SATPREP
Assignment : ***Algebraic Absolute Inequality***

$$|n - 1| < 4$$

1. How many integers n satisfy the inequality above?
   (A) Two
   (B) Five
   (C) Seven
   (D) Nine

2. If $|x| \leq 2$ and $|y| \leq 1$, then what is the least possible value of $x - y$?
   (A) -3
   (B) -2
   (C) -1
   (D) 0

3. If $\left|\frac{1}{2}x\right| \geq \frac{1}{2}$, then which statement must be true?
   (A) $x \leq -2$ or $x \geq 2$
   (B) $x \leq -1$ or $x \geq 1$
   (C) $x \leq -\frac{1}{2}$ or $x \geq \frac{1}{2}$
   (D) $-1 \leq x \leq 1$

4. If $\frac{1}{2}|x|$ and $|y| = x + 1$, then y^2 could be
   (A) 2
   (B) 3
   (C) 4
   (D) 9

5. In a certain greenhouse for plants, the Fahrenheit temperature, F, is controlled so that it does *not* vary from 79° by more than 7°. Which of the following best expresses the possible range in Fahrenheit temperatures of the greenhouse?
   (A) $|F - 79| \leq 7$
   (B) $|F - 79| > 7$
   (C) $|F - 7| \leq 79$
   (D) $|F - 7| > 79$

6. If $\frac{|a + 3|}{2} = 1$ and $2|b + 1| = 6$, then $|a + b|$ could equal any of the following EXCEPT
   (A) 1
   (B) 3
   (C) 5
   (D) 7

7. For what value of x is $|1 + x| = |1 - x|$?

(A) No value
(B) 1
(C) −1
(D) 0

$$-1 < x < 3$$

8. The inequality above is equivalent to which of the following?

(A) $|x - 1| < 2$
(B) $|x + 1| < 2$
(C) $|x - 2| < 1$
(D) $|x + 2| < 1$

9. A certain medication must be stored at a temperature, t, that may range between a low of 45° Fahrenheit and a high of 85° Fahrenheit. Which inequality represents the allowable range of Fahrenheit temperatures?

(A) $|t - 65| \leq 20$
(B) $|t + 20| \leq 65$
(C) $|t + 65| \leq 20$
(D) $|t - 20| \leq 85$

10. The inequality $|1.5C - 24| \leq 30$ represents the range of monthly average temperatures, C, in degrees Celsius, during the winter months for a certain city. What was the lowest monthly average temperature, in degrees Celsius, for this city?

(A) –4
(B) 0
(C) 6
(D) 9

Grid-In

$$|t - 7| = 4$$

$$|9 - t| = 2$$

1. What value of t satisfies both of the above equations?

2. If $|-3y + 2| < 1$, what is one possible value of y?

3. If $|x - 16| \leq 4$ and $|y - 6| \leq 2$, what is the greatest possible value of $x - y$?

4. An ocean depth finder shows the number of feet in the depth of water at a certain place. The difference between d, the actual depth of the water, and the depth finder reading, x, is $|d - x|$ and must be less than or equal to $0.05d$. If the depth finder reading is 620 feet, what is the *maximum* value of the actual depth of the water, to the *nearest* foot?