

Math 56. HW #2.

#3.

$$5 \cdot 5 = 5^2$$

$$a \cdot a \cdot a \cdot a = a^4$$

$$10 \cdot 10 \cdot 10 \cdot 10 = 10^4$$

$$x \cdot x \cdot x \cdot x \cdot x = x^5$$

#4.

$$5^7 = 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5$$

$$9^2 = 9 \cdot 9$$

$$6^3 = 6 \cdot 6 \cdot 6$$

$$m^7 = m \cdot m \cdot m \cdot m \cdot m \cdot m \cdot m$$

#6. a. $5^3 = 5 \cdot 5 \cdot 5$

$$5 \cdot 5 \cdot 5 > 5 \cdot 3, \quad 5 \cdot 5 > 3$$

b. $12^2 = 12 \cdot 12$

$$12 \cdot 12 > 12 \cdot 2, \quad 12 > 2$$

c. $2^5 = 32$

$$5^2 = 25$$

$$32 > 25 \Rightarrow 2^5 > 5^2$$

d. $3^{10} < 3^{11}$

$$3^{11} = 3^{10} \cdot 3$$

e. $5^{21} < 6^{21}, \quad 5 < 6$

f. $2^4 = 4^2$

$$4^2 = (2^2)^2 = 2^4$$

$$\#7. b. 2^* = 64 \quad c. 3^* = 81$$

$$2^6 = 64 \quad 3^* = 9^2 = (3^2)^2 = 3^4$$

$$64 = 8^2 = (2^3)^2 \quad 3^4 = 81$$

$$64 = 2^6$$

$$d. 7^* = 343$$

$$343 = 49 \cdot 7 = 7^2 \cdot 7 = 7^3$$

$$7^3 = 343$$

#11

$$a. 100^2 = (10^2)^2 = 10^4$$

$$b. 100^3 = (10^2)^3 = 10^{2 \cdot 3} = 10^6$$

$$c. 100^4 = (10^2)^4 = 10^8$$

$$d. 100^5 = 100^2 (10^2)^3 = 10^{10}$$

$$e. 100^6 = (10^2)^6 = 10^{12}$$

$$\#15. a. 29^2 < 30^2$$

$$b. 43^2 > 40^2$$

$$30^2 = 900$$

$$40^2 = 1600$$

$$900 < 1000$$

$$1600 > 1500$$

$$29^2 < 1000$$

$$43^2 > 1500$$

$$c. 49^2 < 50^2$$

$$50^2 = 2500$$

$$2500 < 3000$$

$$49^2 < 3000$$

$$d. \quad 67^2 > 60^2$$

$$60^2 = 3600$$

$$3600 > 3500$$

$$67^2 > 3500$$

$$\#19. \quad 127^{23} < 128^{23}$$

$$a. \quad 128^{23} = (2^7)^{23} = 2^{7 \cdot 23} = 2^{161}$$

$$513^{18} > 512^{18}$$

$$512^{18} = (2^9)^{18} = 2^{9 \cdot 18} = 2^{162}$$

$$127^{23} < 128^{23} = 2^{161}$$

$$2^{161} < 2^{162} = 512^{18} < 513^{18}$$

$$127^{23} < 513^{18}$$

$$c. \quad 5^{300} = (5^3)^{100} = 125^{100}$$

$$3^{500} = (3^5)^{100} = 243^{100}$$

$$125^{100} < 243^{100}$$

#22.

$$1.1 \cdot 1.2 = 1.32.$$

P-population

in 1 year $1.1P$

in 2 years $1.2(1.1P) = 1.32P$

32%

23.

$$\frac{7777777 \cdot 7777777}{1+2+3+4+5+6+7+6+5+4+3+2+1} =$$

$$= \frac{7 \cdot 1111111 \cdot 7 \cdot 1111111}{1+6+2+5+3+4+4+3+5+2+6+1+7} =$$

$$= \frac{7 \cdot 7 \cdot 1111111 \cdot 1111111}{7+7+7+7+7+7+7} =$$

$$= \frac{7 \cdot 7 \cdot 1111111 \cdot 1111111}{7 \cdot 7}$$

$$= 1111111 \cdot 1111111$$

$$\frac{5555555 \cdot 5555555}{1+2+3+4+5+4+3+2+1} =$$

$$\frac{5 \cdot 5 \cdot 1111111 \cdot 1111111}{5 \cdot 5} =$$

$$= 1111111 \cdot 1111111$$

$$1111111 - 1111111 - 1111111 \cdot 1111111$$

$$= 0.$$