WRITE IT DOWN!

Sentence Frame: **Sets without Closure**

The set _____ is a subset of the real numbers, which is not closed under _____. We provide a counterexample to prove our claim. The numbers _____ and _____ are elements of _____, but if we _____ then the result is _____ , which is a real number but not a member of the _____.

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$(-\infty, 8]$

$x \leq 8$

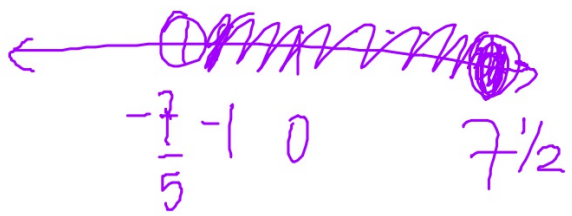
x is $\underbrace{\text{less than or equal}}_{\text{at most}}$ to 8.

Closed, because the endpoint has a bracket and it is unbounded → means infinity covers all points left.

Unbounded because one side goes to infinity.

$$-\frac{7}{5} < x \leq \frac{15}{2}$$

$$\left(-\frac{7}{5}, \frac{15}{2}\right]$$



half open b/c one end has a parethesis (not included) and one has a bracket [included].

Bounded because there are two finite endpoints.

AM: Properties of real numbers

1. Which property is illustrated by the following statement?
$(a+b)c=(b+a)c$

[A] commutative property

[B] inverse property

[C] distributive property

[D] associative property

LO: The order of a&b changes between expressions, which means this is an illustration of the commutative property.

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AM: Properties of real numbers

2. Which property is illustrated by the following statement? If $t > u$ and $u > v$, then $t > v$.

[A] Commutative Property of Inequality

[B] Associative Property of Multiplication

[C] Transitive Property of Inequality

[D] Associative Property of Addition

Equality

If $u = v$ & $v = w$

then $u = w$

LO: This is an example of the transitive property.

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AM: Properties of real numbers

3. What property is illustrated by the fact that $(47 + 92) + 46 = 47 + (92 + 46)$?

[A] Closure Property for Addition

[B] Associative Property for Addition

[C] Commutative Property for Addition

[D] Identity Property for Addition

LO: The grouping changes between expressions, which means this is an illustration of the associative property.

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AM: Properties of real numbers

4. What property is illustrated by the fact that $43 \cdot 36 = 36 \cdot 43$?

[A] associative property of multiplication

[B] distributive property

[C] commutative property of multiplication

[D] identity property of multiplication

LO: The order changes between expressions, which means this is an illustration of the commutative property.

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Properties of the Additive Inverse

WRITE IT DOWN!

Let u, v, and w be real numbers, variables, or algebraic expressions.

Property	Examples
1. $-(-u) = u$	$-(-\pi) = \pi$
2. $(-u)v = u(-v) = -uv$	$(-7.6)(3) = 7.6(-3) = -(7.6 \cdot 3) = -7.6$
3. $(-u)(-v) = uv$	$(-5)(-\sqrt{2}) = 5\sqrt{2}$
4. $(-1)u = -u$	$(-1)r = -r$
5. $-(u+v) = (-u)+(-v)$	$-(5+d) = -5+(-d)$

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Academic Conversation - Fishbowl

$a) -4[-3+x] = 6+(x+1)$ Commutative Property of Addition

$b) -4[x+(-3)] = 6+(x+1)$ Associative Property of Addition

$c) -4[x+(-3)] = (6+x)+1$ Commutative Property of Addition

$d) -4[x+(-3)] = (6+x)+1$ Associative Property of Addition

$e) -4[x+(-3)] = (x+6)+1$ Distributive over Addition

$f) -4[x+(-3)] = x+(6+1)$ Closure & Additive Inverse

$g) -4x+12 = x+(6+1)$ Additive Inverse

$h) -4x+12 = x+7$ Additive Inverse

$i) -4x+5 = x$ Multiplicative Inverse

$j) 5 = 5x$

$k) 1 = x$

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