Math 182 | Problems | Name: ______________

Due: 6 Mar 2018 | 10.1 Quiz | Point Values in $\boxed{\text{boxes}}$.

1. $\boxed{7}$ Please circle **True** or **False**, as appropriate.

   (a) **T** / **F:** If $a_n \to 0$ as $n \to \infty$, the sequence $\{a_n\}$ converges.

   (b) **T** / **F:** If $a_n \to \pi$ as $n \to \infty$, the sequence $\{a_n\}$ converges.

   (c) **T** / **F:** If $a_n \to -3$ as $n \to \infty$, the sequence $\{a_n\}$ converges.

   (d) **T** / **F:** If $a_n \to \infty$ as $n \to \infty$, the sequence $\{a_n\}$ converges.

   (e) **T** / **F:** The Fibonacci sequence $\{1, 1, 2, 3, 5, 8, 13, \ldots\}$ converges.

   (f) **T** / **F:** If $r = -0.3$, the geometric sequence $\{-7r^n\}$ converges. See examples 7 & 9

   (g) **T** / **F:** If $r = 1.3$, the geometric sequence $\{0.1r^n\}$ converges.

   (h) **T** / **F:** The sequence $\{\cos(\pi n)\}$ converges. ← Note: $\{\cos(\pi n)\} = \{(-1)^n\}$

   (i) **T** / **F:** The sequence $\{-1, 1, -1, 1, -1, 1, \ldots\}$ converges.

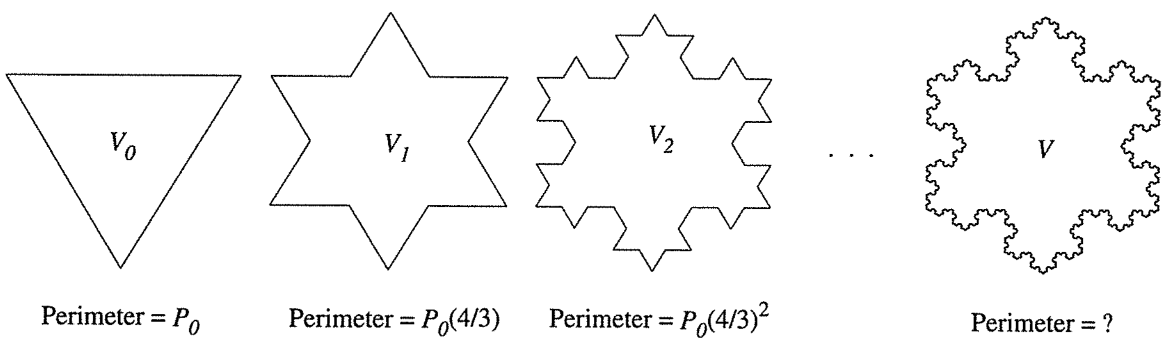
   (j) **T** / **F:** The sequence $\{\sin(\pi n)\}$ converges. ← Note: $\{\sin(\pi n)\} = \{0\}$

   (k) **T** / **F:** If $a_n = f(n)$ for $n \in \mathbb{N}$ and $\lim_{n\to\infty} a_n = L$, then $\lim_{x\to\infty} f(x) = L$. Consider $a_n = \cos(2\pi n)$

   (l) **T** / **F:** If $a_n = f(n)$ for $n \in \mathbb{N}$ and $\lim_{x\to\infty} f(x) = L$, then $\lim_{n\to\infty} a_n = L$. ← See Theorem 1

   (m) **T** / **F:** If $0 < a_n < b_n$ and $b_n \to 0$ as $n \to \infty$, then the sequence $\{a_n\}$ converges. ← Squeeze Theorem

   (n) **T** / **F:** For $P_0 > 0$, the sequence $\left\{P_0\left(\frac{4}{3}\right)^n\right\}$ converges, i.e. the sequence of perimeters of the approximations of the von Koch Snowflake converges.



2. $\boxed{3}$ Determine the limit of the sequence or state that the sequence diverges.

   (a) $a_n = \arcsin\left(\dfrac{n^2+1}{1-2n^2}\right) \xrightarrow[n\to\infty]{} \arcsin\left(-\frac{1}{2}\right) = -\frac{\pi}{6}$

   (b) $b_n = \dfrac{(-2)^{n+2}}{5^n} = (-2)^2\left(\frac{-2}{5}\right)^n \xrightarrow[n\to\infty]{} 0$

   (c) $c_n = \ln(2n^2+1) - \ln(n^2+15) = \ln\left(\frac{2n^2+1}{n^2+15}\right) = \ln\left(\frac{2+1/n^2}{1+15/n^2}\right) \xrightarrow[n\to\infty]{} \ln 2$