The Rising Soufflé Bistro

Assessment Menu · choose your meal and show what you know

Name: _____

Date: _____

How to order

1. Order **4 Appetizers** (5 points each), **4 Entrées** (10 points each) and **2 Chef's Specials** (20 points each). The most you can earn is **100 points**.
2. Your 10 dishes must include **at least one of each skill**: GRAPH, SOLVE, COMPLEX and APPLY (the label next to each dish).
3. Mark your choices on the order form below **and** on the dishes themselves ("My pick"). Only marked dishes are graded, and you cannot swap a dish after turning it in.
4. Show your work in the space for each dish. Points are given for correct steps as well as correct answers.
5. Appetizers and Entrées are on pages 2 and 3. The Chef's Specials are on page 4. Look at every page before you choose!

Appetizers

5 pts each · choose 4

- ☐ **A1** GRAPH
- ☐ **A2** GRAPH
- ☐ **A3** SOLVE
- ☐ **A4** SOLVE
- ☐ **A5** COMPLEX
- ☐ **A6** APPLY

Entrées

10 pts each · choose 4

- ☐ **E1** GRAPH
- ☐ **E2** SOLVE
- ☐ **E3** SOLVE
- ☐ **E4** COMPLEX
- ☐ **E5** COMPLEX
- ☐ **E6** APPLY

Chef's Specials

20 pts each · choose 2

- ☐ **S1** GRAPH
- ☐ **S2** COMPLEX
- ☐ **S3** APPLY
- ☐ **S4** APPLY

My skill check (circle each skill you have covered): GRAPH · SOLVE · COMPLEX · APPLY

Course	Dishes	Points each	Possible	Score (teacher)
Appetizers	4	5	20	
Entrées	4	10	40	
Chef's Specials	2	20	40	
Total			**100**	

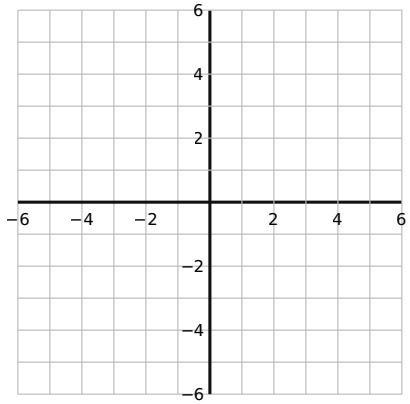
Appetizers

5 points each · choose 4 · Warm-ups

Name: _____

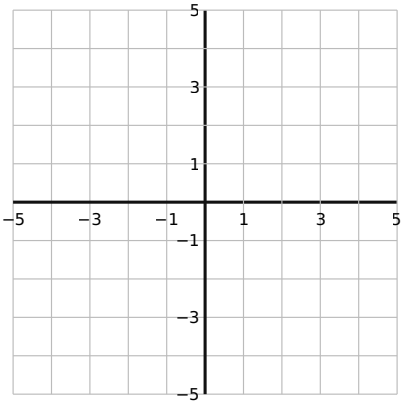
A1 GRAPH ☐ My pick · 5 pts

Let $f(x) = -\frac{1}{2}(x + 2)^2 + 4$. **(a)** Give the vertex, the axis of symmetry and the direction of opening. **(b)** Describe the transformations of $y = x^2$. **(c)** Find the y-intercept. **(d)** Graph $f(x)$.



A2 GRAPH ☐ My pick · 5 pts

Graph $y = (x + 1)(x - 3)$. **(a)** Find the x-intercepts. **(b)** Find the axis of symmetry and the vertex. **(c)** Write the equation in standard form and find the y-intercept.



A3 SOLVE ☐ My pick · 5 pts

Solve each equation. **(a)** $3x^2 - 48 = 0$ **(b)** $(x - 5)^2 = 36$ **(c)** $x^2 + 2x - 15 = 0$ **(d)** $2x^2 = 5x$. In (d), why is dividing both sides by x a mistake?

A4 SOLVE ☐ My pick · 5 pts

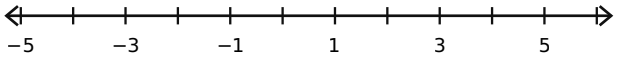
Find $b^2 - 4ac$ and describe the solutions (how many, real or nonreal, rational or irrational). **(a)** $2x^2 - 3x - 5 = 0$ **(b)** $4x^2 - 12x + 9 = 0$ **(c)** $x^2 - 2x + 5 = 0$. **(d)** Find k so that $x^2 + 6x + k = 0$ has exactly one real solution.

A5 COMPLEX ☐ My pick · 5 pts

Simplify. Write complex numbers in $a + bi$ form. **(a)** $\sqrt{-72}$ **(b)** i^{23} **(c)** $(3 - 2i) + (-5 + 6i)$ **(d)** $(4 + i)(4 - i)$

A6 APPLY ☐ My pick · 5 pts

Solve $x^2 - x - 6 > 0$. **(a)** Graph the solution on the number line. **(b)** Write it in interval notation. **(c)** Write the solution of $x^2 - x - 6 \le 0$ in interval notation.



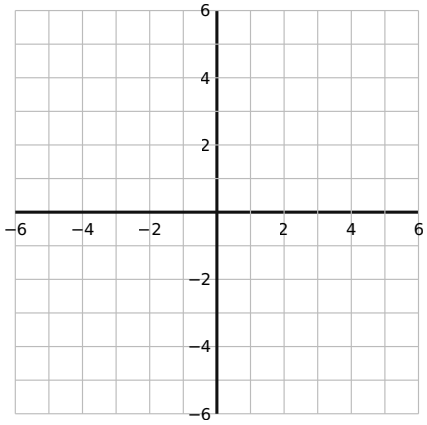
Entrées

10 points each · choose 4 · Multi-step problems

Name: _____

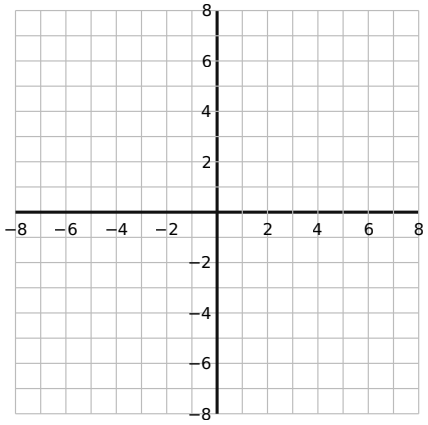
E1 GRAPH ☐ My pick · 10 pts

Let $f(x) = 2x^2 - 8x + 3$. **(a)** Complete the square to write $f(x)$ in vertex form. **(b)** Name the vertex and the axis of symmetry. **(c)** Find the x-intercepts exactly. **(d)** Graph $f(x)$ and label the vertex and intercepts.



E2 SOLVE ☐ My pick · 10 pts

(a) Solve $x^2 + 6x + 4 = 0$ by completing the square. **(b)** Solve $2x^2 - 12x + 7 = 0$ by completing the square (watch the leading coefficient). **(c)** Graph $y = x^2 + 6x + 4$ and plot the x-intercepts from (a).



E3 SOLVE ☐ My pick · 10 pts

(a) Use the quadratic formula on $3x^2 - 4x - 2 = 0$. Give exact solutions, then decimals to the nearest hundredth. **(b)** Solve $2x^2 - 6x + 5 = 0$. **(c)** A student wrote $\frac{4 \pm 2\sqrt{10}}{6} = 2 \pm \frac{\sqrt{10}}{3}$. Find the error.

E4 COMPLEX ☐ My pick · 10 pts

Write each answer in $a + bi$ form. **(a)** $(5 - 3i) - (-2 + 4i)$ **(b)** $(2 + 3i)(4 - 5i)$ **(c)** $(3 - 2i)^2$ **(d)** Find $|6 - 8i|$, the distance from the origin in the complex plane.

E5 COMPLEX ☐ My pick · 10 pts

(a) Write $\frac{10 + 5i}{2 - i}$ in $a + bi$ form. **(b)** Write $\frac{3 + 2i}{1 + 4i}$ in $a + bi$ form. **(c)** Find $(3 - 5i)(3 + 5i)$ and explain why multiplying by a conjugate helps with division.

E6 APPLY ☐ My pick · 10 pts

A chef tosses pizza dough from 6 ft. Its height is $h(t) = -16t^2 + 40t + 6$ feet after t seconds. **(a)** Find the maximum height and when it occurs. **(b)** When does it hit the floor, to the nearest hundredth of a second? **(c)** When is it 20 ft high? Explain the two answers.

Chef’s Specials

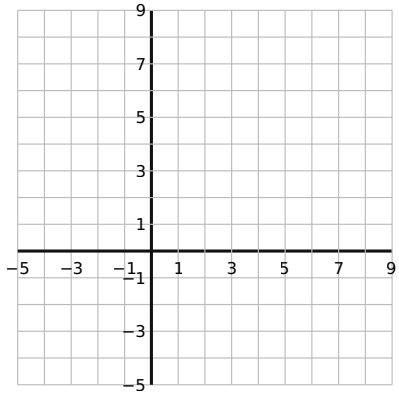
20 points each · choose 2 · Multi-part challenges

Name: _____

S1 GRAPH

☐ My pick · 20 pts

A parabola has vertex (3, −4) and passes through (1, 4). **(a)** Write its equation in vertex form. **(b)** Write it in standard form. **(c)** Find the x-intercepts exactly and the y-intercept. **(d)** Graph it, plotting the vertex, the given point, its mirror image and the x-intercepts. **(e)** Give the axis of symmetry and the mirror image of (1, 4).



S2 COMPLEX

☐ My pick · 20 pts

(a) Solve $x^2 - 6x + 25 = 0$ with the quadratic formula. **(b)** Show the two roots are conjugates, and find their sum and product. **(c)** Write a quadratic with integer coefficients whose roots are $2 + 3i$ and $2 - 3i$. **(d)** Verify by substitution that $3 + 4i$ is a root of $x^2 - 6x + 25 = 0$. **(e)** For what values of k does $x^2 + 2x + k = 0$ have two nonreal solutions?

S3 APPLY

☐ My pick · 20 pts

The bistro sells 120 bowls of soup a day at $8. Each $1 price increase loses 10 bowls. Let x be the number of $1 increases. **(a)** Write the daily revenue $R(x)$ in standard form. **(b)** Find the price that maximizes revenue and the maximum revenue. **(c)** For what prices is revenue at least $960? **(d)** State a sensible domain and the range of $R(x)$.

S4 APPLY

☐ My pick · 20 pts

Consider the parabola $y = x^2 - 2x - 3$ and the line $y = x + 1$. **(a)** Solve the system algebraically. **(b)** Graph both and mark the solutions. **(c)** How many solutions does the system of the parabola and the line $y = -4$ have? And with $y = -6$? **(d)** Find k so that $y = 2x + k$ touches the parabola at exactly one point, and find that point.

