3A Solution Set–Week 2

January 10, 2006

Section 3.1.3

2) $\frac{7}{4} = 1.75$.

5) $\frac{3}{2}\sqrt{2}$

9) $e^{-\frac{1}{2}}$ (this is about .6)

16) 0

21) $-\infty$

24) $-\infty$

29) $\frac{1}{6}$

Section 3.2.3

8) 3

10) Neither limit exists. ($\lim_{x\to -1^-} f(x) = \infty$ and $\lim_{x\to 1^-} f(x) = -\infty$)

22) It is continuous everywhere it is defined, so it is continuous on $(2, \infty)$.

25) It is continuous everywhere it is defined. $\tan\theta$ is defined everywhere except when $\cos\theta = 0$ and this is exactly when θ is an odd multiple of $\frac{\pi}{2}$. Thus the function is not continuous exactly when $2\pi x = (2k+1)\frac{\pi}{2}$, for some $k \in \mathbb{Z}$. Thus the solution is $\{x \in \mathbb{R} \mid x \neq \frac{2k+1}{4} \text{ for all } k \in \mathbb{Z}\}$.

28) a) (Graph omitted) It visibly jumps from 2 to 1 at $x = 1$ so the limit does not exist at $x = 1$, so $f(x)$ is not continuous at 1.

b) The only place where it might be discontinuous is at $x = 1$ and then only if the two limits disagree at that point, so we need to ensure that the limit from below and the limit from above are the same. The limit from above is always 1, so we need to choose c so that the limit from below is 1. The limit from below is $2 + c$, so we see that we need $c = -1$.