EXAM 1 - MATH 112

YOUR NAME:_____

Friday, February 12

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Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. (a) Consider the line ℓ with equation $2x - 7y = 3$. Find its slope and its y-intercept.

    (b) Find an equation for the line ℓ', which is perpendicular to ℓ (of Part (a)) and passes through the point $(4, -12)$. Please, leave it in the form $Ax + By = C$.

2. Consider the function $f(x) = -x^2 - 2x + 3$.

   (a) Its graph is a parabola that opens _____.

   (b) Locate its vertex.

   (c) Its y-intercept is the point (_____, _____).

   (d) Locate its x-intercepts.

   (e) Sketch the graph of $y = f(x)$. (Please, make it nice and label all points of interest.)

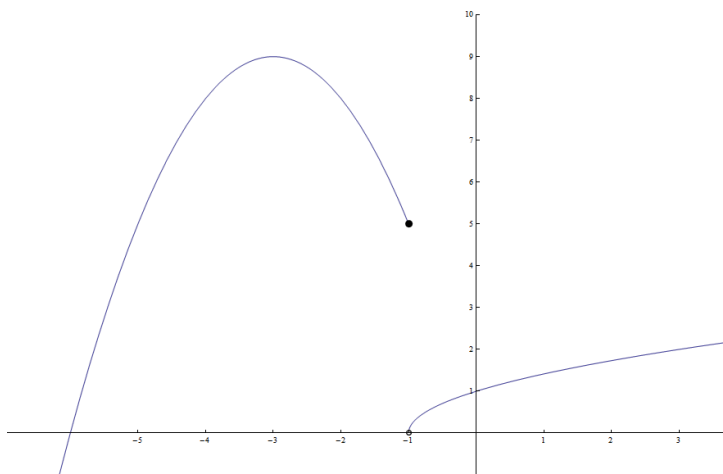3. (a) Find the domain of the function $f(x) = \dfrac{x + 7}{x^3 - 4x^2 - 21x}$.

(b) Compute the difference quotient of $f(x) = \dfrac{3}{x}$ and simplify.

4. Compute the following limits:

(a) $\lim\limits_{x \to 7} \dfrac{5x + 13}{x - 13} =$

(b) $\lim\limits_{x \to -3} \dfrac{\sqrt{x + 4} - 1}{x + 3} =$

5. Based on the following figure, find the following quantities and, further down, circle the statements (if any) that are correct:

$f(-1) \quad =$

$\lim\limits_{x \to -1^-} f(x) \quad =$

$\lim\limits_{x \to -1^+} f(x) \quad =$

$\lim\limits_{x \to -1} f(x) \quad =$

At $x = -1$, $f(x)$ is

      left continuous   right continuous   continuous