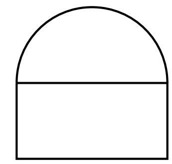
Name: ______________________________________ MATH 200 – QUIZ 11

Instructions: Show work and put a $\boxed{\text{box}}$ around your final answer. April 4, 2013

1. You are designing a window consisting of a rectangle with a half-circle on top, as illustrated. The client can only afford 1 meter of window framing material. The framing material runs around the outside of the window and between the rectangular and semicircular regions. What should the diameter of the half-circle be to maximize the area of the window?



(a) Label the diagram with the appropriate variables. Find the function to be optimized.

(b) Find the critical points of this function.

(c) Use the first or second derivative test on the critical points that make sense in the context of this problem.

(d) Answer the question.

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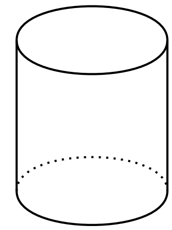
1. You are designing a cylindrical can which has a bottom but no lid. The can must have a volume of $1000\mathrm{cm}^3$. What should the height and radius of the can be to minimize its surface area?



(a) Label the diagram with the appropriate variables. Find the function to be optimized.

(b) Find the critical points of this function.

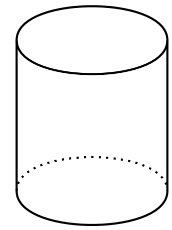
(c) Use the first or second derivative test on the critical points that make sense in the context of this problem.

(d) Answer the question.

Name: ______________________________________ MATH 200 – QUIZ 11

Instructions: Show work and put a $\boxed{\text{box}}$ around your final answer. April 4, 2013

1. You are designing a cylindrical can (with both a top and a bottom) that must have a volume of $1000\mathrm{cm}^3$. What should the height and radius of the can be to minimize its surface area?



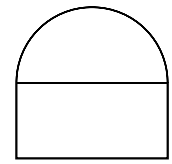
(a) Label the diagram with the appropriate variables. Find the function to be optimized.

(b) Find the critical points of this function.

(c) Use the first or second derivative test on the critical points that make sense in the context of this problem.

(d) Answer the question.

1. You are designing a window consisting of a rectangle with a half-circle on top, as illustrated. The client can only afford 1 meter of window framing material which will run along the very outside portion of the window; no framing material is required between the rectangular and semicircular regions. What should the diameter of the half-circle be to maximize the area of the window?



(a) Label the diagram with the appropriate variables. Find the function to be optimized.

(b) Find the critical points of this function.

(c) Use the first or second derivative test on the critical points that make sense in the context of this problem.

(d) Answer the question.