

Topic: Trichotomy

Question: Which answer best illustrates the idea of trichotomy?

Answer choices:

- A If $a = b$ and $b = c$, then $a = c$
- B If $x \not\geq y$, then $x < y$
- C If $x > y$, then $x > y$
- D $x = 3$



Solution: B

Trichotomy is the idea that the relationship between two numbers a and b is always defined in one of three ways,

$$a > b$$

$$a = b$$

$$a < b$$

Answer choice B illustrates the trichotomy rule by saying that if $x \not> y$ and $x \neq y$, then it must be true that $x < y$, because we've removed two of the three options in the trichotomy, leaving only one option.



Topic: Trichotomy**Question:** Solve the inequality.

$$4(1 - x) \nlessgtr 5(2 - x)$$

Answer choices:

A $x < -6$

B $x \nlessgtr -6$

C $x > 6$

D $x < 6$



Solution: C

Expand both sides using the Distributive Property.

$$4(1 - x) \not\leq 5(2 - x)$$

$$4 - 4x \not\leq 10 - 5x$$

Combine like terms.

$$4 - 4x - 4 \not\leq 10 - 5x - 4$$

$$-4x \not\leq 6 - 5x$$

$$-4x + 5x \not\leq 6 - 5x + 5x$$

$$x \not\leq 6$$

If x is not less than 6 and also not equal to 6, the trichotomy law tells us that it must be greater than 6. Therefore, we can rewrite the solution as

$$x > 6$$



Topic: Trichotomy**Question:** Solve the inequality.

$$-2(3 - x) \not\leq 3(5 - x) + 4x$$

Answer choices:

A $x > 21$

B $x > 9$

C $x > 3$

D $x < 21$



Solution: A

Expand both sides using the Distributive Property.

$$-2(3 - x) \not\leq 3(5 - x) + 4x$$

$$-6 + 2x \not\leq 15 - 3x + 4x$$

Combine like terms.

$$-6 + 2x \not\leq 15 + x$$

$$-6 + 2x - x \not\leq 15 + x - x$$

$$-6 + x \not\leq 15$$

$$-6 + 6 + x \not\leq 15 + 6$$

$$x \not\leq 21$$

Since x isn't less than 21 and also isn't equal to 21, it can only be greater than 21, according to the trichotomy law.

$$x > 21$$

