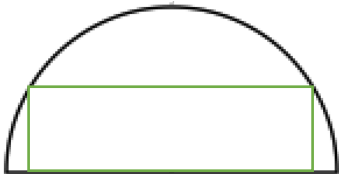


Review Problems

Topics: **Extreme Value Theorem, Chain Rule, Implicit Differentiation & Optimization**

1. Text page 99 #5abc
2. Text page 158 #1, 2, 4a,
3. Given that $\frac{d}{dx}(\sin x) = \cos x$, find the derivative of the following:
 - a) $f(x) = \sin(x^2 - 5x)$
 - b) $y = \sin^2(5x)$
4. Find the maximum and minimum values of the function $f(x) = \frac{1}{x^2 - 2x + 2}$ for $0 \leq x \leq 3$.
5. A rectangular rose garden will be surrounded by a brick wall on three sides and by a fence on the fourth side. The area of the garden will be 1000m^2 . The cost of the brick wall is \$192 per metre. The cost of the fencing is \$48 per metre. Find the dimensions of the garden that will minimize the cost of the materials described above.
6. A rectangle is drawn inside a semi-circle with a radius of 10 m. Determine the dimensions of the rectangle that provide the maximum area for the rectangle. **Hint – try Pythagorean Theorem. This one is probably tough for you right now – try your best!**



7. A typical automotive battery has six cells divided by walls as shown below. If the area of the entire figure below is 390 cm^2 , then what dimensions will give the smallest total perimeter? (total perimeter is the sum of all of the line segments below). Round to nearest tenth.

