

**SOML MEET 2**  
**EVENT 2**  
**APPLICATIONS OF ALGEBRA**

**NAME:**  
**TEAM:**  
**SCHOOL:**

1. [2 Points] An equation used to relate the age of a person to the number of hours of sleep required each day is:

$$H = \frac{34 - A}{2}$$

where  $H$  represents the number of hours of sleep required and  $A$  represents the age in years. Rearrange the formula to describe the age of a person who sleeps  $A$  hours per night.

ANS: \_\_\_\_\_

2. [3 Points] A certain kind of ant can be used as a thermometer. The ant travels faster as the temperature increases. To calculate the temperature we can use the equation:  $T = 11s + 39$  where  $s$  represents the ant's speed in inches per second and  $T$  represents the temperature in degrees Fahrenheit. For what temperatures is this equation impractical?

ANS: \_\_\_\_\_

3. [5 Points] A particular photocopier can increase the length and width of an object by 5% each time a copy is made. Yukiko wants to make a very large copy of a dollar bill from one of her board games. The original size of her bill is 2.6" by 6.1" (width x length). Write an equation to describe the width ( $W$ ) of her photocopied bill after she has made  $n$  enlarged copies.

ANS: \_\_\_\_\_

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1. [2 Points] An equation used to relate the age of a person to the number of hours of sleep required each day is:

$$H = \frac{34 - A}{2}$$

where  $H$  represents the number of hours of sleep required and  $A$  represents the age in years. Rearrange the formula to describe the age of a person who sleeps  $A$  hours per night.

$$\begin{aligned}2H &= 34 - A \\-A &= 2H - 34 \\A &= -2H + 34 \\A &= -2H + 34\end{aligned}$$

$$A = -(2H - 34)$$

or

$$\underline{\text{ANS: } A = 34 - 2H}$$

2. [3 Points] A certain kind of ant can be used as a thermometer. The ant travels faster as the temperature increases. To calculate the temperature we can use the equation:  $T = 11s + 39$  where  $s$  represents the ant's speed in inches per second and  $T$  represents the temperature in degrees Fahrenheit. For what temperatures is this equation impractical?

The ant can't travel a negative speed. A speed of zero is ambiguous. So,  $s > 0$ , requiring  $T > 39$ .

$$\text{ANS: } \underline{T \leq 39^\circ\text{F}}$$

3. [5 Points] A particular photocopier can increase the length and width of an object by 5% each time a copy is made. Yukiko wants to make a very large copy of a dollar bill from one of her board games. The original size of her bill is 2.6" by 6.1" (width x length). Write an equation to describe the width ( $W$ ) of her photocopied bill after she has made  $n$  copies.

$$\text{ANS: } \quad \mathbf{W = 2.6(1.05)^n}$$