

Math 110 Review

Instructions: Focus on the subjects where you feel weakest. I encourage you to work with others.

1. Solve by factoring, using the even root property, or completing the square. Check that the quadratic formula gives the same solution set.

(a) $\{2 \pm \sqrt{6}i\}$

(c) $\{\pm 5\sqrt{3}\}$

(b) $\left\{\frac{3 \pm \sqrt{57}}{4}\right\}$

(d) $\{-5 \pm 2\sqrt{7}\}$

2. Solve each equation. Check for extraneous solutions where appropriate.

(a) $\left\{\frac{7 \pm \sqrt{41}}{2}\right\}$

(e) $\{24\}$

(b) $\left\{\frac{9 + \sqrt{33}}{8}\right\}$

(f) $\{-2\}$

(c) \emptyset

(g) $\{-2\}$

(d) $\{-4, 5\}$

(h) $\left\{1 - \frac{\sqrt[3]{9}}{3}\right\}$

3. Simplify each expression. All denominators should be rationalized, all radicals should be simplified, all complex numbers should be written in the form $a + bi$, and all exponents should be positive.

(a) $2 - i\sqrt{3}$

(e) $\frac{y - 3\sqrt{y}}{9 - y}$

(h) $\frac{v}{t}$

(b) $16 + 11i$

(f) $-\frac{\sqrt{6} + 3\sqrt{2}}{2}$

(i) $\frac{2a\sqrt{3}}{5}$

(c) $\frac{\sqrt[3]{18}}{3}$

(g) $\frac{x^{1/2}z}{y^{5/2}}$

(j) $\frac{49}{144}$

(d) $-32x^2\sqrt{x}$

4. Perform the indicated operations. Remember to simplify fractions before finding LCDs when adding/subtracting, and to cancel before multiplying.

(a) $\frac{-3y}{(y+1)^2}$

(c) $\frac{x^3 + 1}{2x + 2}$

(b) $\frac{-2}{a - b}$

(d) $\frac{3a^2 + 7a + 10}{a^3 - 8}$

5. Rewrite each expression in the form quotient + remainder/divisor. Use synthetic division when dividing by $x - a$, otherwise use long division.

(a) $x^2 + 2x + 2 + \frac{-1}{x-1}$

(b) $x^2 + x + 3$ (No remainder)

6. Simplify each complex fraction.

(a) $\frac{5x + 1}{-x - 5}$

(b) $\frac{y^4 - xy^3}{x^4 + x^5y}$