Math 151, Quiz # 1, Solutions, September 3, 2013

1. Compute $\sin^2(30^\circ) + \cos^2(30^\circ)$. Recall that $\sin^2(x) = (\sin(x))^2$.

Solution: For all x, $\sin^2(x) + \cos^2(x) = 1$. So the answer is 1.

2. If f(x) = 5x - 6, compute $f^{-1}(x)$ (the inverse function).

Solution: Write y = 5x - 6. Now solve for x. So 5x = y + 6 and dividing by 5 gives $x = \frac{y+6}{5}$. So $f^{-1}(y) = \frac{y+6}{5}$.

3. Consider $g(x) = \frac{x^2 + 14x + 1}{x^2 - 4}$. Find and describe all vertical and horizontal asymptotes.

Solution: The function will have vertical asymptotes where the denominator is zero. So Set $x^2 - 4 = 0$ and we find $x = \pm 2$. Note that the numerator is not zero at these values, so we indeed have an asymptote. Next to compute the horizontal asymptotes we consider what happens when x gets very large. As |x| tends towards positive infinity, the x^2 in the numerator dominates the other terms in the numerator and similarly for the denominator. So the value grows as x^2/x^2 , and thus approaches 1.