Unit 2 (1.1) **Alg2 Same Bases Notes**

Suppose we have a bacteria colony that starts with 1 bacterium, and the population of bacteria doubles every day.

Day	Bacteria

1. **How many days will it take for the bacteria population to reach 8?**
2. **How many days will it take for the bacteria population to reach 256?**
3. **How many days will it take for the bacteria population to reach 300?**

Approximate the solution to the following equations.

1. $2^x = 100$
2. $3^x = 600$
3. $5^x = 500,000$
4. $7^x = 300$
5. $8^x = 100,000$
6. $10^x = 1,000$
7. **Why do you suppose the NCAA chooses 64 teams for its annual basketball tournament?**
8. **How would you set up the tournament if only 48 teams were allowed to participate?**

Rules of Exponents Reminders (bases must be the same):

$x^5 * x^7 = x^{5+7} = x^{12}$

Add exponents when multiplying

$\frac{x^{14}}{x^{10}} = x^{14-10} = x^4$

Subtract exponents when dividing

$x^0 = 1$

Any base to the power of zero is equal to 1

When bases are the same, you can solve by using the exponents.

Examples:

1. $2^x = 32$

2. $2^{x-3} = 2^{2x+5}$

3. $2^{x^2-3x} = 2^{-2}$

4. $2^{3x} \cdot 2^5 = 2^7$

5. $2^{x^2-16} = 1$

6. $2^{x^2} = 2^{-2}$

7. $3^{2x} = 27$

8. $\frac{3^{x^2}}{3^{5x}} = 3^6$

9. $\frac{2^{2x}}{2^{x+5}} = 1$

10. $149^{x^2+3x} = 149^{28}$

11. $7^{-28} = 2401^{x^2+2}$

12. $2^{7x-4} * 2^{-2x} = 4^{4x-5}$

13. $15^{x^2} * 15^{-50} = 1$

14. $256^x = 64^{x+5}$

15. $\frac{11^{x^2}}{11^{2x+1}} = 11^7$