

Solutions On the Board

- Groups put ladder problem and cylinder intersection (shells version) problem on wall boards.

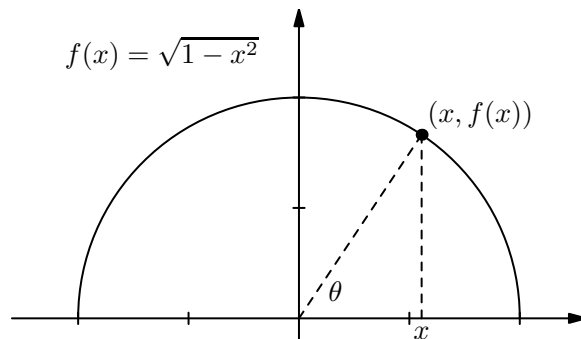
Old and New Questions

1. Evaluate $\int \sin^2 \theta d\theta$. [Hint: Use the cheer, ...*sin sin*]
2. Evaluate $\int_0^1 \sqrt{1-x^2} dx$. [Hint: Think geometry]
3. Now, our goal is to get a general antiderivative for $\int \sqrt{1-x^2} dx$.

(a) Look at the triangle in the graph at the right. Write an equation to express x in terms of θ . Explain.

(b) Consider what happens when you do a θ -substitution by letting $x = \cos\theta$. Push through (e.g. $dx = \dots$) and get useful expression for $\int \sqrt{1-x^2} dx$ in terms of θ .

(c) Check your answer by revisiting question 2.



4. A Battle of the Limits – 0^0

(a) Why might 0^0 be equal to 0? Why might 0^0 be equal to 1?

(b) Demonstrate how to resolve this battle by considering $L = \lim_{x \rightarrow 0^+} x^x$.