M17_LE2_003

Mathematics 17                                        College Algebra and Trigonometry
Second Long Examination                                  First Semester, AY 2011-2012

I.      Fill in the blanks with the word or symbol that will make each statement true.        *2 points each*
        1.  The lines $y = 2x - 4$ and $3x + ky - 2 = 0$ are perpendicular when $k =$ _____.

        2.  The parabola $y = 3x^2 + 4x - 2$ intersects the *x*-acis exactly _____ time(s).

        3.  The solution set $-3 < 3 - 2x \leq 5$ in interval notation is _____.

II.     Given the line $l : 2x + y - 5 = 0$ and the parabola *P*: $y = x^2 - 4x + 5$ .
        1.  Find the *x*- and *y*- intercepts of *l*.                                            *1 point*
        2.  Find the coordinates of the points of intersection of *l* and *P*.                   *3 points*
        3.  Sketch the line and the parabola on one plane.  Label their intercepts, their intersection and the
            vertex of the parabola.                                                             *3 points*

III.    Find the solution set of the following equations                                       *4 points each*

        1.  $\dfrac{2x}{x-3} - \dfrac{5x+8}{x^2 - 9} = 1$

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

        3.  $\sqrt{x^2 + x + \sqrt{2x^2 - 1}} + x = 0$

        4.  $\begin{cases} 3x - 2z = 0 \\ 2x + y = 1 \\ 6z - 3y = 2 \end{cases}$

IV.     Word Problems.
        1.  In Potions class, Professor Slughorn is brewing 15 ml of 80% concentration of polyjuice (in
            water).  If he wants to make a 60% concentration of polyjuice, how much water must he add?
            *4 points*

        2.  After Potions class, Hermione attends Muggle Studies.  She is asked to find the equation of a
            circle whose diameter has endpoints (5,-2) and (-3,4).  What is the equation of the circle?
            *3 points*

        3.  Oh no! Professor Severus Snape has assigned an essay on unicorns due the following day.  Harry
            and Ron team up to make one essay.  Harry starts working on it immediately.  After two minutes,
            Ron joins him together and they finish the essay after another 6 minutes.  If Ron takes thrice the
            time it would take Harry to do the essay by himself, how long would it take each of them to do
            the essay alone?
            *4 points*

                                        END OF EXAM