University of California, San Diego
Department of Mathematics

Instructions: Turn off and put away your cell phone. No calculators or electronic devices are allowed. You may use one page of notes, but no books or other assistance. Show all of your work; no credit will be given for unsupported answers. No credit will be given for illegible solutions.

---

1. (5 points) Write the following set as an interval or as a union of intervals: $\{x : |2x + 7| > 3\}$.

2. (5 points) Find the minimum value of $3x^2 + 6x + 4$.

3. (a) (5 points) Find the equation of the line through the point $(5, -3)$ and perpendicular to the line $2x + 3y = 6$.
   (b) (5 points) Find the value of t so that the line passing through the points $(2, 3)$ and $(4, t)$ is parallel to the line through the points $(-1, 5)$ and $(4, 4)$

4. (10 points) Let $f(x) = \dfrac{1 + x}{2 - x}$.
   (a) Find $f^{-1}(x)$.
   (b) What is the domain of f?
   (c) What is the domain of f^{-1}?
   (d) What is the range of f?
   (e) What is the range of f^{-1}?

5. (5 points) Find the value of c such that $x = 2$ is a zero of the polynomial

$$P(x) = 2x^3 - 3x^2 - cx + 1.$$

6. (5 points) Find all solutions to the following equation:

$$x^4 + 2x^2 - 24 = 0$$