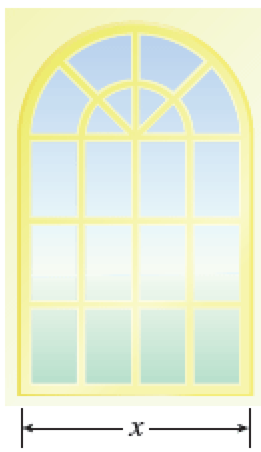
Chapter 4 Test Review

1) Find the minimum/maximum value for $y = 2x^4 - 8x$.
2) Find the domain restrictions and any asymptotes for $f(x) = \sqrt{x^2 + 2x} - x$.
3) Find the domain and over which interval the function is concave up and concave down $y = x(\ln(x))^2$.
4) Find the intervals that $f(x) = x^{\frac{2}{3}}(x - 6)$ is increasing or decreasing.
5) Find the point of inflection for $f(x) = x^3 - 3x^2 - 6x - 3$.
6) Solve $\lim\limits_{x \to \frac{\pi}{4}} \frac{\cos(x) - \sin(x)}{\tan(x) - 1}$.
7) Solve $\lim\limits_{x \to 1} \frac{\sin(x-1)}{x^3 + 2x - 3}$.
8) A farmer wants to fence in a rectangular plot of land adjacent to the north wall of his barn. No fencing is needed along the barn, and the fencing along the west side of the plot is shared with a neighbor who will split the cost of that portion of the fence. If the fencing costs $10 per linear foot to install and the farmer is not willing to spend more than $7000, find the dimensions for the plot that would enclose the most area.
9) A Norman window has the shape of a rectangle surmounted by a semicircle. (Thus the diameter of the semicircle is equal to the width of the rectangle, labeled *x*.)



A window with the shape of a rectangle surmounted by a semicircle. The diameter of the semicircle is equal to the width of the rectangle. The rectangle has width *x*.

If the perimeter of the window is 8 feet, find the exact value of *x* (in ft) so that the greatest possible amount of light is admitted.

10) A fence 8 feet tall runs parallel to a tall building at a distance of 4 feet from the building. What is the length (in feet) of the shortest ladder that will reach from the ground over the fence to the wall of the building? (Round your answer to two decimal places.)