

## **Sec 4.2**

### **Switching to logarithms...**

**A log is simply an  
exponent...an operation to  
determine**

$$2^? = 572$$

**for example.**

**$\log_2 572 =$  that exponent**

**Various bases...**

**We would use:**

**We might want to know:  $2^x = 18$        $\log_2 18 = x$**

**$e^x = 82$        $\ln 82 = x$**

**$10^x = 426$   
 $\log 426 = x$**

Today...converting  
from logarithmic form  
to exponential, using  
the pattern below-

$$y = \log_a x$$
$$x = a^y$$

**Write in exponential form-**

$$3 = \log_2 8 \longrightarrow 2^3 = 8$$

$$\log_5 125 = 3 \longrightarrow 5^3 = 125$$

$$\log_b 4 = 2 \longrightarrow b^2 = 4$$

$$\log 1000 = 3 \searrow 10^3 = 1000$$

**Write in logarithmic form-**

$$4^3 = 64 \longrightarrow \log_4 64 = 3$$

$$\sqrt{16} = 4$$

$$3^{-2} = 1/9$$

$$16^{1/2} = 4$$

$$\log_3 1/9 = -2$$

$$\log_{16} 4 = 1/2$$

**Evaluate without a calculator-**

$$\log_5 25 = 2$$

$$\log_2 \frac{1}{2} = -1$$

$$\log_8 8 = 1$$

$$\log_{36} 6 = \frac{1}{2}$$

$$\log 10 = 1$$

$\frac{1}{2} = \frac{1}{6}$   
 $\rightarrow 36$



**Suggested Practice**  
**Section 4.2**  
**pages 465-466**

**1-39**  
**odds**

$$1. 2^4 = 16$$

$$3. 3^2 = x$$

$$5. b^5 = 32$$

$$7. 6^y = 216$$

$$9. \log_2 8 = 3$$

$$11. \log_2 \sqrt[4]{16} = -4$$

$$\star 13. \log_8 2 = \frac{1}{3}$$

$$15. \log_{13} x = 2$$

$$17. \log_b 1000 = 3$$

$$19. \log_7 200 = y$$

$$21. 2$$



23. 6

\* 31.  $-\frac{1}{2}$

39. 7

25. -1

33.  $\frac{1}{2}$

27. -3

35. 1

29.  $\frac{1}{2}$

37. 0