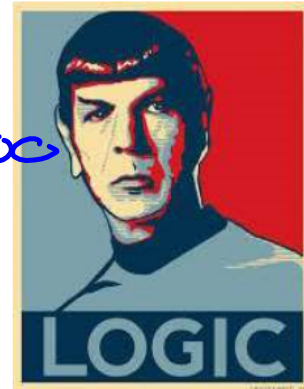# Just Logic It

Here is a quick test of your logic skills:

What number does 11 tens, 8 ones, and 2 hundreds make?

$110 + 8 + 200$

   A. 1182
   B. 2118
   C. 118
   D. 318

50% or Jr. High School students got this wrong…

Why is it confusing?

Why do you think people got it wrong?

$23 - 7 = 16$

$\frac{16}{2} = 8$

$2x + 7 = 23$

$\frac{2x = 23 - 7}{2}$

$x = \frac{23 - 7}{2}$

$x = 8$

Susan had 23 candies. She put the same number in each of two bags and had 7 candies left over. How many did she put in each bag?

The whole idea behind this method of problem solving is that we must work to solve the problem. We use logic to determine a correct solution if we do not already know the correct answer.

For example: I can ask you "What is 3 + 10?" You will quickly telll me 13. But how many of you counted the numbers? I would imagine none. You simply 'know' the answer now. You do not need to think about it. If you did not know the answer you could logic it out… go through the process and add 1 to 3 10 times. You would still get 13.

The key to these types of problems is that you may not know the answer right away - but you have to try. Anything. Just try something.

I am thinking of two numbers. When I add them I get 15. When I subtract them I get 3. What are the two numbers?

Is there a better method than trial and error?

$$12 + 3$$

$$12 - 3 = 9$$

$$3, 12$$

$$3 - 12 = -9$$

$$9 - 6$$

$$9 - 6 = 3$$

$$9, 6$$

$$9 + 6 = 15$$

$$9 - 6 = 3$$

The speed of light is 2.998×10^5 m/s. The sun is 1.5×10^8 km from Earth. How long does it take the light to hit Earth?

-2 numbers $\overset{+}{\text{sum}}$ to 15

difference of 3 $-$

x, y 1) $x + y = 15$

     2) $x - y = 3$

     $\underline{x \quad = 3 + y}$

1) $(3+y) + y = 15$

$3 + y + y = 15$

$3 + 2y = 15$

$2y = 15 - 3$

$2y = 12$

$y = \dfrac{12}{2}$

$\boxed{y = 6}$

1) $x + y = 15$

$x + 6 = 15$

$x \quad = 15 - 6$

$\boxed{x = 9}$

$$10! = 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$$

Construct the number 33 by using three 3's in any way that you like with any mathematical operators that you like.(+-/*!^, etc...)

$$3^3$$

$$3 + 3!$$

$$3 + 3$$

$$\frac{3}{1}$$

$$3^3 - 3$$

$$3$$

$$3! = 3 \cdot 2 \cdot 1$$

$$\frac{3}{3} + 3$$

! — factorial

$$x! = \text{multiply by all smaller } \#$$

You can throw an unlimited number of darts at the dartboard. Some total scores are impossible to achiever. For example any number less than 5. Also you could never achieve a 9.

What is the largest impossible score?

Chicken nugget problem

6, 9, 12, 20

#	✓ ✗				
5	✓	14	✓	22	✓
6	✗	15	✓	23	
7	✓	16	✗ —	24	✓
8	✗	17	5,5,7	25	✓
9	✗	18	✗ —	26	✓
10	5·5	19	✓	27	✓
11	✗	20	✓	28	✓
12	7·5	21	✓	29	✓
13	7·5			30	✓

What is the mystery number if you add it to 1, then multiply by (-1), then add 3, then multiply by 4, and you get 5 as the answer?
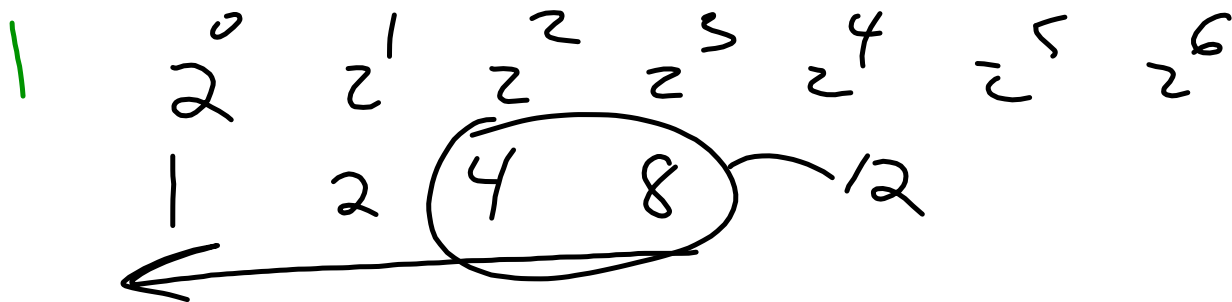
$$4\left(-(x+1)+3\right)=5$$

$$4\left(-x-1+3\right)=5$$

$$-4x-4+12=5$$

$$-4x=5+4-12$$

$$-4x=-3$$

$$x=\frac{-3}{-4}=\frac{3}{4}=.75$$

The sum of the digits in of a four digit number is 15. All the digits are different and they are in decreasing order. Each digit is a power of 2. What is the sum of the first 2 digits?

1

2^0 2^1 2^2 2^3 2^4 2^5 2^6

1   2   ④   ⑧   12

$$8+4+2+1=15$$

$$8421$$

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#1-16 (choose 10).

Do them all if you can. You will have similar questions on the test and the only way to get better at logical problem solving is to do more. I say choose 10 because I don't want you to get stuck on one for too long. Move on and try another.