

# DIGITLE – SAT/ACT

## Puzzle 510 – Functions / Transformations

**Directions:** The first 5 problems have single digit answers. The 6<sup>th</sup> problem has a 5-digit answer (counting leading zeros if present). You have a choice: solve the easier single-digit answer problems or tackle the more difficult 5-digit answer. Once you have done that, attempt to solve the puzzle by entering the following url on your computer, tablet, or phone:

<https://mastermathmentor.com/mmm/digitle.ashx>.

The correct puzzle answer will be the digits of your answer(s) scrambled. Use the following interpretation. You get 6 tries.



**Green :** the digit is in the answer and is in the correct spot.

**Yellow:** the digit is in the answer but is not in the correct spot.

**Grey :** the digit is not in the answer.

### Single Digit Answers:

1) If  $f(x) = (x+2)^2$ ,  $g(x)$  is created by reflecting  $f(x)$  about the  $y$ -axis. What is  $g(5)$ ?

2) Let  $f(x) = 2(x^2 - 2)$  and  $g(x) = x^2 - 3x + 2$ . If  $h(x) = g(f(x))$ , find  $h(2)$ .

3) If the parabola  $y = x^2 - 6x + 7$  is shifted 2 units upward and 3 units to the left, what is the  $y$ -intercept?

4) Given the following systems of equations with  $k$  a constant,  $f(x) = g(x) - k - 3$  : If  $f(2) = -3$ , find  $k$ .  
 $g(x) = \sqrt{3x - 2}$

5) The linear function is defined by  $g(x) = cx + d$  where  $c$  and  $d$  are constants. If  $g(32) = 52$  and  $g(24) = 20$ , find the value of  $c$ .

### 5-Digit Answer:

6) You are given the function  $f(x) = ax^3 + bx^2 + cx + d$  where  $a, b, c$ , and  $d$  are integers. Roots of the function are  $x = \frac{1}{3}$ ,  $x = \frac{-3}{2}$ , and  $x = -5$ . What is the value of  $a^2bc + d$ .