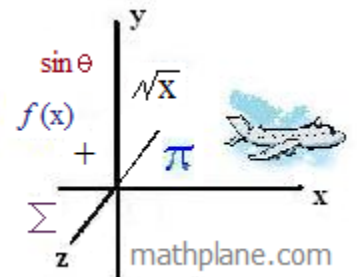


# Prime Time

This introduction includes facts, puzzle, and a comic



## Prime Numbers

Definition: A natural number (i.e. positive integer) greater than 1 that has no positive divisors other than 1 and itself.

⇔ Its factors are only 1 and itself

- \* *2 is the only even prime number*. It is divisible by 1 and itself. (Every other even number is divisible by itself, 1, and 2)
- \* A *non-prime*, positive integer is called a "*composite number*". It has at least 3 factors: 1, itself, and at least one other number.

- \* *Zero is neither prime nor composite*.

Why? Because, zero has an infinite number of factors. (i.e. any number multiplied by 0 is zero!)

- \* *One is neither prime nor composite*.

Why? Because, one has only 1 divisor: itself. So, it does not fit either definition.

- \* *Negative numbers*, such as  $-7$ , are not prime.

Why are negative numbers not included in the definition of prime?

Allowing negatives would double the number of divisors/factors.

Example: 7 would have factors of -1, 1, 7, -7

-7 would have factors of -1, 1, 7, -7

Other Comments:

300 BC Euclid demonstrated that there are infinitely number of primes.

3rd Century BC Greek mathematician Eratosthenes figured out a way to generate a list of primes. ('sieve of Eratosthenes')

7th Century Rules for negative numbers were stated

- The concept of primes preceded the idea of negative numbers. So, primes excluded non-positive integers. The definition of prime numbers was never modified to include negatives.

- \* The *Fundamental Theorem of Arithmetic* -- Any integer greater than one can be expressed uniquely as a product of primes. To maintain unique factorization, 1's and negative numbers must be omitted.

- \* A *Marsenne Number* is a positive integer that is 1 less than a power of 2

$$M_p = 2^p - 1$$

So, a *Marsenne Prime* is any Marsenne number that is prime.

*Hidden Message*

Clue: "All of these Answers"

Solve the problems below.  
Then, convert numbers to letters  
to reveal the hidden message.

Letter Key:

0	1	2	3	4	5	6	7	8	9
B	E	I	G	M	N	P	R	S	U

1)  $8^{(3-1)} - 3 =$

1 → \_\_\_\_\_

2) Sides in a regular heptagon

→ \_\_\_\_\_

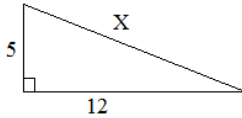
3) 40% of 5

→ \_\_\_\_\_

4)  $4! + 17 =$

1 → \_\_\_\_\_

5) What is X?



3 → \_\_\_\_\_

6) Great Common Factor of 20, 25 and 100

→ \_\_\_\_\_

7) LIX in ancient Rome?

5  → \_\_\_\_\_

8)  $\left(\frac{1}{2} - .03\right) \times 100 =$

7 → \_\_\_\_\_

9) FREE  BOX

Free  
Box → **B**

10)  $.38 = \frac{Y}{50}$  What is Y?

9 → \_\_\_\_\_

11)  $\sqrt{144} + \sqrt{25} =$

1  → \_\_\_\_\_

12) The median of the following set: {83, 13, 33, 93, 93, 13, 93}

3 → \_\_\_\_\_

Open 23 hours  
7 days/week  
359 days/year

*The Prime Rib*  
A-One dining  
with a sense of humor

*Daily Specials:*  
13" Pizza  
Caprese Salad for 3  
11 ounce steak  
(Portions are prepared to be divisible by one guest)

"Seating for four?  
No, sir."

"But, we do have  
a table for five."

"For dessert,  
I recommend  
31 flavors."

"31? Are you  
teasing us?!"

The Mersenne Review:  
"Considering its factors,  
Prime is one-of-a-kind.."  
"Odd ingredients. But, overall,  
an intriguing menu."  
"Best food around...  
Count on it!"

"The Math Guy Opens  
A Unique Restaurant"

L. Friedman #19 2-20-12  
[www.mathplane.com](http://www.mathplane.com)

SOLUTIONS --->

**Hidden Message**

Clue: "All of these Answers"

Solve the problems below.  
Then, convert numbers to letters  
to reveal the hidden message.

**Letter Key:**

0	1	2	3	4	5	6	7	8	9
B	E	I	G	M	N	P	R	S	U

**SOLUTIONS**

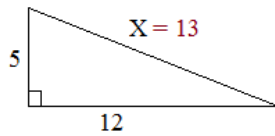
1)  $8^{(3-1)} - 3 = 8^2 - 3 = 61$

2) Sides in a regular heptagon **7 sides in a heptagon**

3) 40% of 5 **.4 x 5 = 2**

4)  $4! + 17 = (4 \times 3 \times 2 \times 1) + 17 = 24 + 17 = 41$

5) What is X?



**5 - 12 - 13 special right triangle**

$5^2 + 12^2 = 13^2$   
(pythagorean theorem)

6) Great Common Factor of 20, 25 and 100 **GCF is 5**

7) LIX in ancient Rome? **Roman numerals: L = 50, I = 1, X = 10, IX = 9, 59**

8)  $\left(\frac{1}{2} - .03\right) \times 100 = (.50 - .03) \times 100 = 47$

9) **FREE BOX**

10)  $.38 = \frac{Y}{50}$  What is Y? **(multiply both sides by 50)**

$Y = 19$  Also,  $\frac{38}{100} = \frac{19}{50}$

11)  $\sqrt{144} + \sqrt{25} = 12 + 5 = 17$

12) The median of the following set: {83, 13, 33, 93, 93, 13, 93}

arrange in order: 13 13 33 **83** 93 93 93

**83 is the middle term**

**6** 1 → **P**

**7** → **R**

**2** → **I**

**4** 1 → **M**

**1** 3 → **E**

**5** → **N**

**5** **9** → **U**

**4** 7 → **M**

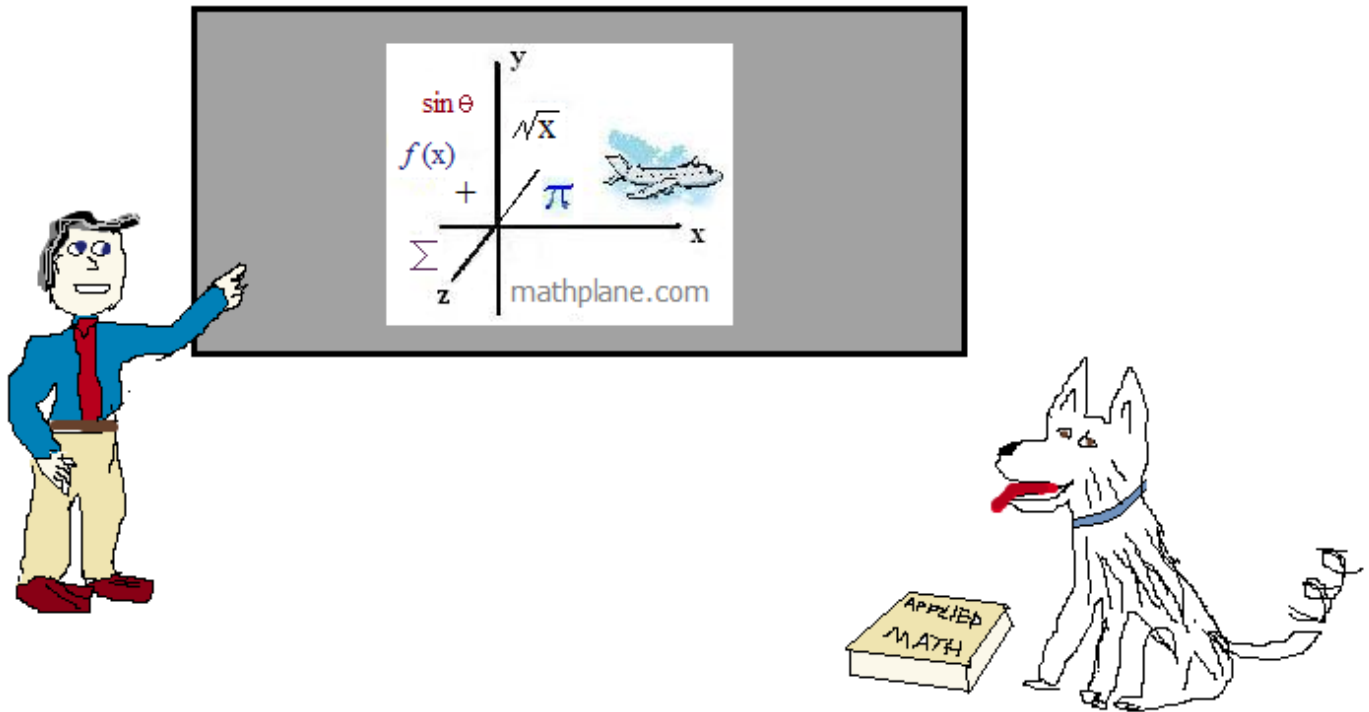
**Free Box** → **B**

**1** 9 → **E**

**1** **7** → **R**

**8** 3 → **S**

"All of these answers":  
61, 7, 2, 41, 13, 5, 59, 47, 19, 17, 83  
**PRIME NUMBERS**



Find more math puzzles, notes, practice tests, comics, and links to great resources at the Mathplane website.

Or, visit us at Facebook, Pinterest, or Google+

Also, the mathplane stores at

[TeachersPayTeachers.com](http://TeachersPayTeachers.com) and [TES.com](http://TES.com)