

Math 221 Quiz #5 Solutions

1. Write an integral or a sum of integrals which calculates the area of the following region. Draw a sketch of the region.

The region below the x -axis, to the left of the line $x = 1$, and above the graph of the function $y = x^2 - 4$.

Answer: $\int_{-2}^1 (4 - x^2) dx$

2. Let $F(x) = \int_0^x (2 - \cos(t^2)) dt$. Which of the following is largest: $F(0)$, $F(1)$, or $F(2)$? Justify your answer.

Answer: The integrand $2 - \cos(t^2)$ is always positive: $2 - \cos(t^2) \geq 1$ for all t (since $\cos(x) \leq 1$ for all x). Therefore, the function $F(x)$ is increasing on its entire domain, and so $F(0) < F(1) < F(2)$. The answer is $F(2)$.