Instructions. Part I: Do each of the following 6 problems. Each problem is worth 5pts. Show all appropriate details in your solutions. Calculators are not allowed on Part I. Good Luck! When you turn this in, please pick up Part II which has 6 problems.

1. Solve the absolute value equation $3|x - 5| - 16 = 2$.

2. Solve the formula $y - y_1 = m(x - x_1)$ for $x$.

3. Solve the equation $2x^2 - x = 1$. 
4. Solve the equation $3x^{2/3} - 5x^{1/3} - 2 = 0$.

5. Solve the inequality $\frac{3x + 4}{x + 1} \geq 2$. Write your answer in interval notation.

6. Solve the inequality $x^2 < -x + 30$. Write your answer in interval notation.
Instructions. Part II: Do each of the following 6 problems. Each problem is worth 5pts. Show all appropriate details in your solutions, you may use a calculator to compute numbers.

7. Solve the radical equation \( \sqrt{3x-5} - \sqrt{x+2} = 1 \). Check all proposed solutions.

8. Write the complex number \( \frac{3 + 2i}{-4 + 3i} \) in standard form.

9. The maximum exercise heart rate in beats per minute is given by

\[
\text{Maximum exercise heart rate} = 0.85(220 - a)
\]

where \( a \) is age in years.

(a) Find the maximum exercise heart rate of a 19 year old college student.

(b) Find the age of a person whose maximum exercise heart rate is 165 beats per minute.
10. A motorboat left a harbor and traveled to an island at an average rate of 20 knots. The average speed of the return trip was 15 knots. If the total trip took 10.5 hours, how far is the harbor from the island?

11. In a daredevil motor cycle jump over a jumbo jet, the height in feet during the jump was given by \( h(t) = -16t^2 + 27t + 25 \) for \( t \geq 0 \) where \( t \) is measured in seconds. The rider left the takeoff ramp at a height of 25 feet, and landed on the landing ramp at a height of 19 feet. How long, to the nearest tenth of a second, was the rider in the air?

12. The amount of juice in a grapefruit is directly proportional to the cube of its diameter. A grapefruit with a 4-inch diameter contains 6 fluid ounces of juice. How much juice is contained in a grapefruit with a 5-inch diameter. Round final answer to the nearest tenth of a fluid ounce.