

Math 126 Extra Credit Assignment

Due Date: Before the final exam on Wednesday, December 13th

These problems come from Chapters 11 and 12. Please work on these problems individually (aside from questions to the instructor) and submit your solutions on a separate sheet. This assignment is worth 10 extra exam points. To receive the full 10 points, you must complete all of the problems correctly.

1. Does $\sum_{n=0}^{\infty} \frac{4 \cdot 5^n - 5 \cdot 4^n}{6^n}$ converge? If so, what number does it converge to?
2. Determine whether the series $\sum_{n=1}^{\infty} \frac{1}{\sqrt[3]{n^9 - n^3 + 1}}$ is convergent or divergent and justify your answer.
3. For what values of x does the series $\sum_{n=0}^{\infty} \frac{2^n (x-3)^n}{\sqrt{n}}$ converge?
4. Find the Maclaurin series for the function $f(x) = x^5 - 5x^4 + 27x^2 - 3x + 17$. What can you say (in general) about a Maclaurin series for a polynomial?
5. For a vector $\vec{a} = \langle 6, 8 \rangle$, find a vector \vec{b} so that the vector projection of \vec{b} onto \vec{a} has length 3.
6. Find an equation of the plane that contains the point $(1, 0, -2)$ and is perpendicular to the line $y = 2x$ in the xy -plane.
7. Consider the vector $\vec{c} = \vec{a} \times (\vec{a} \times \vec{b})$ for nonzero vectors \vec{a} and \vec{b} .
True or False:
 - (a) $\vec{c} \perp \vec{a}$
 - (b) $\vec{c} \perp \vec{b}$

Justify your answer. (If you believe (a) or (b) is false, provide a counterexample.)