Graded quiz on Sets, Number Line, Inequalities, Simplification, and Sigma Notation

CALIFICACIÓN DEL ÚLTIMO ENVÍO

100%

1. Let $B = \{3, 5, 10, 11, 14\}$. Is the following statement true or false: $3 \notin B$

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   ○ True

   ◉ False

   ✓ **Correcto**

   The symbol $\notin$ stands for "is not an element of." Since 3 is in an element of the set B, the given statement is not true.

2. Let $A = \{1, 3, 5\}$ and $B = \{3, 5, 10, 11, 14\}$. Which of the following sets is equal to the union $A \cup B$?

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   ○ $\{1, 10, 18\}$

   ○ $\{3, 5, 10, 11, 14\}$

   ◉ $\{1, 3, 5, 10, 11, 14\}$

   ○ $\{1, 3, 5, 3, 5, 10, 11, 14\}$

3. How many real numbers are there between the integers 1 and 4?

○ 2

◉ Infinitely many

○ 4

○ None

✓ **Correcto**

There are in fact infinitely many real numbers
between any pair of distinct integers, or indeed any pair of distinct real numbers!

4. Suppose I tell you that x and y are two real numbers which make the statement $x \geq y$ true. Which pair of numbers ___cannot___ be values for x and y?

○ $x = 2$ and $y = 1$

○ $x = 10$ and $y = 10$

◉ $x = -1$ and $y = 0$

○ $x = 5$ and $y = 3.3$

✓ **Correcto**

Recall that the statement $x \geq y$ means that x is either equal to y or x is to the right of y on the
real number line. Since -1 is actually to the left of 0, these cannot be values for x and y.

5. Suppose that z and w are two positive numbers with $z < w$. Which of the following inequalities is false?

- ○ $-z > -w$
- ⦿ $-5z < -5w$
- ○ $w - 7 > z - 7$
- ○ $z + 3 < w + 3$

✓ **Correcto**

If we start with $z < w$ and multiply both sides by -5, we need to flip the less-than sign, which would give $-5z > -5w$. For an example, try $z = 1$ and $y = 2$ and see what happens!

6. Find the set of all x which solve the inequality $-2x + 5 \leq 7$

- ⦿ $x \geq -1$
- ○ $x \geq -6$
- ○ $x = -1$
- ○ $x \leq -1$

✓ **Correcto**

Subtracting 5 from both sides of the given inequality gives $-2x \leq 2$. Then we divide both sides by -2, remembering to flip the inequality sign, and we obtain this answer

7. Which of the following real numbers is not in the closed interval $[2, 3]$

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◉ 1

○ 2.1

○ 2

○ 3

✓ **Correcto**

Recall that the closed interval $[2, 3]$ consists of all real numbers x which satisfy $2 \leq x \leq 3$. Since $2 \leq 1$ is false, $1 \notin [2, 3]$

8. Which of the following intervals represents the set of all solutions to:

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$-5 \leq x + 2 < 10$?

○ $[-5, 10)$

○ $(7, 8)$

○ $[-7, 8]$

◉ $[-7, 8)$

9. Which of the numbers below is equal to the following summation: $\Sigma_{k=2}^{5} 2k$?

○ 14

○ 10

○ 4

◉ 28

✓ **Correcto**

We compute $\Sigma_{k=2}^{5} 2k = 4 + 6 + 8 + 10 = 28$.

10. Suppose we already know that $\Sigma_{k=1}^{20} k = 210$. Which of the numbers below is equal to $\Sigma_{k=1}^{20} 2k$?

◉ 420

○ 210

○ 2

○ 40

✓ **Correcto**

By applying one of our Sigma notation simplification rules, we can rewrite the summation in question as $2\left(\Sigma_{k=1}^{20} k\right) = 2 \times 210 = 420$.

11. Which of the numbers below is equal to the summation $\sum_{i=2}^{10} 7$?

- ○ 70
- ● 63
- ○ 48
- ○ 7

> ✓ **Correcto**
>
> According to one of our Sigma notation simplification rules, this summation is just equal to 9 copies of the number 7 all added together, and so we get $9 \cdot 7 = 63$.

12. Which of the following numbers is the variance of the set $Z = \{-2, 4, 7\}$?

- ● 14
- ○ 69
- ○ 42
- ○ $\sqrt{14}$

13. Which of the following sets does *not* have zero variance? (hint: don't do any calculation here, just think!)

- ◉ $\{2, 5, 9, 13\}$
- ○ $\{1, 1, 1, 1\}$
- ○ $\{0, 0, 0, 0, 0, 0, 0\}$
- ○ $\{5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5\}$

✓ **Correcto**
Intuitively, the numbers in this set are spread out.