

Fall 2004 MATH 171

Week in Review II

courtesy of David J. Manuel

Section 1.3, 2.2, 2.4, 2.3

Section 1.3

1. Prove that $x = \frac{1-t^2}{1+t^2}$, $y = \frac{2t}{1+t^2}$ is a parametrization of the unit circle.

2. Given the lines $L_1 : \mathbf{r}(t) = \langle 3 - 4t, -5 + 3t \rangle$ and $L_2 : \mathbf{r}(t) = \langle -3 + 8t, 2 - 6t \rangle$, show they are parallel.

Section 2.2, 2.4

For #3-6, use the epsilon-delta definition to prove the limit:

3. $\lim_{x \rightarrow 3} 2x + 4 = 10$

4. $\lim_{x \rightarrow 1} -5x + 1 = -4$

5. $\lim_{x \rightarrow 2} (x - 2)^2 = 0$

6. $\lim_{x \rightarrow 0^+} \frac{1}{x^3} = \infty$

Section 2.3

7. If $\lim_{x \rightarrow a} f(x) = L_1$ and $\lim_{x \rightarrow a} g(x) = L_2$, prove that $\lim_{x \rightarrow a} [f(x) + g(x)] = L_1 + L_2$

8. Prove the following: if $\lim_{x \rightarrow a} f(x) = L$, then $\lim_{x \rightarrow a} cf(x) = cL$ (assume $c \neq 0$).

9. Prove $\lim_{x \rightarrow 0^+} \sqrt{x} \cos\left(\frac{1}{x}\right) = 0$.