = 12 + \frac{240}{n}$ dollars per item for $n > 0$. Interpret its end behavior and compare $n = 20$ and $n = 80$.

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1.7 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.7.H1

Find both end limits of $r(x) = \frac{4x^3 - x}{2x^3 + 5}$.

1.7.H2

Find both end limits of $r(x) = \frac{7x + 1}{x^3 + 2}$.

1.7.H3

Divide to find the slant asymptote of $r(x) = \frac{2x^2 + 5x + 1}{x + 2}$.

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1.7 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.7.H4

Can a rational graph cross its horizontal asymptote twice? Give an example or explain why not.

1.7.H5

For $A(n) = 18 + \frac{360}{n}$, how many items are needed so average cost is at most \$24? Use whole-number quantities.

1.7.H6

Explain why 'numerator degree is larger' does not by itself identify a slant asymptote. Use $\frac{x^3+1}{x-1}$.

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1.8 Rational Functions and Zeros

CLASS INVESTIGATIONS | Predict • test • explain

1.8.CW1

For $r(x) = \frac{(x-3)(x+1)}{(x-2)(x+1)}$, first list the original exclusions. Then determine zeros, the y-intercept, and the sign on each interval separated by $-1, 2, 3$.

1.8.CW2

Use the same r to solve $r(x) \geq 0$. Compare your sign chart with a graph and identify a feature the default graph may fail to show.

1.8.CW3

The formula $y = \frac{x^2-4}{x-2}$ simplifies to $x + 2$. Decide whether the two formulas define equal functions on their natural domains, and whether the first function has a zero.

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1.8 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.8.H1

Find domain, zeros, and y-intercept of $r(x) = \frac{x^2-9}{x^2-x-6}$.

1.8.H2

Solve $\frac{x+2}{x-1} > 0$ using a sign chart.

1.8.H3

Solve $\frac{(x-4)^2}{x+1} \leq 0$.

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1.8 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.8.H4

A student cancels x from $\frac{x+3}{x+5}$, obtaining $\frac{3}{5}$. Explain the error and give a numerical check.

1.8.H5

Construct a rational function with zeros -2 and 3, a denominator zero at 1, and y-intercept 6. Verify each condition.

1.8.H6

Does multiplying both sides of $\frac{x+2}{x-1} > 0$ by $x - 1$ always preserve the inequality direction? Explain how to solve safely.

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1.9 Rational Functions and Vertical Asymptotes

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1.9.CW1

Compare $f(x) = \frac{1}{x-2}$ and $g(x) = \frac{1}{(x-2)^2}$ near $x = 2$. Predict the signs on each side, then use a table at 1.9,1.99,2.01,2.1 to test your predictions.

1.9.CW2

For $r(x) = \frac{x+1}{(x-2)(x+3)}$, determine the vertical asymptotes and all four one-sided limits using signs. Verify with a graph.

1.9.CW3

A concentration model is $C(t) = \frac{10}{t-3}$ for $t > 3$. Interpret the behavior as t approaches 3 from the right. Does the model define a concentration at $t = 3$?

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1.9 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.9.H1

Find all vertical asymptotes of $\frac{x-2}{(x+1)(x-4)}$.

1.9.H2

Find the left and right limits of $-\frac{3}{x+2}$ as $x \to -2$.

1.9.H3

Find both one-sided limits of $\frac{x+1}{(x-1)^2}$ as $x \to 1$.

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1.9 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.9.H4

For $r(x) = \frac{(x-1)^2}{(x-1)^3}$, decide whether $x = 1$ is a hole or a vertical asymptote.

1.9.H5

A calculator displays an almost vertical line connecting two branches near a pole. Why should you not interpret that segment as part of the function?

1.9.H6

Construct a rational function with a vertical asymptote at $x = 4$ and both one-sided limits equal to $-\infty$. Give its y-intercept.

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1.10 Rational Functions and Holes

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1.10.CW1

For $r(x) = \frac{x^2-4}{x-2}$, distinguish $r(2)$, $\lim$ as $x \to 2$ of $r(x)$, and the point needed to fill the hole. Graph it and explain why the display may hide the exclusion.

1.10.CW2

Compare $a(x) = \frac{(x-1)^2}{x-1}$, $b(x) = \frac{x-1}{(x-1)^2}$, and $c(x) = \frac{x-1}{x-1}$. Classify the discontinuity at 1 and state any hole coordinate.

1.10.CW3

Create a rational expression whose graph is the line $y = 2x - 1$ with a hole at $x = 3$. Write a separate definition that fills the hole, and explain whether the original expression has changed.

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1.10 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.10.H1

Find the hole of $\frac{x^2-9}{x-3}$.

1.10.H2

Find every hole and vertical asymptote of $\frac{x^2-1}{x^2+x-2}$.

1.10.H3

Find the holes of $\frac{x^2-4}{x^2-4}$. What is the range?

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1.10 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.10.H4

A piecewise function equals $\frac{x^2-1}{x-1}$ for $x \neq 1$ and equals k at $x = 1$. Find k for continuity.

1.10.H5

Does a hole always remove its y-coordinate from the range? Explain with a counterexample.

1.10.H6

Determine whether $r(x) = \frac{(x-2)^2}{(x-2)(x+1)}$ has a zero at $x = 2$. Find its hole and its actual zeros.

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1.11 Equivalent Representations of Polynomial and Rational Expressions

CLASS INVESTIGATIONS | Predict • test • explain

1.11.CW1

Divide $x^3 - 2x^2 - 5x + 6$ by $x - 1$. Verify by multiplying back. Use the result to factor the polynomial completely and solve $p(x) = 0$.

1.11.CW2

Two students simplify $\frac{x^2-4}{x-2} = x + 2$ and say the functions are equal. Revise their statement so it is mathematically precise. Then use division on $\frac{x^2+1}{x-2}$.

1.11.CW3

A real-coefficient polynomial of least degree has zeros 2 and $1 + 2i$. Write its third zero and a monic polynomial. Verify the complex factor pair.

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1.11 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.11.H1

Expand $(x-2)^3$ and explain the source of the coefficients.

1.11.H2

Divide $2x^3+3x^2-5$ by $x+2$, including the zero coefficient for x.

1.11.H3

Find the remainder when $p(x)=x^3-4x+1$ is divided by $x-3$. Is $x-3a$ factor?

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1.11 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.11.H4

Factor $x^4 - 16$ over the real numbers and find all its complex zeros.

1.11.H5

Solve $\frac{x^2-9}{x-3} = 6$, checking the original domain.

1.11.H6

Rewrite $\frac{3x^2+x-2}{x+1}$ to expose its slant asymptote and any hole.

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1.12 Transformations of Functions

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1.12.CW1

The point $(3, -2)$ lies on $y = f(x)$. Locate the corresponding point on $g(x) = -2f(3(x-1)) + 4$. Explain both coordinate changes before graphing an example.

1.12.CW2

Use $f(x) = |x|$ to compare $f(x) + 2$, $f(x-2)$, $2f(x)$, and $f(2x)$. Describe transformations of the general parent and explain the coincidence for this particular parent.

1.12.CW3

If f has domain $[-2, 4]$ and range $[-1, 3]$, find the domain and range of $g(x) = -2f(3(x-1)) + 4$.

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1.12 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.12.H1

Describe $g(x) = 3(x+2)^2 - 5$ relative to $y = x^2$. Give its vertex and range.

1.12.H2

The point $(-4, 7)$ lies on f. Find its image under $g(x) = f(-2x) + 1$.

1.12.H3

If f is increasing on $(1, 5)$, on what interval does $g(x) = f(x - 3)$ inherit that increase?

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1.12 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.12.H4

If f is increasing on all real inputs, determine whether $-f(x)$, $f(-x)$, and $-f(-x)$ increase or decrease.

1.12.H5

If f has a vertical asymptote $x = 2$ and horizontal asymptote $y = 3$, find the corresponding asymptotes of $g(x) = 2f(x + 4) - 1$.

1.12.H6

Is $x^4 - 3x^2$ even, odd, or neither? What about $x^3 + 2x$? Explain algebraically and state the graph symmetry.

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1.13 Function Model Selection and Assumption Articulation

CLASS INVESTIGATIONS | Predict • test • explain

1.13.CW1

Three data sets use equally spaced inputs $0, 1, 2, 3$. A: $5, 8, 11, 14$. B: $1, 4, 9, 16$. C: $12, 6, 4, 3$ at inputs $1, 2, 3, 4$ instead. Propose a family and exact rule for each, and identify evidence beyond appearance.

1.13.CW2

A school sells tickets. Revenue is modeled by $R(p) = p(120 - 4p)$, with price p in dollars. Identify variables, assumptions, a contextual domain, and the meaning of the vertex.

1.13.CW3

A fitted model has residuals $+2, +1, -2, -1, +2, +1$ as time increases. Interpret positive and negative residuals. Does their pattern suggest anything worth investigating?

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1.13 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.13.H1

A data set has constant second differences -6 at input step 1. What candidate family is appropriate, and what is the quadratic coefficient?

1.13.H2

A model predicts 18.4 cm when the observation is 19.1 cm. Find and interpret the residual.

1.13.H3

A model was fit to student heights for ages 12–18. Classify predictions at ages 15 and 35, and discuss confidence.

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1.13 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.13.H4

A constant-area rectangle has area 48cm^2 and width x. Choose a model for length and state the contextual domain.

1.13.H5

A polynomial passes through every training point. Does that guarantee accurate predictions between points or outside the data interval? Explain.

1.13.H6

Give one reason a piecewise model might be preferable to one quadratic for a tank that fills at a constant rate and then drains at a different constant rate.

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1.14 Function Model Construction and Application

CLASS INVESTIGATIONS | Predict • test • explain

1.14.CW1

Find a quadratic passing through $(0, 1), (1, 4), (2, 11)$. Explain why three distinct input conditions determine a quadratic of degree at most 2. Verify the rule at each point.

1.14.CW2

Fit a quadratic regression to $(-2, 5), (-1, 2), (0, 1), (1, 2), (2, 6)$. Record coefficients, calculate residuals, and explain why this is not exact interpolation. In Desmos, put data in x_1, y_1 and enter $y_1 \sim ax_1^2 + bx_1 + c$.

1.14.CW3

A tank starts with 15 L, fills at 5L/min for 3 min, then drains at 2L/min. Build a continuous piecewise model through emptying. Interpret its domain and find $V(8)$.

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1.14 Homework

PART 1 OF 2 | Show reasoning and label every graph.

1.14.H1

Construct a quadratic with vertex $(2, 5)$ that passes through $(0, 1)$. State the maximum or minimum.

1.14.H2

A rectangle has perimeter 40 cm. Model its area in terms of width x, give the physical domain, and find the largest area.

1.14.H3

An average-cost model has form $C(n) = v + \frac{F}{n}$. If $C(20) = 23$ and $C(50) = 14$, find v and F and interpret them.

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1.14 Homework

PART 2 OF 2 | Show reasoning and label every graph.

1.14.H4

A polynomial has least degree, zeros -1 and 2, touches at 2, crosses at -1, and passes through $(0, 8)$. Construct it and state the end behavior.

1.14.H5

The height model $h(t) = -2(t-2)^2 + 12$, in meters at time t seconds, describes a ball until it hits the ground. Find the initial height, maximum height and time, and positive ground-hit time.

1.14.H6

Use regression to fit a cubic to $x = -2, -1, 0, 1, 2$ with $y = -7, 0, 1, 2, 9$, and a quartic to $x = 0, 1, 2, 3, 4, 5$ with $y = 1, 2, 17, 82, 257, 626$. Report both models and one substitution check. Does exact fit prove global validity?

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Unit 1 Mixed review

Choose a method, then justify your answer.

U1.R1

A function has values $f(0) = 3, f(2) = 7, f(5) = 4$. Find the average rates on both intervals. What can and cannot be concluded about behavior between the samples?

U1.R2

At inputs 0,2,4,6 a quadratic has outputs $5, 1, 13, 41$. Determine its leading coefficient and full formula.

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Unit 1 Mixed review

Choose a method, then justify your answer.

U1.R3

For $p(x) = -2(x+3)(x-1)^2$, identify zeros, multiplicities, y-intercept, degree, leading coefficient, and both end limits. Sketch a compatible graph.

U1.R4

Analyze $r(x) = \frac{(x+2)(x-1)^2}{(x-1)(x-3)}$: domain, zeros, hole, vertical asymptote, slant asymptote, and y-intercept.

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Unit 1 Mixed review

Choose a method, then justify your answer.

U1.R5

Solve $\frac{x-2}{x+1} \leq 0$ and explain both endpoint decisions.

U1.R6

For $g(x) = -3f(2(x+1)) + 5$, map the point $(4, -2)$ on f to g. If f has range $[-2, 6]$, find the range of g.

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Unit 1 Mixed review

Choose a method, then justify your answer.

U1.R7

Divide $x^3 + 2x^2 - x + 4$ by $x + 1$. State the remainder and use it to evaluate $p(-1)$.

U1.R8

Find the least-degree real monic polynomial with zeros -2 and $3 + i$. Give all zeros and the expanded polynomial.

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Unit 1 Mixed review

Choose a method, then justify your answer.

U1.R9

A quadratic model is fitted using observations from $0 \le t \le 8$. Its prediction at $t = 5$ is 20, while the observation is 22. Find the residual and classify predictions at 5 and 12. Explain one limitation of the latter.

U1.R10

A tank holds 10 L initially, fills at 4L/min until $t = 5$, then drains at 3L/min. Write a continuous model through emptying and find the overall average rate from start to empty.

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