

- 3) What is the relationship between the prime factorization of 30 and the number of factors of 30?
- 4) Does the relationship found in question 3) above hold true for 32?
- 5) Describe a process for finding the number of divisors of any natural number.

Problem 2: Find the number of divisors for $16,200 = 2^3 \times 3^4 \times 5^2$.

★ Determining if a Number is Prime

Theorems:

- 1)
- 2)
- 3)

Problem 3: Explain the process to determine if 247 is prime or composite.

Problem 4: On Monday the local toy store sold x stuffed dogs, and on Friday they sold y stuffed dogs. If they collected \$5665 on Monday, and \$8239 on Friday, how many did they sell on Monday?

★ Sieve of Eratosthenes

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

★ Large Primes

a. $n^2 - n + 41$, $n \in \mathbb{W}$, $n < 41$ always produces a prime number

b. Mersenne primes found in 1998 by Cal State student

$$2^{3021377} - 1$$

$$2^{6972593} - 1$$

$$2^{13466917} - 1$$

c. Sophie Germain primes p an odd prime, $2p+1$ is also prime

$$p = 3 \rightarrow 3, 7$$

$$p = 5 \rightarrow 5, 11$$

$$p = 11 \rightarrow 11, 23$$

★ Practice

Are the following numbers prime or composite?

a. 12,345

b. 8,142

c. 524,331

d. 352,253

e. $(7)(5)(11)(17)+1$

★ **Problem Solving**

The total sales on the first day were \$2323 and on the second day were \$2461. Only stuffed rabbits were sold. How many were sold each day?