

Precalc Study Guide Test 2

Rational exponents

Be able to interpret rational exponents, e.g., $8^{\frac{1}{3}} = 2$

Be able to convert between $\sqrt[a]{x^b}$ and $x^{\frac{b}{a}}$, e.g.: $\sqrt[5]{x^4} = x^{\frac{4}{5}}$

Be able to multiply radicals, e.g., $x^{\frac{1}{2}}x^{\frac{1}{3}} = x^{\frac{5}{6}}$

Complex numbers

Understand that $i = \sqrt{-1}$ and that $i^2 = -1$

Understand that $a + bi$ represents a complex number with real part a and imaginary part b

Be able to add, subtract, and multiply complex numbers with each other

Be able to use the complex conjugate to remove imaginary numbers from the denominator

BONUS PROBLEM: Use the conjugate for a complex number with square root coefficients

Review exercises

Complete on separate paper:

- | | a. | b. | c. |
|-------------------------------------|----------------------------------|----------------------------------|--------------------------------------|
| 1. Evaluate: | $27^{\frac{1}{3}}$ | $25^{\frac{3}{2}}$ | $16^{\frac{3}{4}}$ |
| 2. Write using a rational exponent: | $\sqrt[3]{y^5}$ | $\sqrt[4]{y^3}$ | $\sqrt[3]{y^4}$ |
| 3. Write using a radical sign: | $z^{\frac{3}{4}}$ | $x^{\frac{2}{3}}$ | $y^{\frac{5}{6}}$ |
| 4. Multiply: | $x^{\frac{2}{9}}x^{\frac{1}{3}}$ | $y^{\frac{1}{6}}y^{\frac{5}{6}}$ | $x^{\frac{1}{3}}x^{-\frac{1}{4}}$ |
| 5. Add/subtract: | $(4 + 2i) + (3 - 6i)$ | $(2 - 4i) - (3 + i)$ | $(1 + i) - (4 - 2i)$ |
| 6. Multiply: | $(4 + 2i)(3 - 6i)$ | $(2 - 4i)(3 + i)$ | $(1 + i)(4 - 2i)$ |
| 7. Divide: | $\frac{4}{3 - 6i}$ | $\frac{2 - 4i}{3 + i}$ | BONUS: $\frac{1 + i}{\sqrt{4} - 2i}$ |