

EXPONENT RULES

$$x^a * x^b = x^{a+b}$$

$$(x^a)^b = x^{(a*b)}$$

$$\frac{x^a}{x^b} = x^{a-b} \quad x^{-a} = \frac{1}{x^a}$$

Simplify the radicals using the exponent rules. Remember no negative exponents in your answers.

1.) $x^4 \cdot x^6$

2.) $(y^3)^4$

3.) $\frac{a^7}{a^5}$

4.) 3^{-4}

5.) $2x^3 \cdot 5x^4 \cdot (-3x^2)$

6.) $(2x^3y^4)^3$

7.) $\left(\frac{x^5}{x^2y}\right)^4$

8.) $\left(\frac{x^3}{x^5}\right)^{-2}$

COMPLEX NUMBERS

- **Operations with Complex Numbers**
 - **Add:** combine like terms; **Subtract:** distribute the negative then combine like terms;
 - Multiply:** Multiply coefficients & add exponents (FOIL if necessary) then simplify exponent on "i" ; **Divide:** multiply by "i" on top and bottom if denominator is a monomial and multiply by the conjugate ($a + bi$ & $a - bi$) if the denominator is a binomial
- **Simplify exponents of "i" : i one, i one, negatives in the middle [divide exponents by 4]**

Simplify the following. You should have no "i" with an exponent greater than 1 in your answer.

9.) $-6 - (3 - 6i) + i$

10.) $(-5 + 3i)(-8 + 5i)$

11.) $\frac{7-6i}{-3i}$

12.) $\frac{3i}{6-i}$

13.) i^{45}

14.) $i^{15} + 2i^5 - i^8 + 3i$

SOLVING QUADRATICS

- You should be able to solve quadratics by factoring, taking square roots, completing the square, and by using the quadratic formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Solve each quadratic by one of the methods above.

15.) $x^2 - 6x - 27 = 0$

16.) $3x^2 - 48 = 0$

17.) $x^2 - 3x + 1 = 0$

18.) $3x^2 + 10x - 8 = 0$

19.) $3x^2 + 2x - 6 = x^2 + 2x + 2$

20.) $x^2 - 4x + 6 = 0$

21.) $3x^2 = 8x - 2$

22.) $2x^2 - 3x + 3 = 0$

RATIONAL EXPONENTS AND RADICALS

- You should be able to write radicals in exponential form and exponential expressions in radical form. Remember:

$$\cdot \text{root} \sqrt{\text{radicand}}$$

$$\cdot \left(\text{root} \sqrt{\text{radicand}} \right)^{\text{power}} = \text{radicand}^{\frac{\text{power}}{\text{root}}}$$

Rewrite the following with a rational exponent. (Negative exponents are allowed)

23.) $\sqrt{3x}$

24.) $(\sqrt[6]{2x})^7$

25.) $\frac{1}{(\sqrt[3]{4p})^4}$

Rewrite the following in radical form.

26.) $(3b)^{\frac{3}{4}}$

27.) $(10m)^{\frac{1}{6}}$

28.) $(5x)^{\frac{2}{5}}$