The Function 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**: NOTATION, TRANSFORM, COMPOSE and INVERSE (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** NOTATION
- ☐ **A2** NOTATION
- ☐ **A3** INVERSE
- ☐ **A4** TRANSFORM
- ☐ **A5** TRANSFORM
- ☐ **A6** COMPOSE

Entrées

10 pts each · choose 4

- ☐ **E1** NOTATION
- ☐ **E2** NOTATION
- ☐ **E3** TRANSFORM
- ☐ **E4** TRANSFORM
- ☐ **E5** COMPOSE
- ☐ **E6** INVERSE

Chef's Specials

20 pts each · choose 2

- ☐ **S1** TRANSFORM
- ☐ **S2** NOTATION
- ☐ **S3** COMPOSE
- ☐ **S4** INVERSE

My skill check (circle each skill you have covered): NOTATION · TRANSFORM · COMPOSE · INVERSE

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 NOTATION ☐ My pick · 5 pts

Let $f(x) = 2x^2 - 3x + 1$. Find **(a)** $f(-2)$ **(b)** $f(3)$ **(c)** every x for which $f(x) = 1$.

A2 NOTATION ☐ My pick · 5 pts

Relation R = {(1, 3), (2, 5), (3, 3), (4, 7)} and relation T = {(2, 1), (2, 4), (3, 6)}. **(a)** Which one is a function? Explain. **(b)** State the domain and range of that function.

A3 INVERSE ☐ My pick · 5 pts

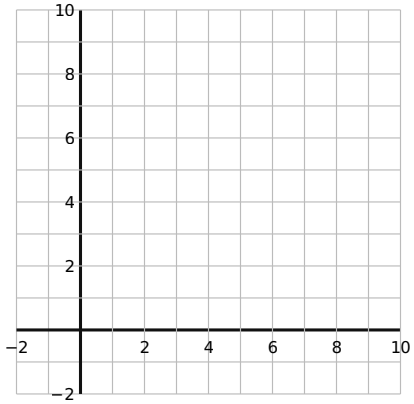
Let $f(x) = \dfrac{x - 4}{3}$. **(a)** Find $f^{-1}(x)$. **(b)** Find $f^{-1}(5)$. **(c)** Is $f^{-1}(5)$ equal to $\dfrac{1}{f(5)}$? Explain.

A4 TRANSFORM ☐ My pick · 5 pts

The function $g(x) = |x + 3| - 2$ is a transformation of $f(x) = |x|$. **(a)** Describe each shift. **(b)** Give the vertex of $g(x)$. **(c)** Write the equation of the reflection of $g(x)$ in the x-axis.

A5 TRANSFORM ☐ My pick · 5 pts

Graph $g(x) = \sqrt{x - 1} + 2$ on the grid. Plot the starting point and at least two more points, then draw the curve. State the domain and range.



A6 COMPOSE ☐ My pick · 5 pts

Let $f(x) = 2x + 1$ and $g(x) = x^2 - 3$. Find **(a)** $(f(x) + g(x))(2)$ **(b)** $(f \circ g)(2)$ **(c)** $(g \circ f)(2)$.

Entrées

10 points each · choose 4 · Multi-step problems

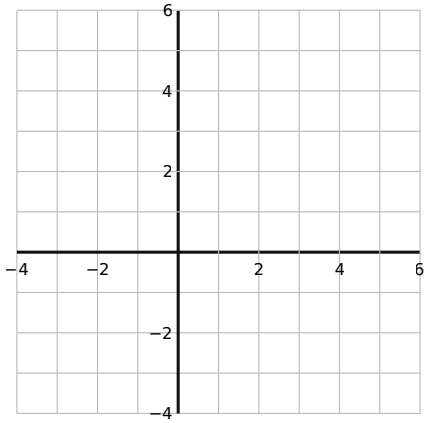
Name: _____

E1 NOTATION ☐ My pick · 10 pts

Write in interval notation. **(a)** Domain and range of $h(x) = \sqrt{x - 5} + 1$. **(b)** Domain and range of $k(x) = \dfrac{1}{x + 2} - 3$. **(c)** Domain of $m(x) = \dfrac{\sqrt{x + 1}}{x - 3}$.

E2 NOTATION ☐ My pick · 10 pts

Let $f(x) = \begin{cases} x^2 & \text{if } x \le 1 \\ 3 - x & \text{if } x > 1 \end{cases}$. **(a)** Find $f(-2)$, $f(1)$ and $f(3)$. **(b)** Graph $f(x)$ on the grid using open and closed circles. **(c)** State the range.



E3 TRANSFORM ☐ My pick · 10 pts

Start with $f(x) = x^2$. In this order: stretch vertically by a factor of 3, reflect in the x-axis, shift left 2, shift up 5. **(a)** Write the equation of the new function $g(x)$. **(b)** State its vertex and range. **(c)** Find $g(0)$.

E4 TRANSFORM ☐ My pick · 10 pts

The point $(4, -6)$ is on the graph of $y = f(x)$. Name the image of this point on each graph. **(a)** $y = f(x + 3) - 2$ **(b)** $y = -f(x)$ **(c)** $y = f(-x)$ **(d)** $y = 2f(x)$ **(e)** $y = f(\frac{1}{2}x)$

E5 COMPOSE ☐ My pick · 10 pts

Let $f(x) = x^2 + 1$ and $g(x) = 3x - 2$. **(a)** Find $(f \circ g)(x)$ and $(g \circ f)(x)$, simplified. **(b)** Evaluate $(f \circ g)(-1)$. **(c)** Solve $(g \circ f)(x) = 49$.

E6 INVERSE ☐ My pick · 10 pts

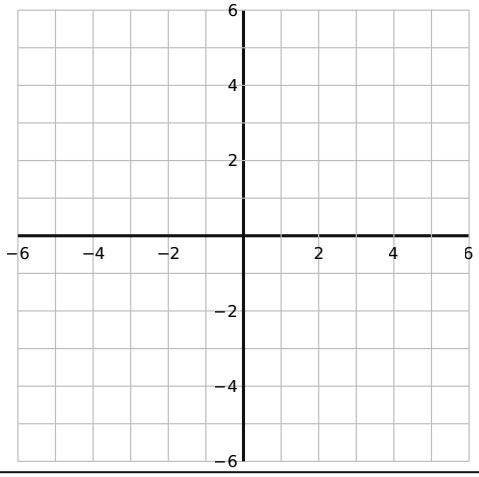
Let $f(x) = (x - 2)^2 + 1$ for $x \ge 2$. **(a)** Find $f^{-1}(x)$. **(b)** State the domain and range of $f^{-1}(x)$. **(c)** Verify that $f(f^{-1}(x)) = x$. **(d)** Why is the restriction $x \ge 2$ needed?

Chef’s Specials

20 points each · choose 2 · Multi-part challenges Name: _____

S1 TRANSFORM ☐ My pick · 20 pts

Graph $g(x) = -\frac{1}{2}|x - 2| + 2$ on the grid by transforming $y = |x|$. **(a)** List the four transformations. **(b)** Give the vertex, domain and range. **(c)** Find both intercepts exactly and plot them. **(d)** Is $g(x)$ even, odd or neither? Justify.



S2 NOTATION ☐ My pick · 20 pts

A garage charges $F(t)$ dollars to park for t hours:

$$F(t) = \begin{cases} 5 & \text{if } 0 < t \le 2 \\ 3t - 1 & \text{if } 2 < t \le 6 \\ 17 & \text{if } 6 < t \le 12 \end{cases}$$

(a) Find $F(1.5)$, $F(4)$ and $F(10)$. **(b)** For what t is $F(t) = 14$? **(c)** State the domain and range, and what 17 means. **(d)** Dana parks 6.5 hours and computes $3(6.5) - 1$. Find her error.

S3 COMPOSE ☐ My pick · 20 pts

Use the table. **(a)** Find $(f \circ g)(1)$. **(b)** Find $(g \circ f)(2)$. **(c)** Solve $(f \circ g)(x) = 0$.

x	−1	0	1	2	3
$f(x)$	4	1	−2	0	5
$g(x)$	2	−1	3	1	0

(d) Let $p(x) = \sqrt{x}$ and $q(x) = x - 4$. Find $(p \circ q)(x)$ and its domain.

S4 INVERSE ☐ My pick · 20 pts

Let $f(x) = \sqrt{x + 3}$. **(a)** Graph $f(x)$ and the line $y = x$ on the grid. **(b)** Graph $f^{-1}(x)$ by reflecting $f(x)$ in $y = x$. **(c)** Find $f^{-1}(x)$ algebraically. **(d)** State the domain and range of $f(x)$ and $f^{-1}(x)$. **(e)** Does $y = x^2$ (all real x) have an inverse function? Explain.

