Section 2.6

Mathematical Models

Math 1051 - Precalculus I
Graph $f(x) = 2 - (3 - x)^2$
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Word Problems
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AGAIN!!!
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Be sure to get a handout.
Beth has 3000 feet of fencing available to enclose a rectangular field. One side of the field lies along a river, so only three sides require fencing. Express the area $A$ of the rectangle as a function of $x$, where $x$ is the length of the side parallel to the river.
A right triangle has one vertex on the graph of $y = 9 - x^2$ at $(x, y)$, another at the origin, and the third on the positive $x$-axis at $(x, 0)$. Express the area of the triangle as a function of $x$. 
\[ A(x) = -\frac{1}{2}x^3 + \frac{9}{2}x \]
A wire 10 meters long is to be cut into two pieces. One piece will be shaped as an equilateral triangle, and the other piece will be shaped as a circle. Express the total area $A$ enclosed by the pieces of wire as a function of the length $x$ of a side of the equilateral triangle.
$A_{\text{triangle}} + A_{\text{circle}} = \frac{\sqrt{3}}{4} x^2 + \frac{(10 - 3x)^2}{4\pi} \approx 1.15x^2 - 4.77x + 7.96$
\[ A_{\text{triangle}} + A_{\text{circle}} = \frac{\sqrt{3}}{4}x^2 + \frac{(10 - 3x)^2}{4\pi} \approx 1.15x^2 - 4.77x + 7.96 \]
MetroMedia Cable is asked to provide service to a customer whose house is located 2 miles from the road along which the cable is buried. The nearest connection box for the cable is located 5 miles down the road.

If the installation cost is $10 per mile along the road and $14 per mile off the road, express the total cost $C$ of installation as a function of the distance $x$ (in miles) from the connection box to the point where the cable installation turns off the road.
\[ C(x) = 10x + 14\sqrt{x^2 - 10x + 29} \]
Inscribe a right circular cylinder of height $h$ and radius $r$ in a sphere of fixed radius $R$. Express the volume $V$ of the cylinder as a function of $h$. 
\[ V(h) = \pi \left( R^2 - \frac{h^2}{4} \right) h \]
Exam review on Friday

Start studying NOW!