

$$2^x = 4 \quad \text{Know} \quad x = 2$$

analytically:

$$2^x = 2^2 \quad x = 2$$

## 7.2 Solving Exponential Equations and Inequalities

### Honors Algebra 2

1. Solve the following equations:

a.  $2^x = 8^3$

$$2^x = (2^3)^3$$

$$2^x = 2^9$$

$$\boxed{x = 9}$$

b.  $9^{2x-1} = 3^{6x}$

$$(3^2)^{2x-1} = 3^{6x}$$

$$2(2x-1) = 6x$$

$$4x - 2 = 6x$$

$$-2 = 2x$$

$$\boxed{x = -1}$$

c.  $4^{2n-1} = 64$

$$(4)^{2n-1} = 4^3$$

$$2n-1 = 3$$

$$2n = 4$$

$$\boxed{n = 2}$$

d.  $5^{5x} = 125^{x+2}$

$$5^{5x} = (5^3)^{x+2}$$

$$5x = 3(x+2)$$

$$5x = 3x + 6$$

$$2x = 6$$

$$\boxed{x = 3}$$

\*Numberphile Video

### KeyConcept Compound Interest

You can calculate compound interest using the following formula.

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

where  $A$  is the amount in the account after  $t$  years,  $P$  is the principal amount invested,  $r$  is the annual interest rate, and  $n$  is the number of compounding periods each year.

2. An investment account pays 4.2% annual interest compounded monthly. If \$2500 is invested in this account, what will be the balance after 15 years?

$$r = 0.042$$

$$n = 12$$

$$P = 2500$$

$$t = 15$$

$$A = 2500\left(1 + \frac{0.042}{12}\right)^{12(15)}$$

$$= \$4,688.87$$

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3. Find the account balance after 20 years if \$100 is placed in an account that pays 1.2% interest compounded twice a month.

$$t = 20$$

$$P = 100$$

$$r = 0.012$$

$$n = 24$$

$$A = 100 \left( 1 + \frac{0.012}{24} \right)^{24(20)}$$
$$= \$127.12$$

4. A certificate of deposit (CD) pays 2.25% annual interest compounded biweekly. If you deposit \$500 into this CD, what will the balance be after 6 years?

$$A = 500 \left( 1 + \frac{0.0225}{24} \right)^{24 \cdot 6}$$
$$= \$572.23$$

\* On college loans do you want interest rate high or low?  
how often do you want interest compounded?