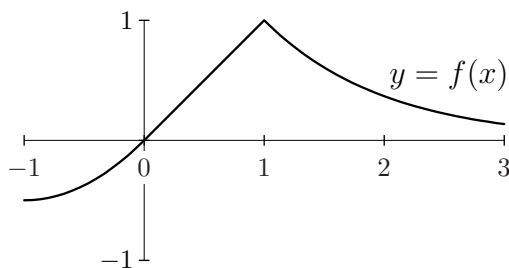
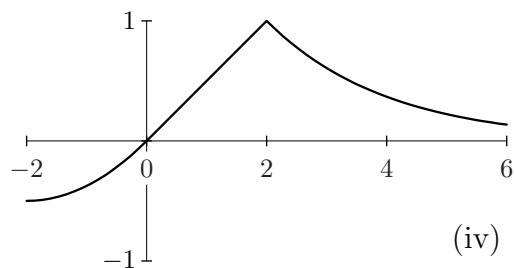
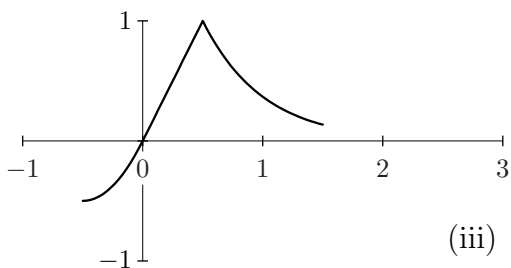
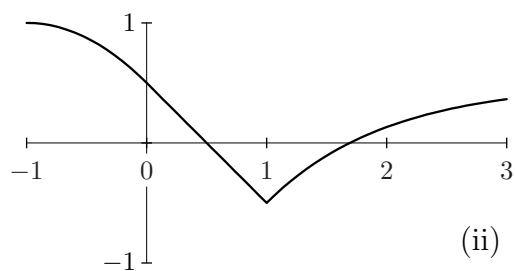
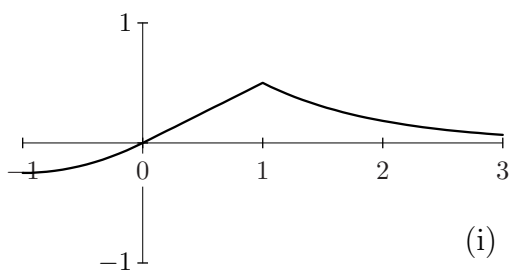


College of the Holy Cross, Fall Semester, 2005
Math 131, Practice Midterm 1

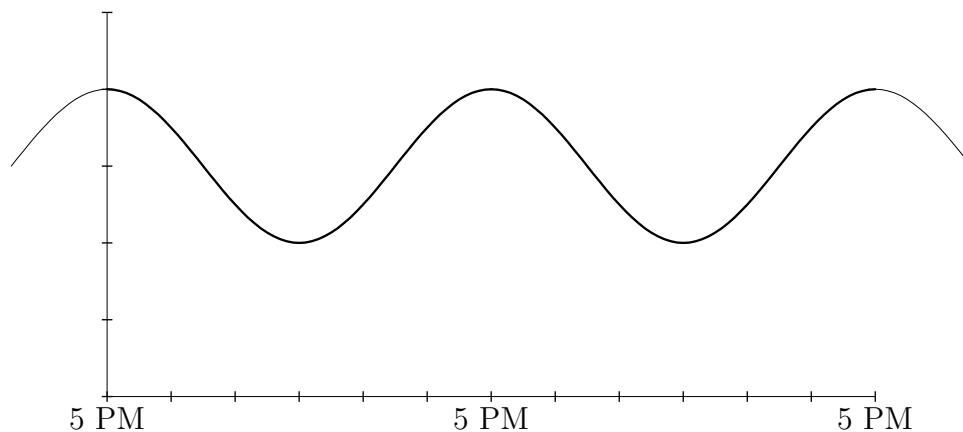
1. The graph $y = f(x)$ and four graphs obtained by transforming it are shown. Match the given formulas with the corresponding graph. Note that there is an extra graph.



- (a) $y = f(2x)$: _____ (b) $y = \frac{1}{2}f(x)$: _____ (c) $y = \frac{1}{2} - f(x)$: _____



2. [20 points] The desert temperature H varies sinusoidally from a high of 80°F at 5 PM to a low of 40°F at 5 AM. Find a formula for H as a function of t , with t measured in hours from 5 PM. You may use the graph below for reference; it's a good idea to start by labeling the vertical and horizontal scales.



3. [10 points each] In each part, fill in the table as indicated.
Give **exact answers**: Use fractions, square roots, logarithms, etc. as needed.

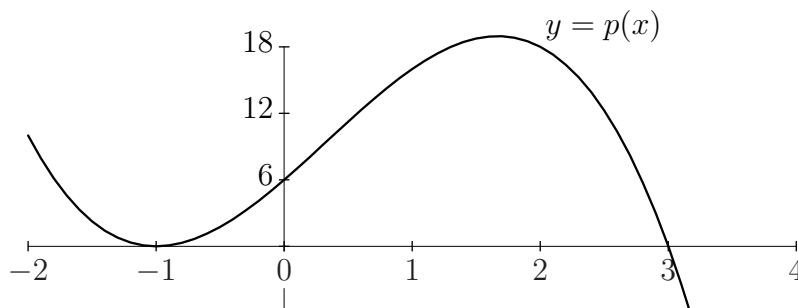
(a) Assuming f is a **linear function**.

x	-1	2	5	10
$f(x)$	24	12		

(b) Assuming f is an **exponential function**.

x	-1	2	5	10
$f(x)$	24	12		

4. [10 points] Find the polynomial whose graph is shown; express your answer in **both** factored and expanded (multiplied out) form.



5. [10 points each] Let $y = f(x) = x^2 - 3$ for $x \geq 0$.

(a) Find the inverse function in the form $y = f^{-1}(x)$, and find the domain of f^{-1} .

(b) Suppose $g(x) = x + 2$. With $f(x)$ as above, find $f(g(x))$; simplify your answer.

6. [20 points] An automobile costs \$25,000 and depreciates in value by 20% per year. How many years pass before the car is worth \$5000? Give both an **exact answer** and a numerical answer rounded to two decimal places.