MATH 116 Practice EXAM 2

Problem 1 Solve the following equations.
a. \(2x^4 - 11x^2 + 12 = 0\).

b. \(\sqrt{2t} + 4 = t\).

c. \(|x^2 - 3x| = -4x + 6\).

Problem 2 Solve the following inequalities.
a. \(|x - 2| < -2\).

b. \(|x - 2| \geq -2\).
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c. $|2x - 7| < 3$.

d. $x^2 - 4x > 5$.

e. $\frac{1}{x - 1} < \frac{2}{x + 3}$

**Problem 3** Find the equation of the circle with center $(-1, 2)$ and passing through $(0, 1)$.

**Problem 4** Let $x^2 + y^2 - 4y = 0$. Sketch the graph. Also find the center and the radius.
**Problem 5** Find the equation of the following line.

a. The $x$-intercept is 2 and the $y$-intercept is 5.

b. Find the equation of the vertical line passing through $(1, 2)$.

c. Find the equation of the horizontal line passing through $(1, 2)$.

**Problem 6** Let $f(x) = \begin{cases} -x + 2, & \text{if } x \leq 1 \\ 2x - 1, & \text{if } x > 1. \end{cases}$

Sketch the graph.

**Problem 7** Sketch the graph of $y = -2(x - 1)^2 + 2$ by showing each translation step by step. Also, indicate the $y$-intercept on your final graph.
Problem 8 Let $f(x)$ have the following graph (See the graph of the Example 14 on page 35 in the lecture note.)

a. Is this a function? Explain your answer.

b. What are the $x$-coordinate where $f(x) = 0$

c. Determine the intervals where $f(x) > 0$

d. Determine the intervals where $f(x)$ is increasing.

e. Determine if the function is an even, odd or neither.

Problem 9 Simplify $\frac{f(2 + h) - f(2)}{h}$ if $f(x) = \frac{1}{x}$