

Math 06 - Midterm - Fall 2014

1. (15 points) Simplify the following expressions involving radicals:

(a) $7\sqrt{75} - 4\sqrt{20} - \sqrt{27}$

(b) $(1 + \sqrt{2})^2$

(c) $16^{-3/4}$

(d) $\frac{7}{5+\sqrt{2}}$

(e) $\left(\frac{18x^7y^3}{2xy^9}\right)^{\frac{1}{2}}$

2. (10 points) Solve the equation with radicals. Make sure to check all your answers.

(a) $\sqrt{-4x+1} - 1 = -x$

3. (15 points) Perform the following operations with complex numbers

(a) $(3 + 8i) - (-2 + 6i)$

(b) $(-4 + 3i)(1 - 2i)$

(c) $\frac{-2+3i}{2-2i}$

4. (20 points) Given the quadratic function:

$$f(x) = -2x^2 + 4x + 16$$

(a) Find the y-intercept.

(b) Find the x-intercepts.

(c) Find the vertex.

(d) Sketch the graph.

(e) Find the equation of the axis of symmetry.

5. (10 points) Solve the quadratic equation $4x^2 + 2x = -1$.

6. (30 points) Simplify:

(a) $\frac{n^2-3n-10}{n^2+n-2}$

(a') $\frac{4x^2-25}{4x-10} \cdot \frac{12x^2+4x}{6x^2+11x+5}$

(b) $\frac{b^2-4}{b^2-5b-14}$

(b') $\frac{\frac{3}{x-5} - \frac{2}{x}}{\frac{7}{x^2-5x}}$

(c) $\frac{x^2-1}{8x^2-2x} \div \frac{x^2-x-2}{4-x}$

(c') $\frac{3x-7}{x+5} + \frac{2x-18}{x+5}$

(d) $\frac{a-b}{5} - \frac{31-4b}{3}$

(d') $\frac{3x-7}{x-2} + \frac{2x-18}{x^2-3x+2}$

(e) $\frac{x-4}{x+5} - \frac{x+1}{x-3}$

(e') $\frac{\frac{3}{x-5} - 2}{1 - \frac{4}{x-5}}$