

## 2.1 Properties of Order & Absolute Values

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### Properties of Order:

- 1) Trichotomy property- for all real #'s  $a$  and  $b$ , then either  $a < b$ ,  $a > b$ , or  $a = b$ .
- 2) Transitive property of order- for all real #'s  $a$ ,  $b$ , and  $c$ , if  $a < b$  and  $b < c$ , then  $a < c$ .
- 3) Addition property of order- for all real #'s  $a$ ,  $b$ , and  $c$ , if  $a < b$ , then  $a + c < b + c$ .
- 4) Multiplication property of order- for all real #'s  $a$ ,  $b$ , and  $c$ , if  $a < b$  and  $c > 0$ , then  $ac < bc$  or if  $a < b$  and  $c < 0$ , then  $ac > bc$ .

Definition of Absolute value- for every value of a then,

$$|a| = \begin{cases} a & \text{if } a \geq 0 \\ -a & \text{if } a < 0 \end{cases}$$

Simplify the absolute values expressions:

Ex1:  $|2 - \pi|$  <sup>Neg</sup> =  $-(2 - \pi)$   
 $-2 + \pi = \pi - 2$

Ex4:  $|x - 7|$  <sup>Neg</sup> =  $-(x - 7)$   
 for  $x < 7$   
 $-x + 7$   
 $7 - x$

Ex2:  $|\sqrt{12} + 2|$  <sub>pos</sub> =  $\sqrt{12} + 2$   
 $2\sqrt{3} + 2$

Ex5:  $|-3 - \pi| + 7 = \pi + 10$

Ex3:  $|p^2 + 10|$  <sub>pos</sub> =  $p^2 + 10$

$-(3 + \pi) + 7 = 3 + \pi + 7$

## Properties of Absolute Values:

$$|a| \geq 0$$

$$|a| |b| = |ab|$$

$$|-a| = |a|$$

$$\left| \frac{a}{b} \right| = \frac{|a|}{|b|}$$

$$|a+b| \leq |a| + |b| \quad (\text{Triangle Inequality})$$

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