```
diff --git a/main.tex b/new.tex
index cabd02c..f9d852f 100644
--- a/main.tex
+++ b/new.tex
@@ -28,14 +28,16 @@
     $\xi$2. THE THEOREM \\ OF SARD AND BROWN
     \end{center}
   }
-  In general, it is too much to hope that the set of critical values of a smooth
map be finite. But this set will be ``small,'' in the sense indicated by the next theorem, which
was proved by A. Sard in 1942 following earlier work by A.P. Morse, (References [30], [24].)
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map be finite. But this set will be ``small,'' in the sense indicated by the next theorem, which
was proved by A.\ Sard in 1942 following earlier work by
A.P.\ Morse, (References [30], [24].)
+
   \begin{theorem}
-  $let f : U \to R^n$ be a smooth map, defined on an open set $U \subset R^m$,
and let
-  \begin{center}
-  $C = \{x\in U|\ rank\ df_{x} < n \}$
-  \end{center}
-  Then the image $f(C) \subset R^n$ has Lebesgue measure
zero \footnote[1]{In other words, given any $\xi > 0$, it
is possible to cover $f(C)$ by a sequence of cubes in $R^n$ having total n-dimensional volume less
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volume less than $\xi$ }
   \end{theorem}
+
   Since a set of measure zero cannot contain any nonvacuous open set, \\
   it follows that the complement $R^n - f(C)$ must be everywhere dense\footnote[2]{Proved by
Arthur B. Brown in 1935. This result was rediscovered by Dubovickil in 1953 and by Thorn in 1954.
(References [5], [8], [36].)} in $R^n$. \\
   The proof will be given in $\xi3$. It is essential for the proof that $f$ should \\
@@ -43,72 +45,87 @@
   We will be mainly interested in the case $m\geq n$. If $m < n$, then \\
   clearly $C = U$; hence the theorem says simply that $f(U)$ has measure \\
   zero. \\
-  More generally consider a smooth map $f : M
=> N$, from a manifold \\
+  More generally consider a smooth map $f : M
\to N$, from a manifold \\
   of dimension $m$ to a manifold of dimension $n$. Let $C$ be the set of all \\
-  $x\in
\mathbb{M}$ such
that
-  \begin{align*}
+  $x\in M$ such that
+  \[
     df_{x} : TM_{x}\to TN_{f(x)}
-  \end{align*}
-  Regular values \hfill 11 \\ \\
-  has rank less than $n$ (i.e. is not onto). Then $C$ will be called the set \\
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onto). Then $C$ will be called the set \\
   of critical points, $f(C)$ the set of critical values, and the complement \\
   $N - f(C)$ the set of regular values of $f$. (This agrees with our previous \\
   definitions in the case $m = n$.) Since $M$ can be covered by a countable \\
   collection of neighborhoods each diffeomorphic to an open subset of \\
   $R^m$, we have:
-  \begin{corollary}
-  (A. B.
Brown). The set of regular values of a smooth map $f: M\to
N$ is everywhere dense in $N$.
+
+
\begin{corollary}[A.B.      Brown]
+         The set of regular values of a smooth map $f: M\to N$ is everywhere
dense in $N$.
   \end{corollary}
+
   In order to exploit this corollary we will need the following:
+
   \begin{lemma}
-  If $f: M \to N$ is a smooth map between manifolds of dimension $m\geq n$, and
if $y\in N$ is a regular value, then the set $f^{-1}(y) \subset M$ is a smooth manifold of
dimension $m - n$.
+         If $f: M \to N$ is a smooth map between manifolds of dimension $m\geq
n$, and if $y\in N$ is a regular value, then the set $f^{-1}(y) \subset M$ is a smooth manifold of
dimension $m - n$.
   \end{lemma}
-  \begin{proof} Let $x\in f^{-1}(y)$.
Since $y$ is a regular value, the derivative $df_{x}$ must map $TM_{x}$ onto $TN_{y}$. The null
space $\Re \subset TM_{x}$ of $df_{x}$ will therefore be an $(m - n)$-dimensional vector space.
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therefore be an $(m - n)$-dimensional vector space.
   \end{proof}
-    If $M \subset R^{k}$ choose a linear map $L :
R^K \to R^{m-n}$ that is nonsingular on this subspace $\Re
\subset TM_{x} \subset R^k$. Now define
-    \begin{align*}
-    F : M \to N X R^{m-n}
-    \end{align*}
+
+    If $M \subset R^{k}$ choose a linear map $L :
R^k \to R^{m-n}$ that is nonsingular on this subspace $\Re
\subset TM_{x} \subset R^k$. Now define
+    \[
+          F : M \to N \times R^{m-n}
+    \]
    by $F(\xi) = (f(\xi), L(\xi))$. The derivative $dF_{x}$ is clearly given by the formula
-    \begin{align*}
-      dF_{x}(v) = (df_{x}(v), L(v)).
-    \end{align*}
-    Thus $dF_{x}$ is nonsingular. Hence $F$ maps some neighborhood $U$ of $x$
diffeomorphically onto a neighborhood $V$ of $(y, L(x))$. Note that $f^{-1}(y)$ corresponds, under
$F$, to hyperplane $y X R^{m-n}\cap V$. This proves that
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$F$, to hyperplane $y \times R^{m-n}\cap V$. This proves
that $f^{-1}(y)$ is a smooth manifold of dimension $m - n$.
     As an example we can give an easy proof that the unit sphere $S^{n-1}$ is a smooth
manifold. Consider the function $f : R^m \to R$ defined by
-    \begin{align*}
-      f(x) = x^2_{1} + x^2_{2} + ... +
x^2_{m}.
-    \end{align*}
+    \[
+           f(x) = x^2_{1} + x^2_{2} +
\cdots + x^2_{m}.
+     \]
     Any $y \neq 0$ is a regular value, and the smooth manifold $f^{-1}(1)$ is the unit
sphere.
-    If $M'$ is a manifold which is contained in $M$, it has already been noted
that $TM'_{x}$ for $x\in M'$ is a subscape of $TM_{x}$ for $x\in M'$. The orthogonal complement of
$TM'_{x}$ in $TM_{x}$ is then a vector space of dimension $m - m'$ called the \emph{the space of
normal vectors to M' in M at} $x$.
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normal vectors to
$M'$ in
$M$ at} $x$.
    In particular let $M' = f^{-1}(y)$ for a regular value $y$ of $f: M \to N$.
-  \begin{lemma} The null space of
$df_{x} : TM_{x} \to TN_{y}$ is precisely equal to the tangent space $TM'_{x} \subset TM_{x}$ of
the submanifold $M' = f^{-1}(y)$. Hence $df_{x}$ maps the orthogonal complement of $TM'_{x}$
isomorphically onto $TN_{y}$.

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the tangent space $TM'_{x} \subset TM_{x}$ of the submanifold $M' = f^{-1}(y)$. Hence $df_{x}$ maps
the orthogonal complement of $TM'_{x}$ isomorphically onto $TN_{y}$.
   \end{lemma}
-  \begin{proof} From the
diagram \\
-    \begin{center}
-    \begin{tikzpicture}
-      \draw[thick,->] (4,4) -- (4,0) node[anchor=north west] {y};
-      \draw[thick,->] (4,0) -- (8,0) node[anchor=north west] {N};
-      \draw[thick,->] (4,4) -- (8,4) node[anchor=north west] {M};
-      \draw[thick,->] (8,4) -- (8,0);
-    \end{tikzpicture}
-    \end{center}
-    we see that $df_{x}$ maps the subspace $TM'_{x} \subset TM_{x}$ to zero.
Counting dimensions we see that $df_{x}$ \emph{maps the space of normal vectors to M'
isomorphically onto} $TN_{y}$.
+
+  \begin{proof}
+         From the diagram
+         \begin{center}
+         \begin{tikzpicture}
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zero. Counting dimensions we see that $df_{x}$ \emph{maps the space of normal vectors to M'
isomorphically onto} $TN_{y}$.
   \end{proof}
+
+
   \section{Manifolds with Boundary}
+
   The lemmas above can be sharpened so as to apply to a map defined on a smooth "manifold with
boundary." Consider first the closed half-space
-  \begin{align*}
-    H^m = {(x_{1}, ..., x_{m})\in R^m |
x_{m}\geq 0}.
-  \end{align*}
+  \[
+          H^m =
\{(x_{1},\ldots,
x_{m})\in R^m | x_{m}\geq 0\}.
+    \]
   The boundary $\partial H^m$ is defined to be the hyperplance $R^{m-1} \times 0 \subset
R^M$.
+
   \begin{definition}
-    A subset $X \subset R^k$ is called a \emph{smooth m-manifold with boundary}
if each $x\in X$ has a neighbohood $U \cup X$ diffeomorphic to an open subset $V\cup H^m$ of $H^m$.
The \emph{boundary} ${\partial X}$ is the set of all points in $X$ which correspond to points of
$\partial H^m$ under such a diffeomorphism.
+          A subset $X \subset R^k$ is called a \emph{smooth m-manifold with
boundary} if each $x\in X$ has a neighbohood $U \cup X$ diffeomorphic to an open subset $V\cup H^m$
of $H^m$. The \emph{boundary} ${\partial X}$ is the set of all points in $X$ which correspond to
points of $\partial H^m$ under such a diffeomorphism.
   \end{definition}
+
   It is not hard to show that $\partial x$ is a well-defined smooth manifold of dimension $m -
1$. The \emph{interior} $X - \partial X$ is a smooth manifold of dimension $m$.
   The tangent space $TX_{z}$ is defined just as in $\xi 1$, so that $TX_{x}$ is a full
$m$-dimensional vector space, even if $x$ is a boundary point.
   Here is one method for generating examples. Let $M$ be a manfiold without boundary and let $g
: M \to R$ have $0$ as regular value.
+
   \begin{lemma}
-    The set of $x$ in $M$ with $g(x) \geq 0$ is a smooth manifold, with boundary
equal to $g^{-1}(0)$.
+          The set of $x$ in $M$ with $g(x) \geq 0$ is a smooth manifold, with
boundary equal to $g^{-1}(0)$.
   \end{lemma}
+
   The proof is just like the proof of Lemma 1.
 \end{document}
```