

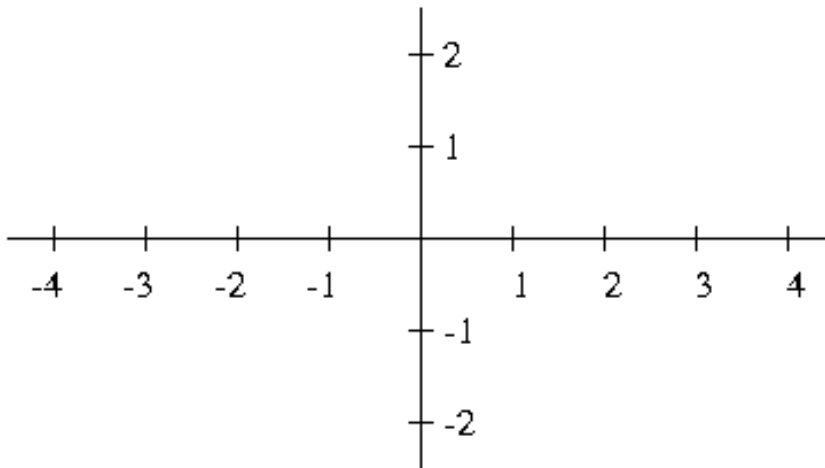
Discussion Section (please circle day and time):

We 2:30 We 3:30 Th 9:00 Th 10:30 Th 12:00 Th 1:30

I. Write the precise ϵ - δ definition of the following: $\lim_{g \rightarrow f} x(g) = a$.
(4)

II. Use the definition of limit to prove that $\lim_{x \rightarrow 0} x^{1/3} = 0$.
(4)

III. In this coordinate system,
(6) graph the functions $x^{1/3}$,
 $x^{1/4}$, and $x^{1/5}$, indicating
which curve corresponds to
each function.



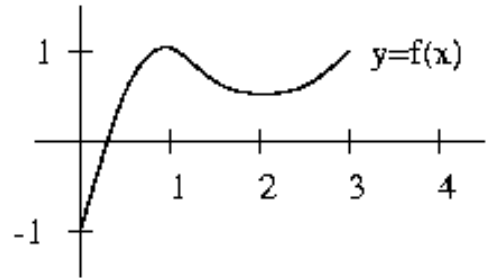
IV. For the functions $f(x) = \frac{1}{x}$ and $g(x) = x^3 + 3x$, calculate the compositions $f \circ g$ and $g \circ f$.
(4)

V. Calculate the limit $\lim_{x \rightarrow 4} \frac{x - 4}{\sqrt{x} - 2}$.
(4)

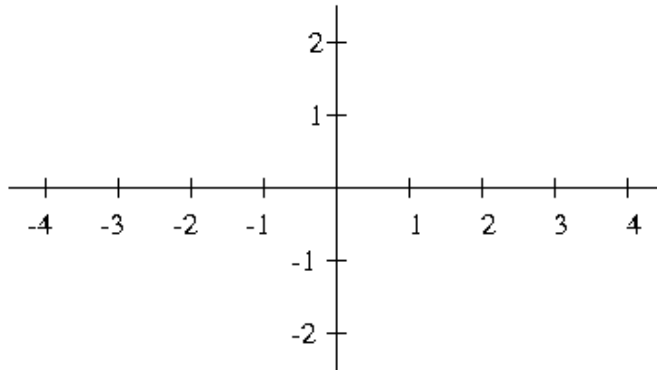
VI. Complete this statement of the Intermediate Value Theorem: Suppose that $f(x)$ is a continuous function
(3) on the domain $a \leq x \leq b$, and let N be any number ...

VII. Use the formula $\lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a}$ to calculate the slope of the tangent line to the graph of the function
(7) $f(x) = \sqrt{3x + 1}$ at the point where $x = a$. (Hint: Use $(A - B)(A + B) = A^2 - B^2$ to simplify the numerator.)

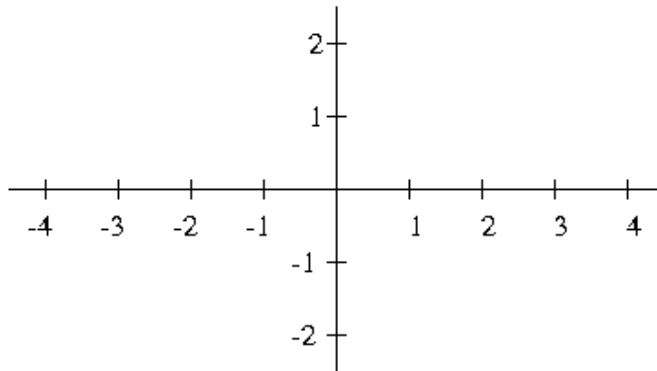
VIII. The problems on this page all refer to the function $f(x)$
(9) whose graph is shown in this coordinate system:



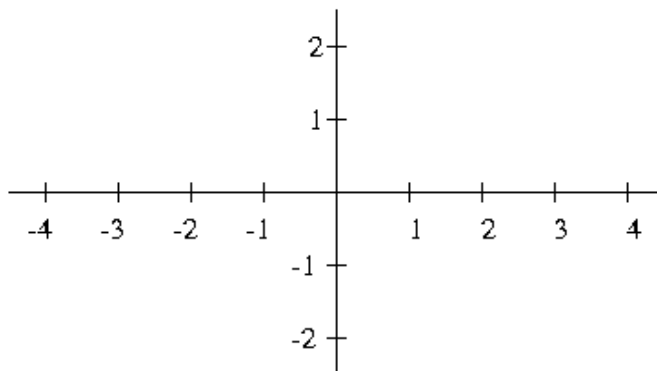
1. In this coordinate system,
graph the function $-2f(x)$.



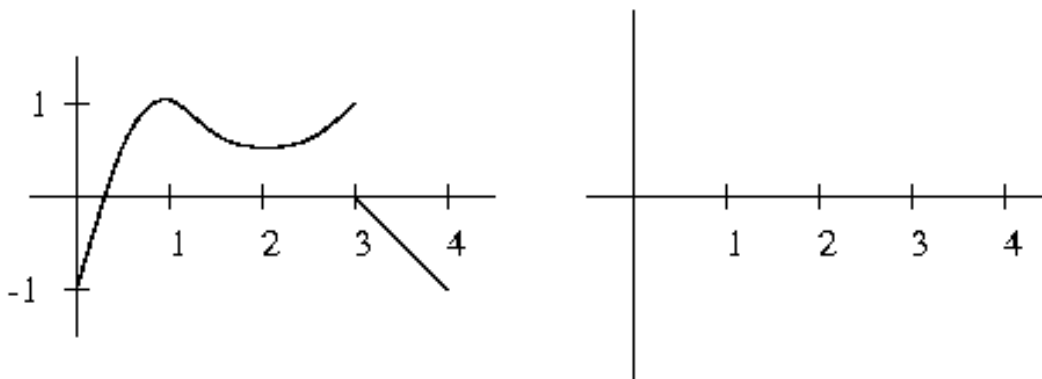
2. In this coordinate system,
graph the function $-2f(x+3)$.



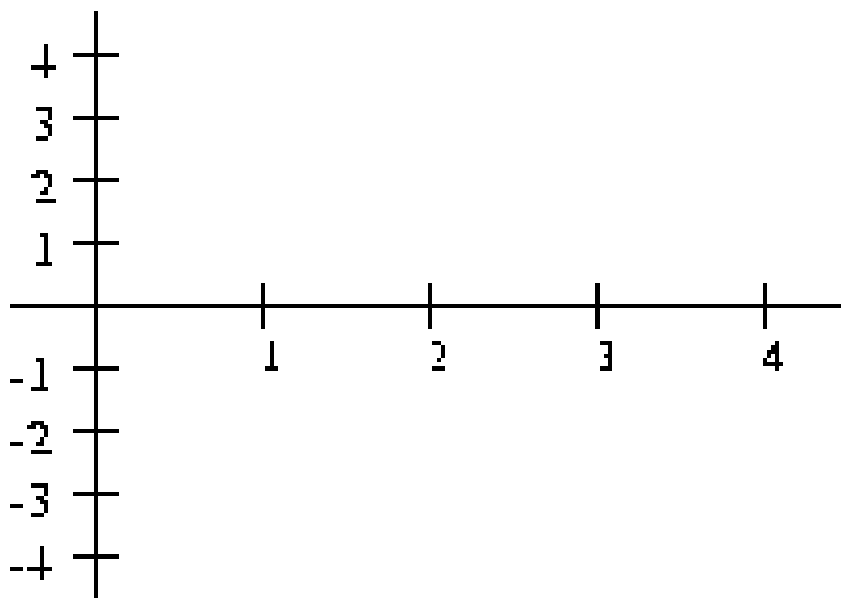
3. In this coordinate system,
graph the function $1/f(x)$.



- IX.** The first coordinate system shows the graph of a function $f(x)$. On the second coordinate system, sketch the graph of its derivative $f'(x)$.



- X.** In the coordinate system below, sketch the graph of a function $g(x)$ satisfying the following conditions:
 (5) $g(0) = 1$, $g'(0) = 1$, g is discontinuous at $x = 1$ but is continuous at all other $x < 4$, $g(2) = 0$, $g'(2) = 3$, $g'(3) = -1$, and $\lim_{x \rightarrow 4^-} g(x) = -\infty$.



- XI.** (bonus problem) Sketch the graph of $y = \frac{1}{x} \sin\left(\frac{1}{x}\right)$.
 (3)