

## Problem Set for Final Exam - Math 171 Psychology

1. Solve the following inequality:  
 $|x^2 - 10| > 6$       Answer:  $(-\infty, -4) \cup (-2, 2) \cup (4, +\infty)$
2. Find the equation of the line which is perpendicular to  $y = -2x + 3$  and passes through the origin. Sketch both lines on the same graph.
3. Determine the x and y intercepts, and domain for the function  $y = (x^2 + 1)(x^2 - 4)$ . Test for symmetry about the x-axis, the y-axis, and the origin. Do not sketch.
4. Sketch  $y = (x + 1)^2 + 3$ . Determine the x and y intercepts, vertex, domain and range for the function. Test for symmetry about the x-axis, the y-axis, and the origin.
5. Solve the following problems for  $x$ :
  - a.  $3 = \log_x(x^3 + x^2 - x - 2)$
  - b.  $2 = \log_4(x + 3) + \log_4(x - 3)$
  - c.  $3(5)^{x^2+1} + 6 = 3^4$
  - d.  $2 = \log_5(x^2 + 9)$       Hint:  $x$  can be negative.
6. A debt of \$2000 due two years from now, and \$1210 due five years from now are instead to be paid off by a single payment at the end of three years. What would this payment be if an interest rate of 10% compounded annually is assumed?  
Answer: \$3200
7. An investor has the choice of investing money at 21% compounded annually. If the investor is looking for an equally profitable investment compounded semiannually what is the interest rate for this investment.      Answer: 20%
8. Every student in a class of 20, randomly picks a card from two decks of playing cards.
  - a. Determine the probability that everyone gets a black card.
  - b. Determine the probability that no one gets spades.
  - c. Determine the probability that at least two students get the same card. Hint:  $P(E) = 1 - P(\bar{E})$
9. In how many ways can a three-member committee be formed from a class of 40 students?
10. One day before the actual Champions League 2012 draw, a dress rehearsal has been conducted. 8 seeded teams in pot-A pairs with 8 unseeded teams in pot-B. Assuming any team in pot-A can pair with any team in pot-B, determine the probability of producing the same pairings in the actual draw as in the dress rehearsal.